

Final Environment Impact Assessment Report

For

Proposed Project of Bio Medical Waste Treatment Facility
with Incinerator capacity of 330 Kg/hr

At

Sy. No. 7/1 & 8/1, Tana Annavaram Village, Nuzendla Mandal,
Guntur District, Andhra Pradesh

Plot Area- 3.3 acres (13354.6 m²)

[ToR LETTER NO: SEIAA/AP/GNT/IND/05/2016/84 on Dated 10/10/2018 and
Amended granted in Minutes of 114th Meeting of SEIAA, Andhra Pradesh]

Monitoring done by M/s. Team Lab and consultants (Certificate No. TC-5087)

[Category "B", Project or Activity 7(da)]



APPLICANT

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ENPRO Enviro Tech & Engineers Pvt. Ltd.

(QCI-NABET ACCREDITATION NO. NABET/EIA/1922/SA 0125 valid
till 12th January, 2022)

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September 2021 (EIA Report No. EP/REIA/13)

Y.J. MULTICLAVE

BIO MEDICAL WASTE MANAGEMENT

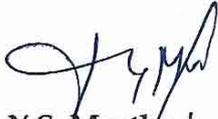
Thana Annavaram (Village), Nuzendla (Mdl), Vinukonda, Guntur (Dt), A.P.

UNDERTAKING

Subject: Submission of Final EIA for Proposed New Project of **Common Bio Medical Waste Treatment Facility** with Incinerator having capacity of 330 kg/hr, Autoclave having capacity of 250 kg/hr, Two Nos. of Shredder having capacity of 150 kg/hr each at Sy. No. 7/1 & 8/1, Tana Annavaram Village, Nuzendla Mandal, Guntur District, Andhra Pradesh.

Reference: TOR No.: SEIAA/AP/GNT/IND/05/2016/84 dated 10/10/2018
Proposal No.: SIA/AP/MIS/11338/2016

The undersigned, hereby, undertakes that the present EIA study report for proposed project of Common Bio-Medical Waste Treatment Facility (CBMWTF) of Y.J. Multiclave to be located at Sy. No. 7/1 & 8/1, Tana Annavaram Village, Nuzendla Mandal, Guntur District, Andhra Pradesh is in entire compliance with the Terms of Reference (TOR) prescribed by the contents (information and data) of the EIA report, as presented by the EIA Consultant to be true and correct


Y.S. Murthy
Proprietor

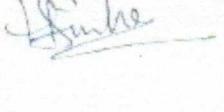
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Client	Y.J. Multiclave	
Project	Final Rapid EIA Report	
Report No.	EP/REIA/13	Rev. 01
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Declaration by Experts Contributing to the EIA Report of Y.J. Multiclave

I, hereby, certify that I was a part of the EIA team in the following capacity that developed the above EIA.

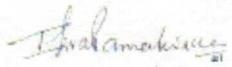
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Sr. No.	Functional Area	Name of Experts	Involvement Period	Sign
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2	Air Pollution Prevention, Monitoring & Control	Mr. Paresh Mevawala	May 2018 till date	
3	Solid Waste and Hazardous Waste Management	Mr. Paresh Mevawala	May 2018 till date	
4	Socio-Economics	Dr. Harshit Sinha	June 2018 till date	

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5	Ecology and Biodiversity	Mr. I Siva Rama Krishna	June date	2018	till	
6	Hydrology, Ground Water & Water Conservation	Mr. N.H. Reddy	June date	2018	till	
7	Geology	Mr. N.H. Reddy	June date	2018	till	
8	Meteorology, Air Quality Modelling & Prediction	Mr. Paresh Mevawala	May 2018	till date		
9	Land Use	Mr. Jada Srinivas Rao	June date	2018	till	
10	Risk Assessment & Hazard Management	Mr. Nilesh Jogal	June date	2018	till	

Y.J.Multiclave, Guntur

Certificate of Plagiarism Check

Title of EIA report	Proposed New Project of Common Bio Medical Waste Treatment Facility (CBMWTF) with Incinerator capacity of 330 kg/hr by Y.J. Multiclave
Name of Accredited organization	ENPRO Enviro Tech and Engineers Private Limited
Unique Identification Number	U29248GJ2007PTC049831
Name of the Unit	Y.J. Multiclave
Name of EC	Mr. Paresh Mevawala
Name of the software	Plagiarism Checker X
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I hereby certify that this Final EIA report has been evaluated using in-house software "Plagiarism Checker X". The report produced has been analysed by the system and based on it, I certify that Final EIA report produced in accordance with good scientific practice.



Date and sign of the EIA coordinator: 18/09/2021

Name: Mr. Paresh Mevawala

Designation: Director



Date and sign of the head of the ACO: 18/09/2021

Name of the EIA consultant organization: ENPRO Enviro Tech and Engineers Private Limited

NABET Certificate No. and Issue date: NABET/EIA/1922/SA 0125 dated 9th January 2021



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LIST OF ABBREVIATIONS USED

AAQ	AMBIENT AIR QUALITY
APPCB	ANDHRA PRADESH POLLUTION CONTROL BOARD
BDL	BELOW DETECTABLE LIMIT
BMW	BIO MEDICAL WASTE
BOD	BIOCHEMICAL OXYGEN DEMAND
CPCB	CENTRAL POLLUTION CONTROL BOARD
COD	CHEMICAL OXYGEN DEMAND
DMP	DISASTER MANAGEMENT PLAN
EC	ENVIRONMENT CLEARANCE
EHS	ENVIRONMENT, HEALTH & SAFETY
EIA	ENVIRONMENTAL IMPACT ASSESSMENT
EMP	ENVIRONMENT MANAGEMENT PLAN

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GLC	GROUND LEVEL CONCENTRATION
GPS	GLOBAL POSITIONING SYSTEM
LU	LAND USE
MOEF	MINISTRY OF ENVIRONMENT AND FOREST
KLD	KILO LITRE PER DAY
NAAQS	NATIONAL AMBIENT AIR QUALITY SYSTEM
PM	PARTICULATE MATTER
PPE	PERSONNEL PROTECTIVE EQUIPMENT
PLPL	POLLUCON ENVIRO PVT LTD
REIA	RAPID ENVIRONMENT IMPACT ASSESSMENT
R & D	RESEARCH AND DEVELOPMENT
SEAC	STATE EXPERT APPRAISAL COMMITTEE
SIA	SOCIAL IMPACT ASSESSMENT
TSDF	TREATMENT STORAGE AND DISPOSAL FACILITY
TDS	TOTAL DISSOLVED SOLIDS
WHC	WATER HOLDING CAPACITY

LIST OF SYMBOLS / NOTATIONS USED

dB(A)	Decibel
$\mu\text{g}/\text{m}^3$	Microgram per cubic meter
mg/m^3	Milligram per cubic meter
NO _x	Oxides of Nitrogen
ppm	parts per million
Kmph	Kilometer per hour
m/sec	Meter per Second

Copy of ToR Letter

o/c



State Level Environment Impact Assessment Authority (SEIAA)

Andhra Pradesh

Ministry of Environment, Forests & Climate Change,

Government of India

**D.No.33-26-14 D/2, Near Sunrise Hospital, Pushpa Hotel Centre,
Chalamavari Street, Kasturibaipet, Vijayawada-520010**

By Speed Post

Lr.No. SEIAA/AP/ GNT /IND/ 05/ 2016/ 84-

Dt:10.10.2018

To

Sri T. Hari Krishna, Manager,
M/s. YJ. Multiclave Bio Medical Waste Treatment Facility,
H.No.1-12-52, R&B Road,
Ponnur, **Guntur Ditriect – 522124.**
Andhra Pradesh.

Sir,

Sub: SEAC - A.P. – SEAC - A.P. – M/s. YJ Multiclave, Bio Medical Waste Treatment Facility at Sy.No. 7/1 & 8/1, Tana Annavaram (V), Nuzendla (M), Guntur District, Andhra Pradesh - Terms of Reference (TOR) – Issued - Reg.

Ref: 1. Your TOR Application received on 04.05.2016 (Proposal No. SIA/AP/MIS/11338/2016).
2. T.O.Letter dated. 13.07.2016 & 23.08.2018.
3. Your lr.dt. 28.05.2018.

In continuation of the above, it is to inform that your application was examined by the State Expert Appraisal Committee (SEAC) in its meeting held on 25.08.2018. *The project proponent and their consultant M/s. ENPRO Enviro Tech and Engineers Pvt. Ltd., have attended the meeting and presented their case.*

The Committee noted that M/s.Y.J. Multi Clave proposes to establish the Common Bio-medical Waste Treatment Facility (CBMWTF) of capacity - 7000 kg/day at Sy.No. 7/1 & 8/1, Tana Annavaram (V), Nuzendla (M), Guntur District, Andhra Pradesh. The project proponent submitted the In-Principle permission letter from the Andhra Pradesh Pollution Control Board only. (Lr.No.1/APPCB/HO/UH-IV/BMW/In-Principle/2018, dated 23.05.2018) and in this letter it was noted

“the total number of Health Care Facilities (HCFs) and their bed strength as per the registering authority i.e., The District Medical & Health Officer (DM&HO), (vide letter . dt.14.10.2016) – there are 541 Nos. of Private Hospitals with a Bed

Reddy

strength of 17,744 Nos. (excluding Government Hospitals i.e., HCFs covered under APVVP Area Hospitals, Director of Public Health and Family Welfare and Department of AYUSH). The existing Common Bio-medical Waste Treatment Facility(CBMWTF) in Guntur District is covering 700 Nos. of Health Care Facilities (HCFs) with 13,683 bed strength (as per BMW annual report 2016 submitted to CPCB) . There are about 4061 numbers of beds uncovered by the existing CBMWTF. There are number of VeterinaryHospitals, Dispensaries, DentalHospitals, Ayurvedic and HomeopathicHospitals which need to be covered under BMWM Rules, 2016.”

The project proponent submitted the letter issued by Office of the District Medical & Health Officer, Guntur vide letter Rc.No. Spl./A1/DRA/2018, dated 04.06.2018. The Committee noted that the proposed project falls under Item 7(da) of the schedule of the EIA Notification 2006- Common Bio-medical Waste Treatment Facility (CBWTF).

The Committee recommended for issue of **Standard Terms of Reference (TOR) with public hearing** and with additional TOR: The project proponent shall comply with the Bio-medical Waste Management Rules, 2016 and its amendments and the Central Pollution Control Board Revised guidelines - 21st December, 2016., to this Common Bio-Medical Waste Treatment Facility (CBMWTF) of Capacity – 7000 kgs/day proposed at Sy.No. 7/1 & 8/1, Tana Annavaram (V), Nuzendla (M), Guntur District, Andhra Pradesh, without prejudice to the orders of any Hon'ble Courts.

The issue was placed before the SEIAA in its meeting held on 24.09.2018 and the Authority agreed with recommendation of the SEAC, A.P for issue of Standard Terms of Reference (TOR) with public hearing and with additional TOR.

In view of the above, you are requested to prepare EIA report based on the standard TOR & said additional TOR with Public hearing and submit to the SEAC, A.P. for appraisal. The Terms of the reference are valid for a period of three years.

Yours faithfully,
Sd/-

**MEMBER SECRETARY,
SEIAA, A.P.**

//T.C.F.B.O//


P. Muna Swamy Narayana
SENIOR ENVIRONMENTAL ENGINEER (EC)

ToR Compliance

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TOR Compliance

TOR letter No.: SEIAA/AP/GNT/IND/05/2016/84 dated 10.10.2018

TOR Amendment: Minutes of 114th Meeting of SEIAA, Andhra Pradesh

Sr. No.	Compliance of Terms of Reference	Response
1	Justification for selecting the proposed capacity of the incineration facility.	Existing CBMWTF is covering 700 nos. of health care facilities with 13,683 bed strength. There are about 4061 numbers of beds uncovered by the existing CBMWTF. So there is need of another project in this region. In-principle letter No. 1/APPCB/HO/UH-IV/BMW/In-Principle/2018- dated 23/05/2018 of Andhra Pradesh Pollution Control Board attached as Annexure III. Refer Section 1.4 on page No. 1.3 in Chapter 1.
2	Establishment of the facility as per Bio-Medical Waste Management Rules, 2016.	Proposed Common Bio-Medical Waste Treatment facility will be established and operated as per the Bio-Medical Waste Management Rules, 2016.
3	Land requirement for the facility including its break up for various purposes, its availability and optimization.	Proposed project site shall be located at Sy. No. 7/1 & 8/1, Tana Annavaram Village, Nuzendla Mandal, Guntur District, Andhra Pradesh. Total land area of the project site is 13354.6 m ² . Proposed incineration plant shall be located in 1000 m ² area. 4491.9 m ² (33.63 %) land shall be allotted for green belt development. Plant layout with break-up for various facilities is presented in Section 2.4.1.1, Figure 2.1 and Table 2.4 on page Nos. 2.6 and 2.7 respectively in Chapter 2. Detailed plant out is attached as Annexure VI.
4	Details of proposed layout clearly demarcating various activities such as security.	Total site area of the project site is 13354.6 m ² . Proposed incineration plant shall be located in 1000 m ² area. Security cabin shall be located in 30.2 m ² area, Admin Office shall be located in 400 m ² and vehicle parking shall be

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		<p>located in 400 m² Treated storage room and haz. Waste storage room shall be located in 200 m² area and 120 m² area.</p> <p>Plant layout with break-up for various facilities is presented in Section 2.4.1.1, Figure 2.1 and Table 2.4 on page Nos. 2.6 and 2.7 respectively in Chapter 2 and attached as Annexure VI.</p>
5	<p>Waste Storage Rooms, Waste Treatment Equipment Rooms/Areas, Treated Waste Storage Room, Pollution Control Devices like APCS and ETP, ash storage/disposal area, vehicle washing areas and others such as admin area, worker's room, health centres, greenbelt, etc.</p>	<p>600 m² area is allotted for storage of waste. 200 m² area is provided for treated waste. Effluent treatment plant shall be located in 450 m² will consist of primary, secondary and tertiary treatment.</p> <p>120 m² area is for haz. Waste storage like incineration ash, ETP sludge etc. Administrative building shall be located in 400 m² area. 4491.9 m² (33.63 %) area of total land area shall be allotted for Green belt development plan.</p> <p>1120 m² area shall be allotted for incinerator with capacity of 330 kg/hr, Autoclave with capacity of 750 Litre and 2 nos. of Shredder with capacity of 150 kg/hr each.</p> <p>Collection, Transport and Storage presented in Section 2.6.2 on page Nos. 2.9 to 2.15 in Chapter 2.</p>
6	<p>Details on collection and transportation of Bio-Medical Waste from health care establishments. No. of vehicles and feature of vehicles, etc.</p>	<p>Waste shall be segregated in mainly four colours Yellow, Red, White (translucent) and Blue. Wastes like human anatomical waste, animal anatomical waste, soiled wastes, chemical wastes, expired discarded wastes, microbiological, biotechnology and other clinical waste will be included in Yellow category waste and will be collected in yellow coloured non-chlorinated plastic bags. Contaminated waste (recyclable) will be in Red category and will be collected in red coloured non-chlorinated plastic bags. White sharps will be segregated in White category and will be collected in</p>

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		<p>puncture proof, leak proof, temper proof containers. Glass wares and metallic body implants will be segregated as Blue category waste and will be collected in card board boxes with blue colour marking.</p> <p>More Collection, Transport and Storage presented in Section 2.6.2 on page Nos. 2.9 to 2.15 in Chapter 2 and details of no. of vehicles is given in Section 4.7.2 on page No. 4.19 in Chapter 4.</p>
7	Details of waste storage facilities/ rooms	<p>For Red, Yellow and other waste area shall be 210 m², 210 m² and 180 m² respectively. Treated waste Room shall be in 200 m². Hazardous waste storage room shall be located in 120 m².</p> <p>Please refer Figure 2.1 and Table 2.4 in Chapter 2 on page No. 2.6 and 2.7. Also refer Figure 7.1 in Section 7.1.1.1 on page No. 7.3 in Chapter 7.</p>
8	Details of the treatment equipment's capacity and make	<p>Total capacity of the proposed project will be 7 TPD in which capacity of incinerator will be 330 kg/hr, capacity of autoclave will be 750 litres and capacity of 2 nos. of shredders will be 150 kg/hr (each).</p> <p>Technical specifications of Incinerator, Autoclave and Shredder is given in Table 2.7, Table 2.8, Table 2.9 in Section 2.6.3.1, on page Nos. 2.17 to 2.20 in Chapter 2.</p>
9	Details of the incineration system - a statement on the compliance to the CPCB guidelines for common bio-medical waste incinerators in respect of waste feed cutoffs, operating parameters of combustion chambers, flue gas cleaning, ash handling, etc.	<p>Proposed incinerator will have capacity of 330 kg/hr. Venturi scrubber and packed bed scrubber will be provided with 30 m stack height for Air pollution control. Detailed Technical specifications of Incinerator is presented in Section 2.6.3.1 and Table 2.7 on page No. 2.17 in Chapter 2.</p>
10	Details on fuel requirement for incineration	<p>LDO will be used as a fuel for 330 kg/hr incinerator system. Furnace oil will be used as a fuel for 65 KVA D.G. However, D.G. Set will be used only during the power failure/emergency power back</p>

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		up. Please refer Table 2.10 in Section 2.7 on page no. 2.21 in Chapter 2.
11	Details on flue gas emissions discharge through stack and proposed pollution control technologies	Incinerator with capacity of 330 kg/hr will emit Particulate matter, HCL and Oxides of nitrogen. Ventury scrubber and packed bad scrubber will be provided for control of air pollution with stack height of 30 m and diameter of 400 mm. Adequate stack height will be provided to 65 KVA D.G. Set for control of Particulate matter, sulphur dioxide and oxides of nitrogen. However, D.G. Set will be operated only during power failure as an emergency power back up. Please refer Table 2.10 in Section 2.7 on page no. 2.21 in Chapter 2.
12	Details on residue/ash generation and management	90 kg/day ash will be generated from operation of incineration and will be send to TSDF site for further treatment. 15 kg/day sludge will be generated from operation of Effluent treatment plant and will be send to TSDF site for further treatment and disposal. Please refer Section 2.9 on page no. 2.28 in Chapter 2 for details of Solid and haz. Waste management.
13	Details of waste heat utilization, if any	No waste heat utilization is for proposed CBMWTF
14	Details on waste water management	Total waste water generation will be 17.3 KLD from proposed project. Out of which 15.5 KLD industrial waste water will be send to effluent treatment plant consisting of primary, secondary and tertiary treatment and 13 treated water will be reused for washing and incinerator scrubber. And domestic 1.8 KLD waste water will be send to septic tank followed by soak pit. Waste water management is presented in Section 2.8 on page no. 2.22 to 2.27 in Chapter 2.
15	Details of the proposed overall safety and health protection measures	Please refer Chapter 7.

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16	Details on source of water and power to the facility	<p>The required water shall be drawn from bore wells within the premises in addition to reuse of treated waste water. Required permission will be taken from concern authority for withdrawal of water once EC is granted for proposed project. The total water requirement is 28 KLD consisting of 15 KLD of fresh water and 13 KLD of recycled water.</p> <p>75 KVA Power shall be met from AP Transco(APTRANSCO). And one nos. of D.G. Set having capacity of 65 KVA will be used only during emergency/ power cut-off. LDO shall be used for proposed incinerator and furnace oil shall be used for D.G. Set.</p>
17	Details of the existing access road(s)/ walkways to the designed operations in the site and its layout	<p>4936.5 m² are shall be allotted to road network and open plot area. However, separate entry and exit is provided in the plant. Also, plant layout is provided as per guidelines and requirements of BMW treatment facility.</p> <p>Plant layout with break-up for various facilities is presented in Section 2.4.1.1, Figure 2.1 and Table 2.4 on page Nos. 2.6 and 2.7 respectively in Chapter 2 and attached as Annexure VI.</p>
18	Location of the incineration facility and nearest habitats with distances from the facility to be demarcated on a toposheet (1: 50000 scale).	<p>Proposed Common bio medical waste treatment facility will be located at Sy. No. 7/1 & 8/1, Tana Annavaram Village, Nuzendla Mandal, Guntur District, Andhra Pradesh. Geographical location for the proposed project is Latitude: 15°59'52.12"N, Longitude: 79°41'25.35"E. Nearest village to the project site is Tana Annavaram village at 06 km distance in SE direction. Nearest water body is Gudalkamma river at 03 km in NW direction. Nearest railway station is Vinukonda station at 9 km in NE direction and nearest airport is Vijaywada (Gunnaram) airport at 131 km in NE direction. Topomap is presented as MAP 3.2 on page no. 3.31 in Chapter 3.</p>
19	Land use map based on satellite	Landuse land cover map is presented as

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	imagery including location specific sensitivities such as national parks / wildlife sanctuary, villages, industries, etc.	Map 3.7 on page no. 3.36 in Chapter 3
20	Topography details.	Please refer Section 3.7.4.3 on page no. 3.34 in Chapter 3 for topography details.
21	Surface water quality of nearby water bodies	Two monitoring locations has been selected for surface water monitoring. One is Gundlakamma river upstream and second is Gundlakamma downstream. Results for Surface water quality is presented in Section 3.3.2 and Table 3.3. on page no. 3.5 in Chapter 3.
22	Details on proposed groundwater monitoring wells, locations, frequency of monitoring, parameters, etc.	8 different monitoring location has been selected for ground water monitoring locations. 1 is tube well and 7 others are bore wells from different locations. Results for ground water quality is presented in Table 3.4 in Section 3.3.2 on page no 3.7 in Chapter 3.
23	Action plan for the greenbelt development in accordance to CPCB published guidelines	4491.9 m ² (33.63 %) of total plot area has been allotted for green belt development plan. Details of plantation, landscaping and greenbelt development is given in Section 10.5.4, Table 10.2, Table 10.3 and Table 10.4 on page Nos. 10.8 to 10.11 in Chapter 10.
24	Details on pollution control technologies and online monitoring equipments.	Ventury scrubber and packed bed scrubber will be provided for control of PM, HCL and NOx with stack height of 30 m and diameter of 400 mm for incinerator. Adequate stack height will be provided for D.G. Set. However, D.G. Set will be used only during power cut-off as an emergency power backup. Details on pollution control technologies is given in Section 2.7 on page No. 2.21 in Chapter 2.
25	Details on monitoring of pollutants at source - performance of incinerator including operating hours, fuel consumption, operating parameters (combustion chamber - temperature,	Unit has allotted INR 3.5 Lakhs for post project environmental monitoring plan. Detailed Monitoring plan is given in Section 6.2 on page Nos. 6.1 to 6.4 in

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	pressure, stack temperature, total particulate matter, HCl, NO _x) as per Bio-Medical Waste Management Rules, 2016	Chapter 6.
26	Stack and fugitive emissions may be monitored for SPM, HCl & NO ₂ as per Bio-Medical Waste Management Rules, 2016	Detailed Monitoring plan is given in Section 6.2 on page Nos. 6.1 to 6.4 in Chapter 6.
27	Specific programme to monitor safety and health protection of workers	Frequency of Health Monitoring for regular employee is once in year and for contract base employee it is once in a six month as mentioned in Section 10.5.5 on page no. 10.12 in Chapter 10
28	Details of administrative and technical organizational structure	Details of EHS Cell is presented in Section 10.3.3 on page no. 10.2 in Chapter 10.
29	EMP devised to mitigate the adverse impacts of the project should be provided along capital and recurring costs.	Cost Estimate for Environment Management Plan is around INR 80 lakhs and details for the same is presented in Section 10.6.1 on page no. 10.15 in Chapter 10.
30	Details of the emergency preparedness plan and on-site & off-site disaster management plan	Disaster Management Plan is presented in Section 7.1.5 on page No. 7.19 in Chapter 7.

EXECUTIVE SUMMARY

(English)

for

PROPOSED COMMON BIO MEDICAL WASTE TREATMENT FACILITY

with incinerator capacity of 330 kg/hr

at

Y.J. Multiclave

Sy. No. 7/1 & 8/1, Tana Annavaram Village, Nuzendla Mandal,
Guntur District, Andhra Pradesh.

As per 7(da) of Schedule to EIA Notification dated 14thSeptember, 2006 Category B

EIA Consultant



ENPRO Enviro Tech and Engineers Pvt. Ltd.

(QCI-NABET Accreditation vide Certificate No. NABET/EIA/1922/SA 0125 valid till
12thJanuary, 2022)

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ENPRO Enviro Tech and Engineers Pvt. Ltd.			
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EXECUTIVE SUMMARY

1. INTRODUCTION

M/s. Y.J. Multiclave has proposed Common Bio Medical Waste Treatment Facility at Sy. No. 7/1 & 8/1, Tana Annavaram Village, Nuzendla Mandal, Guntur District, Andhra Pradesh. The proposed project falls under item 7(da) of Schedule to EIA Notification dated 14th September, 2006, i.e. Bio Medical Waste Treatment Facilities, under Category - "B".

In order to assess the potential environmental impacts arising due to proposed project, the promoter has assigned the work of EIA study to M/s. ENPRO Enviro Tech & Engineers Pvt. Ltd. (ENPRO), Surat to prepare EIA Study report for proposed common bio medical waste treatment facility. ENPRO Enviro Tech and Engineers Pvt. Ltd. is NABET Accredited organization (NABET/EIA/1922/SA 0125 validity till January 12, 2022) under this sector. ENPRO entered into agreement with TEAM Labs and Consultants, Hyderabad for use of base line monitoring data for the period post monsoon season 2018. TEAM labs and consultants, Hyderabad is NABL accredited laboratory (Certificate No. TC-5087) and recognized by MoEF & CC. ENPRO TEAM visited site and carried out ground survey for the various aspects to be covered in EIA Report.

2. PROJECT DESCRIPTION

2.1 Need of the Project

At present there is an existing CBMWTF operated by Safe Environ in Guntur district catering to treatment and disposal of Bio-Medical Waste in the district. However, as per letter No. 1/APPCB/HO/UH-IV/BMW/In-Principle/2018- dated 23/05/2018 of Andhra Pradesh Pollution Control Board, the existing CBMWTF is covering 700 nos. of health care facilities with 13,683 bed strength (as per BMW annual report 2016 submitted to CPCB). There are about 4061 numbers of beds uncovered by the existing CBMWTF. So, there is need of another project in this region. In addition, there are number of veterinary hospitals, dispensaries, dental hospitals, Ayurvedic and Homeopathic hospitals which need to be covered under BMWM Rules, 2016. Copy of this letter is enclosed in Final EIA Report.

2.2 Location & Study Area

Proposed Common Bio Medical Waste Treatment Facility shall be set up at Sy. No. 7/1 & 8/1, Tana Annavaram Village, Nuzendla Mandal, Guntur District, Andhra Pradesh.

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SALIENT FEATURES IN STUDY AREA OF PROPOSED PROJECT

Particulars	Details	Approx. Distance from Project Site
Geographical Co-ordinates	Latitude: 15°59'52.12"N, Longitude: 79°41'25.35"E	-
Village /City / Industrial Area	Tana Annavaram Village	0.60 km (NE)
District	Guntur District	-
Nearest Water body	Gudlakkama river Krishna River Bay of Bengal	0.30 km (NW) 57 km (NW) 71.2 km (SE)
Nearest Highway	State Highway 42 & 50 National Highway 16	1.66 km (NW) 41.14 km (ESE)
Nearest Railway station & Railway line	Vinukonda railway station	9 km (NE)
Nearest Airport/ Airbase	Vijaywada (Gannavaram) airport	131 km (NE)
Protected Area/ Sanctuaries	No	-
CRZ applicability	No	-

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

2.3 Salient Features of the Proposed Project

Proposed Capacity of Common Bio Medical Waste Treatment Facility	7 TPD
Proposed Capacity of Incinerator Autoclave Shredder	330 Kg/hr 750 lts. 2 nos. x 150 Kg/hr
Proposed Capacity of Effluent Treatment Plant	Flow rate: 15.5 KLD Design Capacity: 20 KLD
Cost of Proposed Project	Rs. 2.32 crores (including cost of land)
Allocation for CSR Activities	Rs. 4,70,000 for next 5 yrs for required activities such as: i) Technical Training Centres (I.T.I)/Govt. School Funds; ii) Health Care Centres/Medical Camps; iii) Swachh Bharat Mission.
Estimated Manpower Required	During construction – 07 During Commissioning - 07 During operation - 03 - Managerial 13 - Skilled & Unskilled Workers
Area of Land	13354.6 m ² - for proposed project
Area of Green-Belt	4491.9 m ² (33.63 %)
Water Requirement - Total Domestic	28 KLD (15 KLD Fresh + 13 KLD Recycled) 2 KLD

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	Gardening Industrial Washing Scrubber for Incineration	2 KLD 3 KLD 21 KLD
Source of Water -	Recycled Fresh	13 KLD 15 KLD (from local village authority)
Waste water Generation	Industrial Domestic	17.3 KLD 15.5 KLD (2.5 KLD Washing + 13 KLD Incineration Scrubber) 1.8 KLD
Mode of Treatment	Industrial Domestic	Sent to Effluent Treatment Plant and treated waste water reused for washing and incineration scrubber Septic tank followed by soak pit
Power Requirement		75 KVA
Source of Power Supply		AP TRANSCO
Emergency Power Supply		1 Nos. D.G. Sets – 65 KVA each
Fuel Requirement	Furnace oil for DG Set	16.3 Litres/Hr
Treatment Chemicals	Caustic Lye PAC Poly Electrolyte Sodium Hypo Chlorite (10% Solution)	2500 kg/month 100 kg/month 50 kg/month 100 kg/month
Sources of Gaseous Emissions		Incinerator - 330 kg/hr D.G. Sets - 1 nos. – 65 KVA (stand-by)
Air Pollution Control Measures		Ventury Scrubber and Packed Bed Scrubber to incinerator
Solid / Hazardous Waste Generation		36.2 – Ash - 90 kg/day 34.3 - ETP Sludge - 15 kg/day Plastic, Glass and metallic body, metal sharps, waste after autoclave and shredding – 3 T/Day Spent activated carbon – 50 kg/month Sharps after autoclave and shredding – 5 kg/day 5.1 – Waste oil - 15 L/Month Used Batteries – 4 nos./Year
Solid / Hazardous Waste Disposal		36.2 – Send to TSDF site 34.3 - Send to TSDF site Waste from Shredder – Send to Authorized Recyclers Spent Activated Carbon – TSDF site Sharps after Autoclave and shredding – Sent to iron foundry/TSDF site 5.1 – Send to Authorized Recyclers Used Batteries – Send to Authorized Recyclers

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2.4 Process Description

A. Incineration System

The waste shall be conveyed on a belt and charged into the Primary Chamber of incinerator through the charging door. The primary chamber shall be lined with refractory and insulation bricks of IS-8 & IS-2042 standards. The air required for volatilization shall be supplied through an air duct and introduced through equally placed nozzles. Airflow shall be controlled with the help of air dampers. The primary chamber shall be fitted with a fuel oil burner, which shall have necessary instrumentations to function automatically. A forced draft fan shall be used to provide for combustion/volatilization of air. This fan shall also supply air required for the dilution of flue gases before venturi scrubber. The combustion air shall be controlled to have minimum turbulence, restricting fly ash. The fly ash collected in Primary Chamber shall be removed from the dashing door. Inside primary chamber a min. of 800 °C ± 50 °C temperature shall be maintained.

The volatiles/gases emitted from the primary chamber shall pass through the neck of the secondary chamber, which shall also be lined with refractory and insulation bricks. The secondary chamber will be designed to ensure that flue gas residence time of min. two seconds is provided. The secondary chamber will operate at a temperature of 1050 °C ± 50 °C. The gases will be completely burnt and safe gases then shall be let out of the incinerator unit.

The volatile matter has a low flash point and hence gets liberated in the primary combustion chamber. This shall later be burnt in the secondary chamber at a high temperature and in the presence of excess air. Fixed carbons are the non-volatile portion of the waste and are completely incinerated in primary chamber only. The moisture present in the waste is evaporated in the primary chamber and passes through the secondary chamber and gets released as super-heated water vapour. Sterilized ash and non-combustible material shall remain in the primary chamber. To prevent them from flying out along with gases, non-turbulent conditions shall be maintained in the primary chamber. Depending upon the type of waste destroyed in the incinerator the sterile ash content ranges between 5-10 %.

The flue gases then pass through the downstream air pollution control system, consisting of high pressure drop Venturi Scrubber for removal of particulate matter and partially acidic gases by absorption with caustic solution and removal of balance acidic gases in packed bed scrubber. Then gases are let out through an I.D. fan followed by 30 m height stack.

B. Autoclave

The primary purpose of autoclave is to sterilize / disinfect the waste with steam. Microorganisms which contribute to infection do not survive beyond 80 °C. However, as a precaution, Bio-Medical Waste (Management & Handling) Rules, 2016 has stipulated a temperature of 121 °C with 15 psi pressure and 60 min. duration to ensure distribution of temperature. At this temperature and pressure, microorganisms are completely destroyed and thus render the wastes infection free. The disinfected waste shall then 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

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medical / food grade purposes. All the process control conditions will be as per the applicable Bio-medical Waste Rules. It is proposed to install a horizontal rectangular autoclave with single hinge door. Capacity of autoclave shall be 750 L.

C. Shredding

Medical waste that is subjected to an autoclave is often also subjected to a compaction process, such as shredding, after treatment so that it is no longer recognizable and cannot be re-used for 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 disposed to landfill. 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. Shredder is equipped with hopper of adequate size to accept the material to be shredded. The hopper is also provided with a lid, which can be locked during operation. The hopper is well designed to take care of volume and weight of the material. The hopper directs the materials to the cutting chamber. The shredded waste is then packed in black coloured HDPE bags.

3. Description of Environment

The baseline environmental status in the study area was studied for the various environmental attributes, as delineated in TOR, between 1st October, 2018 and 31st December 2018 at different locations, including the proposed project site. The noise levels were measured and water, soil and air samples were collected and analysed by NABL approved laboratory, M/s. Team Labs & Consultants [NABL accreditation TC-5087]. All the samples were collected, preserved and analysed as per the standard procedures / methods.

Sr.	Environmental Attributes	Baseline Status
1.	Ambient Air Quality	6 stations - at proposed project site & nearest residential area in downwind direction & crosswind directions
	Observation - PM ₁₀ PM _{2.5} SO ₂ NO _x VOC	41 to 52 µg/m ³ 14 to 16 µg/m ³ 9 to 12 µg/m ³ 9 to 14 µg/m ³ Below Detectable Limit
	Inference	All results were within NAAQ permissible limits
2.	Meteorological Status	Meteorological data for period of 1 st October, 2018 to 31 st December, 2018 was given by NABL approved laboratory M/s. Team Labs and Consultants.
	Observation	Post monsoon season Pre-dominant wind – South-East to North-West Calm – 5.89 % Average wind speed – 2.25 m/s Maximum wind speed – 6.7 m/s Temperature range – 22.6 to 33.6 °C

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Sr.	Environmental Attributes	Baseline Status
		Relative Humidity range - 52 to 71 %
	Inference	Nearest residential area is 0.6 km NE of proposed project site. There are 2 reserved forests within the study area - Pamidipadu R.F. at 9.6 km and Vinukonda R.F. at 7.96 km in North direction.
3.	Water Quality	Surface water samples were collected from 2 different sources – Gudlakamma upstream and down stream Ground water samples were collected from 1 Tube well & 7 different Hand pumps.
	Observation	It was observed that Surface water sources has DO and BOD levels are at permissible limit. More than 50 % of the Ground water monitoring stations results of some parameters such as TDS, Magnesium, Alkalinity, Chloride, Hardness is above desirable limit of drinking water standards (IS 10500:2012) but below permissible limit of same.
	Inference	Surface water need Water treatment plant consisting of clarification, sand filtration, carbon treatment and disinfection, before it is used as domestic purpose. Ground water can be used as drinking water after treatment through RO plant.
4.	Noise Quality	Noise levels were measured at 8 locations in study area including proposed project site
	Observation	Equivalent noise levels in the residential areas varied from 41 - 53 dB(A) during day time. Equivalent noise levels in the residential areas varied from 38 - 42 dB(A) during night time.
	Inference	All results were within CPCB permissible limits
5.	Soil Quality	Soil samples were collected from 8 locations of study area including proposed project site
	Observation - Physical	Soils are predominantly sandy loam. Porosity ranged from 46 to 60 %. Water Holding Capacity ranged from 0.22 to 12 %. Mildly acidic to mildly alkaline.
	Chemical	Electrical Conductivity ranged from 0.129 to 0.299 dS/m. Cation Exchange Capacity ranged from 2.35 to 4.93Col (+)/kg soil. Sodium content ranged from 42 to 466 mg/kg soil. Potassium content ranged from 95 to 216 mg/kg soil. Calcium content ranged from 1.23 to 18.7 mg/kg soil. Magnesium content ranged from 24 to 146 mg/kg soil. Sodium Adsorption Ratio values range from 0.56 to 5.80.
	Inference - Physical	The Cation Exchange Capacity of the soils is very low contributed mainly by potassium exchangeable ions.

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Sr.	Environmental Attributes	Baseline Status
	Chemical	The level of nitrogen in most of the soil samples is low to medium while the potassium levels are medium to high. Calcium / Magnesium ratios of the samples reflect Magnesium deficiency in 4 samples, low in Magnesium in 1 sample and low Calcium in 3 samples
6.	Land Use / Land Cover	Satellite IRS P-6 LISSIV images were obtained from National Remote Sensing Centre (NRSC) Hyderabad. Land use / land cover mapping was carried out for 10 km radius area with proposed project site at centre.
	Observation	42% of study area is agricultural fallow land 2% of study area has plantation 13% area has water bodies 6% area has covered with open scrub Only 9% of study area has built-up
	Inference	There is no any sanctuary or national park or other ecologically sensitive areas within study area. However, there are 2 reserved forests within the study area - Pamidipadu R.F. at 9.6 km and Vinukonda R.F. at 7.96 km in North direction.
7.	Ecology and Biodiversity	Study was carried out in core area and in buffer area in a scientific manner and ecological pursuance, validating primary data using secondary data. Biological assessment of study area was done to identify ecologically sensitive areas and to identify the presence of any Rare or Endangered or Endemic or Threatened (REET) species of flora or fauna in the study area.
	Observation - Core Zone	The proposed project site is a private land with no vegetation. Few weed species are present here. The entire area is with terrestrial vegetation is without any forest or agriculture land and it was devoid of any ecologically sensitive biological resources. No REET species present in the core zone. No migratory corridors or breeding grounds for faunal species present here. The common butterflies, dragonflies, lizards, birds and smaller mammals are observed. The most commonly seen flora in the project site are <i>Achyranthes aspera</i> , <i>Hyptis suaveolens</i> , <i>Tridax procumbens</i> . Various common types of grasses present near the site are found throughout the region. Paddy, tobacco and mirchi are mainly cultivated in the region. The faunal composition generally with arboreal and semi arboreal based animals. Some very common small animals such as rats, snakes, skinks and lizards are commonly found here. In aves, Mynas, Red vented bulbuls, Black drango and Indian Robin are present.

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Sr.	Environmental Attributes	Baseline Status
	Buffer Zone	<p>Buffer zone is mostly with human habitations and agricultural fields. <i>Azadirachta indica</i>, <i>Ficus hispida</i>, <i>Borassus flabellifer</i>, <i>Prosopis juliflora</i>, <i>Pongamia pinnata</i>, <i>Dalbergia sisoo</i>, <i>Phoenix sylvestris</i>, <i>Albizia lebbeck</i>, <i>Acacia nilotica</i> are dominant here. Eucalyptus is widely spread over buffer zone. Some scattered bushes of <i>Euphorbia tirucalli</i>, <i>Balanites roxburghii</i>, <i>Opuntia dillenii</i>, <i>Prosopis juliflora</i>, <i>Datura metel</i> and <i>Zizyphus numularia</i> are also predominant here. <i>Pergularia daemia</i> and <i>Ipomoea nil</i> are climbers commonly present here. Buffer area is mainly rural environment with few aquatic bodies. Most of the region is covered with agricultural land and villages. Hence, vegetative survey was mainly conducted near road side, pond side and near agricultural areas. There are no endangered and endemic plants present in the buffer and core zones. There are few medicinal, timber / fuel wood, fodder and other socio-economic purposes. The faunal composition was also estimated based on the direct and indirect evidences.</p>
	Inference	<p>There is good potential diversity within study area means no individual or few tree species are occurred continuously and species are evenly distributed in core and buffer zones.</p> <p>None of the terrestrial species in study area are under endangered and threatened species.</p>
8.	Geology	<p>The study area is underlain by different geological formations comprising oldest Archaeans to Recent fluvial alluvium. The Archaean basement complex comprising the granitegneisses, schists and basic dykes of dolerites form the predominant rock types. The Nallamalla hill ranges occurring 10 km west of the Vinukonda area forming the relief areas. These are the Proterozoic sediments of Upper Cuddapah Supergroup and Kurnool Group comprising the quartzites, schists, shales and limestones. These are unconformably resting over the crystalline rocks of Archaean age. Recent Alluvium occurs along the Gundlakamma River course and its tributaries and stream courses and ranges from few to tens of meters in thickness. The fluvial (river) alluvium forming the unconsolidated sediments comprise of rock, sand, silt and clay sediments in varying amounts with variable effective porosity and permeability.</p>
	Hydrology	<p>The study area is mainly comprised of semi-consolidated to unconsolidated formations. The chief sources of surface irrigation are through canals and tanks and are harnessed by major, medium and minor irrigation</p>

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		schemes. Ground water is developed by means of dug wells, bore wells, tube wells and filter point wells in the district. The depth of the bore wells in the Archaean crystallines (esp. granite gneisses) varies from 40 to >150 m, and even some were drilled down to 200 m. The depth of weathering ranges between 5.5 and 15 m bgl. The ground water yields generally range from < 1.0 lps to 3.0 lps (liters per second), with some instances of upto 5.0 lps. The depth of dug wells ranges between 10 to 30 m yielding 1.5 to 75 cu.m/day with the average pumping of 4-5 hrs/day. Unless those situated near to canal commands and river/stream courses, the dug wells go almost dry during the pre-monsoon times and reaching shallow levels of < 5.0 m bgl during post monsoon season. The depth to water level in the fluvial alluvium areas of Gundlakamma river system usually ranges from ground level to 4 to 12 m bgl with poor to moderate discharges.
	Inference	CGWB has categorized this area as "safe" with the stage of ground water utilization of 14 %, indicating good scope for further ground water development in as per Ground water Assessment 2009
9.	Socio-Economic Status	Primary data was collected from 10 % sample villages and correlated with secondary data
	Observation	A total of 20 villages falls fully or partially in the radial distance of 10 km from the proposed project site of M/s. Y.J. Multiclave at Sy. No 7/1 and 8/1, Tana Annavaram Village, Nuzendla Mandal, Guntur District, Andhra Pradesh. Among these, 50% villages fall in Nuzendla Mandal, 25% in Vinukonda Mandal and rest 25% fall in five Mandals having one village for each Mandal (Thullur, Chebrolu, Ponnur, Rapalle, Rompicheria). The percentage of main work participation rate is highest in study area after Nuzendla mandal and lowest is in Vinukonda Mandal. The work participation rate is maximum in the village Jadavalli (63.8%) and the minimum is in village Uppalapadu (45.1%); while the average work participation rate is 55.6% in the villages located in the radial distance of 10 km from the project site. In the sample village, it was reported that the population is largely engaged in agriculture sector (51%); followed by casual labour work (23%); and petty business (12%). It is also observed that about 13% of the population is engaged in service sector, of which 4% skilled jobs and 11% are engaged in unskilled jobs. For

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Sr.	Environmental Attributes	Baseline Status
		doing the skilled jobs, by large the population migrated to other places.
	Inference	To initiate literacy program, especially for female population and sanitation system in study area, under Corporate Social Responsibility. It is to be noted that the skill gaps in the industries for persons having skilled jobs degree, are largely fulfilled by the urban areas while the persons with unskilled jobs are largely taken up from surrounding villages during construction and operation stage of the industries. 30 workers will be required in construction and operation stage. The proposed CBMW will boost growth of industries in this region resulting in direct and indirect employment and development of small-scale ancillary industries in the region. Considering absence of facilities like training centres-ITIs, Sanitation facilities and commercial banks; proponent has decided to spend total Rs. 4.70 Lakhs in next 5 years as a CSR activities which shall include technical training centres/educational support for government schools, Health care centres/Medical camps and funds for Swachh Bharat Abhiyan for nearby villages.

4. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact identification matrix has been developed by establishing cause-effect relationship between activities of proposed project and various environmental attributes.

Since the entire treated effluent will be recycled back to the industries for reuse in washing and incineration scrubber, there will be reduction in the groundwater withdrawal. Hence no major impact has been envisaged on the water resources in quantitative terms.

There will be no discharge of waste water into any water body or surface body/land, so there is insignificant effect on surface water and ground water quality.

High pressure drop Venturi Scrubber will be provided for removal of particulate matter and partial acidic gases by absorption with 5 % caustic solution, followed by packed bed scrubber for removal of complete acidic gases from flue gas. Modelling of pollutant emission (PM, HCL, NO_x) was carried out using AERMOD to assess incremental ground level concentration within study area. Incremental ground concentration due to proposed project was found insignificant in study area.

Hazardous waste generated from the facility will be disposed to TSDF site. Ash generated from incinerator and ETP sludge will be sent to TSDF site. Other waste after Autoclave and Shredding such as Plastic, Glass and metallic body, Metal Sharps and Used batteries shall be

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sent to authorized recyclers. There shall be no unscientific or improper disposal of solid / hazardous waste on land, there shall be insignificant impact on land condition.

There is insignificant effect on ecology, biodiversity, geology and hydrogeology aspects. Due to construction of CBMW there is irreversible effect on land use pattern. Excavated soil shall be reused for development of green belt at project site. Project site shall have 33% green belt cover.

All the construction and operation phase activities of the proposed project will require skilled, semi-skilled and unskilled labour, thereby creating temporary as well as permanent employment for the local people. As local people will be hired on priority basis, there shall be no influx of people in the region. Hence, the socio-cultural and economic structure within the study area is also not likely to be affected.

5. ENVIRONMENTAL MONITORING PROGRAMME

For the proposed project, monitoring activity is mainly envisaged for ambient air quality parameters, water quality, water quality, soil quality, noise levels and to collect data to keep a check on performance of CBMW facility. An effluent quality-monitoring programme will be put in place by the CBMW facility, which includes location of monitoring, frequency of monitoring and specification of parameters to be monitored in line with Central Pollution Control Board (CPCB) guidelines.

ENVIRONMENTAL MONITORING PARAMETERS & FREQUENCY

Sr. No.	Item / Attribute	Parameters	Frequency & Responsible Party
1.	Ambient Air quality	Particulate Matter [PM _{2.5}] & [PM ₁₀], Sulphur Dioxide [SO ₂], HCl, Nitrogen Dioxide [NO _x] and Carbon Monoxide	Once in 3 months at project site and at Villages within 10 KM radius (5 stations) By External Lab
2.	Emission from Stack (Incineration)	PM, HCl, NO _x , Hydrogen Floride, Total Organic Carbon	Once in 3 months By External Lab
		Dioxin & Furan	Once in a year By External Lab
3.	Emission from Stack (incineration)	CO, O ₂ (Or as added in future by CPCB)	On line monitoring (CEMS) connected to CPCB / SPCB server
4.	Work Place Monitoring	PM _{2.5} , PM ₁₀ , SO ₂ , NO _x , Noise, Temperature, Humidity.	Once in 3 Months By External Lab. Or In house by EHS Exe./Sr. Chemist

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5.	Ground Water	As per IS 10500	Twice in a year (except monsoon)
6.	Waste Water	pH, EC, Turbidity, TDS, Calcium, Magnesium, Total Hardness, Total Alkalinity, DO, COD, BOD Chlorides, Sulphates, Phosphate, Ammonia, Nitrite, oil & grease, Bio assay test (Heavy Metals if required)	Monthly by external lab
		pH, COD, TDS, BOD, Flow	Daily by internal lab (Or On line as per future guideline of CPCB)
		Flow at inlet and outlet	On line monitoring on continuous basis provided with recorder
7.	Noise	Equivalent Noise Level - dB (A) (At least 1 hr. continuous)	Once in 3 Months by external lab
8.	Soil	pH, EC, Moisture, Organic matter, N, P, K, SO ₄ -2, Cl-, Ca+2, Mg+2 & Na+	Once in a year
9.	Hazardous Waste	General Parameters	Once in a year by External Lab.
10.	Greenbelt	Number of plantation (Units), Number of Survived Plants/Trees, Number of Poor Plant/Trees	Throughout Year at regular interval: In House by EHS Executive & other EMC members
11.	Employee Medical/Health Check-up	As per statutory provision & requirement	Yearly through Approved Medical Officer & Doctor as per OHS Plan

In addition to above table, preventive maintenance plan covering all the equipment's shall be prepared and strictly followed by maintenance staff. All the details shall be maintained in log-book for efficient implementation.

The General Manager of the unit will co-ordinate all monitoring programs at the site and the data generated will be submitted regularly to the statutory agencies. Frequency of reporting shall be once in every six months to GPCB and Regional Office of MoEF & CC.

6. ADDITIONAL STUDIES

6.1 Hazard Identification, Risk Assessment and Mitigation Measures

Identification of hazards at the proposed site indicates the characteristics of hazardous wastes that pose potential for an emergency situation. At the proposed Y. J. Multiclave site, following

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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:

- Wastes produced by hospitals
- Veterinary facilities
- Medical research facilities

These wastes include both infectious ("red bag") medical wastes as well as non-infectious, general housekeeping wastes. The emission factors presented here represent emissions when both types of these wastes are combusted rather than just infectious wastes.

Hospitals, veterinary facilities, and medical research facilities dispose 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.

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.

Risk Assessment is a structured approach to identifying and understanding the risks associated with Storage and Handling of Hazardous/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. **Qualitative Risk Assessment** has been carried out by using methodology called HIRA-Hazards Identification & Risk Assessment.

Qualitative Risk Assessment has been carried out for the following areas:

1. Working at DG Set Area
2. Other Operational Activities Carried Out at Site
 - Hazardous Solid Waste transportation from generation site to HBS (Hygiene Biomed Services) site
 - Weighing and Sampling of Waste
 - Incineration
 - Autoclave
 - Shredding

Solid Waste Storage Area & Incinerator Area have been identified the potential for major hazards.

On-site injuries are very likely due to constant exposure and proximity to various chemicals, reagents, hazardous liquids and solids. Skin burns, injury to the eyes, allergies, dermatitis, etc. are the most common forms of injury. Injury by slips, trips and falls on wet floors; by falls

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into treatment ponds, pits, clarifiers or vats and by splashes of hazardous liquids; are also very commonly possible. Hazards are also likely due to leakage of untreated effluent, fire during handling of inflammable things like Fuel oil, electricity during handling heavy machines, sharp equipment etc.

All possible precautionary measures shall be taken on-site and structures to prevent any hazard. Suitable fire extinguishers along with fire and smoke detection alarm system shall be provided at various places in the plant and laboratory.

CBWM staff will be trained for safe handling of ETP chemicals and operation of treatment units. All personnel working at CBWM will be provided with necessary personnel protective equipments (PPEs). Periodical medical check-up shall be done for all employees at least once in a year.

A proper Emergency and Disaster Management Plan shall be in place and shall be accessible to the security staff and all the key personnel. The roles and responsibilities of all the key personnel shall be clearly identified and addressed to the key personnel.

7. PROJECT BENEFITS

Proposed project will help in attaining better hygienic conditions, as Bio-Medical waste shall be disposed off in scientific manner instead of dumping along with solid waste.

The proposed 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 beneficial impact of proposed project on the civic amenities will be substantial after the commencement of project activities. 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.

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 generate 30 direct and indirect employment generation during construction and operation phase.

8. ENVIRONMENTAL MANAGEMENT PLAN

Guidelines for Management, Operation and Maintenance of plant issued by Central Pollution Control Board (CPCB) will be followed to operate plant effectively and efficiently. Maintenance schedule of plant is 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

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basis for effective and efficient operation of plant. Training will be imparted to plant operating staff as well as waste transporters on regular basis.

Operator shall follow an SOP mentioning operation of bio medical waste facility and also shall inform prescribe authority about occupiers who are not sending segregated Bio Medical waste as per rules. Operator shall maintain all the records for operation of incinerator, shredder and autoclaving.

Occupiers who are giving waste, will be allowed to inspect site and see whether operator is carrying out treatment properly or not. Facility shall supply non-chlorinated plastic coloured bags to authorized occupier if required and shall collect bio-medical waste during holiday period as well.

In case for any reason if it becomes necessary to store waste beyond such a period, the occupier shall be trained to take appropriate measures to ensure that the waste does not adversely affect human health and the environment. Occupier should inform prescribed authority along with the reasons for doing so.

8.1 Environmental Management Cell

The overall management of the project will be looked after by Managing Director. The technical and scientific staff will be appointed under General Manager.

- Qualified and experienced personnel in the field of environment pollution control shall be recruited as a plant in-charge for overall responsibility for plant operation and for looking after Environment, Health and Safety aspects of the plant. Plant in-charge will be responsible for collection, transportation and receipt of waste at site.
- Account and HR Manager and Environmental Manager will report to General Manger and will support for better implementation of EMP.
- Environmental Manager who is also responsible for Environment, Health and Safety will look after all statutory compliances associated with plant operation and environmental Manager will be directly reporting to General Manger.
- Lab In-charge will be reporting Environmental Manager and will be responsible for implementation of Environmental Monitoring Plan.
- Plant Operators will be reporting to plant in charge as well as Shift in-charge and will be responsible for operation and maintenance of the facility in each shift of operation.

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CHAPTER 1 INTRODUCTION

1.1 BACKGROUND

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 from health care facilities causes a direct health impact on the community, the health care workers and on the environment. Indiscriminate disposal of bio-medical wastes and exposure to such wastes poses serious threat to environment and to human health and so 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.

Y.J. Multiclave proposes to establish a Common Bio-Medical Waste Treatment Facility (CBMWTF) at Sy. No. 7/1 & 8/1, Tana Annavaram Village, Nuzendla Mandal, Guntur District, Andhra Pradesh. Geographical location of project site is Latitude: 15°59'52.12"N, Longitude: 79°41'25.35"E.

At present there is an existing CBMWTF operated by Safe Environ in Guntur district catering to treatment and disposal of Bio-Medical Waste in the district. However, as per letter No. 1/APPCB/HO/UH-IV/BMW/In-Principle/2018- dated 23/05/2018 of Andhra Pradesh Pollution Control Board, the existing CBMWTF is covering 700 nos. of health care facilities with 13,683 bed strength (as per BMW annual report 2016 submitted to CPCB). There are about 4061 numbers of beds uncovered by the existing CBMWTF. So there is need of another project in this region. In addition, there are number of veterinary hospitals, dispensaries, dental hospitals, Ayurvedic and Homeopathic hospitals which need to be covered under BMWM Rules, 2016.

Ministry of Environment, Forest & Climate Change (MoEF&CC) notified amendment to the EIA Notification 2006 published vide MoEF&CC Notification of S.O. 1142 (E) dated April 17, 2015. According to this notification, the bio-medical waste treatment facility is categorized under the Item 7 (da) in the Schedule.

The project proponent, Y.J. Multiclave, applied for ToR on 04.05.2016. However, SEAC recommended to obtain 'in-principle permission' from APPCB for setting up of CBMWTF vide letter No. SEIAA/AP/AP/GNT/IND/05/2016/84- dated 13.07.2016. APPCB issued 'in-principle permission' vide letter No. 1/APPCB/HO/UH-IV/BMW/In-Principle/2018- dated 23/05/2018. ToR was granted by SEIAA vide letter No. SEIAA/AP/GNT/IND/05/2016/84- dated 10.10.2018. During a site visit, it was observed that the geographical co-ordinates submitted in the ToR application didn't match with the co-ordinates of the actual site. Hence a corrigendum to the ToR to change the geographical co-ordinates of the site, was sought for during the 123rd SEAC meeting on 08.01.2019.

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Draft EIA report, duly incorporating the proposed facilities in the CBMWTF, following the Bio-medical Waste Management Rules, 2016 and the Central Pollution Control Board revised guidelines - 21st December 2016 has been prepared by ENPRO Enviro Tech and Engineers Pvt. Ltd., Surat for appraisal. The proposed project falls under Category B and project activity 7 (da) as per EIA notification 2006, as amended time to time. ENPRO Enviro Tech and Engineers Pvt. Ltd. is NABET Accredited (NABET/EIA/1922/SA 0125) under this sector. ENPRO entered into agreement with TEAM Labs and Consultants, Hyderabad for use of base line monitoring data for the period post monsoon season 2018. TEAM labs and consultants, Hyderabad is NABL accredited laboratory (Certificate No. TC-5087) and recognized by MoEF & CC. ENPRO team visited site and carried out ground survey for the various aspects to be covered in EIA Report.

1.2 PURPOSE OF EIA

'Environmental Impact Assessment (EIA)' is the process of evaluating likely environmental impacts, both positive and negative, of a new or expansion project by taking into account natural, social and economic aspects. It also comprises of suggesting mitigation measures, for the possible negative impacts, before implementation of the project.

Purpose of the report is to identify environmental aspects, impacts & mitigation measures for the proposed project of Common Bio-Medical Waste Treatment Facility (CBMWTF) for treating bio-medical waste and prepare EIA/EMP and RA/DMP report in line with ToR issued by SEIAA on 10.10.2018 and ToR amendment is granted in 114th minutes of SEIAA , A.P. held on 20.01.2019 and 30.1.2019 at Vijaywada, Andhra Pradesh to seek Environmental Clearance. Copy of same is attached in prefix portion of report.

This report is prepared based on 'Generic Structure of EIA Document' given in Appendix III and IIIA to EIA Notification dated 14th September 2006.

1.3 OBJECTIVES OF EIA

The overall objective of any EIA study is to identify and assess the adverse impacts of a project in the planning stage itself, so that necessary mitigation measures to prevent or minimize these adverse impacts can be planned early and cost-effectively. In view of this, the specific objectives of this EIA are -

- To have an in-depth know-how of the proposed project and to identify the probable sources of pollution that may arise from each stage of the process.
- To review the current environmental status of the study area within 10 km radius of the project site by collecting the baseline data on the environmental attributes including air, noise, water, land, ecological and socio-economic environments.
- To estimate the impacts of the project activities on the surrounding environment on the basis of baseline monitoring data.

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- To prepare a comprehensive Environmental Management Plan to ensure that the environmental quality of the area would be preserved.
- To formulate a strategy for effective monitoring and identify any deviations in the environmental quality after the project is operational, which would help in evolving measures to counter these.

1.4 PROJECT PROPONENT AND NEED OF THE PROJECT

M/s. Y.J. Multiclave has proposed Common Bio-Medical Waste Treatment facility at Sy. No. 7/1 & 8/1, Tana Annavaram Village, Nuzendla Mandal, Guntur District, Andhra Pradesh. The project is proposed by Mr. Y. Srirama Murthy, proprietor of the company.

The existing CBMWTF facility, Safe Environ located at Chinakakani (V), Mangalagiri (M), Guntur District covers about 700 Health Care Facilities (HCFs) with 13683 beds. There are about 4061 numbers of beds uncovered by the existing CBMWTF. In addition, there are number of veterinary hospitals, dispensaries, dental hospitals, Ayurvedic and Homeopathic hospitals which need to be covered under BMWM Rules, 2016. Hence it is proposed to establish another Common Bio-Medical Treatment Facility in Guntur district. In-principle permission was obtained from APPCB vide letter no. 1/APPCB/HO/UH-IV/BMW/In-Principle/2018- dated 23.05.2018. Copy of this letter is enclosed in **Annexure III**.

Status of Bed Strength and Health Care Facilities available in Guntur district is tabulated as under in **TABLE 1.1**.

TABLE 1.1 - TOTAL BED STRENGTH AND HEALTH CARE FACILITIES

Sr. No.	Type of Health Care Facilities	No. of Beds	No. of HCFs
1	Hospitals / Nursing Homes	17019	540
2	Clinics	-	286
3	Dental Clinics	-	150
4	Diagnostic Centers	-	356
5	Primary Health Centers	480	80
	Total	17499	1412

(Ref.: Letter from District Medical & Health Officer, Guntur vide Rc. No. Spl./A1/DRA/2018, dated 04.06.2018. Copy of this letter is enclosed vide **Annexure III**)

Based on above numbers, estimated waste quantity of Bio-Medical Waste generated from uncovered beds of 4061, in the district is about 1015 kg/day (@ 250 gm/bed/day on avg. basis). Moreover, it has to be considered that there are number of veterinary hospitals, dispensaries, dental hospitals, Ayurvedic and Homeopathic hospitals which need to be covered. So the expected quantity of bio-medical waste shall be much higher. Capacity of various units of facility is decided considering 40% incineration waste, 40% plastic waste, 19% glass waste and 1% sharps / metallic waste.

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1.5 PROPOSED PROJECT DETAILS

Installed capacity at Y.J. Multiclave CBMWTF will be 330 kg/day treatment of bio-medical waste. Capacity of various units of facility is provided as under in **TABLE 1.2**.

TABLE 1.2 - LIST OF TREATMENT FACILITY WITH CAPACITY

Sr. No.	Treatment Facility	Capacity
1	Incinerator	330 kg/hr
2	Autoclave	250 kg/hr (750 L)
3	Shredder	150 kg/hr - 2 Nos.

Total area for proposed project is 3.3 acres i.e. 13354.6 m², out of which 4491.9 m² shall be used for greenbelt development, 1376 m² area for processing, 1070 m² area for storage, 450 m² area for ETP and remaining 5966.7 m² will be allotted for utilities i.e. administration building, parking, vehicle washing area, roads and open area.

Fresh water requirement for the proposed project will be 15 KLD which will be withdrawn from bore well and another 13 KLD water will be recycled water from effluent treatment plant. Permission to use ground water shall be obtained from Central / State Ground Water Board, as applicable.

Waste water generation from the proposed project will be 15.5 KLD and 1.8 KLD as domestic waste water. For waste water treatment, ETP has been proposed with primary, secondary and tertiary treatment including pressure sand filter and activated carbon filter. Treated waste water will be recycled back to plant.

Air Pollution Control System provided for the Incineration system shall consist of High Pressure Venturi Scrubber and Packed Bed Scrubber followed by a stack of effective height for achieving emission norms as per CPCB guidelines.

Hazardous waste generated during process activity i.e. ETP sludge, ash from incinerator and spent activated carbon shall be sent to TSDF site. In addition, other waste like waste oil, used batteries and waste from shredding (glass and plastic after autoclaving and shredding) shall be sent to authorized recyclers. Sharps after autoclaving and shredding shall be sent to iron foundry or TSDF site for secured landfilling.

Electricity required for proposed project will be 75 KVA which shall be fulfilled by **Transmission Corporation of Andhra Pradesh (APTRANSCO)**. 65 KVA DG set shall be installed as stand-by to cater during load shut down from APTRANSCO. LDO (4 Liters/Hr) for incinerator and Furnace Oil (16.3 Liter/Hr) will be provided for D.G. Set.

Facility shall provide fire hydrants and fire extinguishers at appropriate places. Electrical fittings shall be fire resistant and earthing shall be provided as required based on risk assessment study.

Total cost of proposed project is estimated to be Rs 2.32 crore.

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1.5.1 Importance of Project to the Country and the Region

Exposure to infectious Bio-Medical Waste can result in disease and/or injury. It may contain infectious agents, toxic or hazardous chemicals or pharmaceuticals 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 class.

At present in Guntur district, there are 17499 beds in various Health Care Facilities. However present facility covers only 13683 beds and for proper treatment of rest of the beds and other non-bedded facilities generating bio-medical wastes, it is important to establish a new bio-medical waste treatment facility in this region.

The project will generate direct and indirect local employment during construction and operation phase.

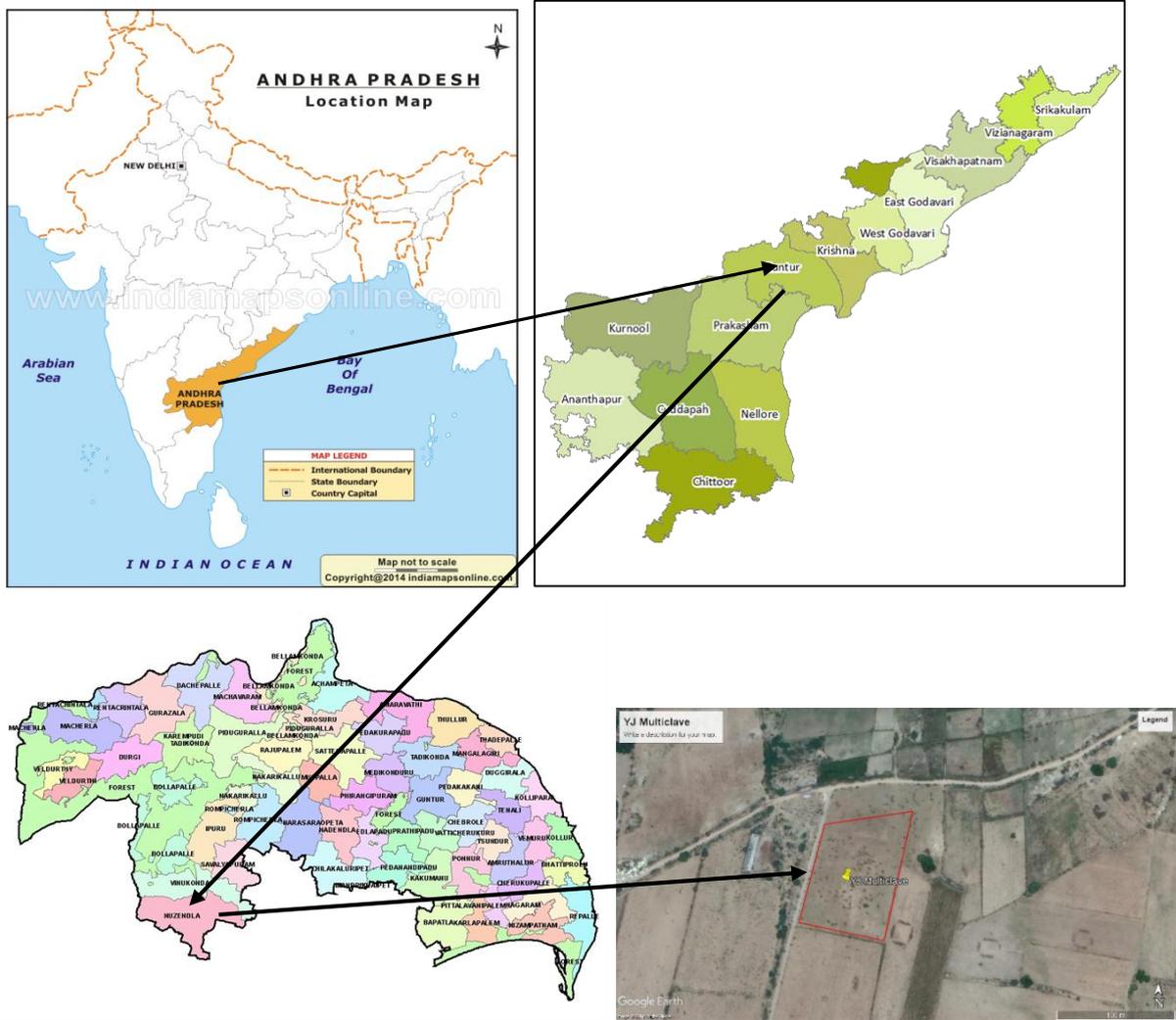
1.6 PROJECT LOCATION

M/s. Y.J. Multiclave has proposed a CBMWTF at Sy. No. 7/1 & 8/1, Tana Annavaram Village, Nuzendla Mandal, Guntur District, Andhra Pradesh. Geographical location of project site is Latitude : 15°59'52.12"N, Longitude: 79°41'25.35"E.

The location of the project site is shown in **FIGURE 1.1**.

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FIGURE 1.1 - LOCATION OF PROPOSED PROJECT SITE



1.7 REGULATORY FRAMEWORK

As a part of Environmental Clearance process, Y.J. Multiclave has uploaded and submitted relevant documents, namely Form - 1 (as per the EIA Notification, 2006, as amended), along with a Pre-Feasibility Report and proposed Terms of Reference (ToRs) for carrying out environmental studies, to the State Expert Appraisal Committee (SEAC) on 04.05.2016. In AP SEAC meeting held on 07.06.2016, Y.J. Multiclave was recommended to obtain 'in-principle permission' from APPCB to set up CBMWTF. The proponent obtained the said 'in-principle permission' letter on 23.05.2018. In AP SEAC meeting held on 30.06.2018, committee recommended to obtain remarks/comments (stamped letter) from District Medical and Health Officer of Guntur district with respect to Central Pollution Control Board revised guidelines - 21st December 2016 for the proposed CBMWTF. Revised presentation for grant of ToR was made including the letter from DM & HO on 25.08.2018 during the 118th SEAC meeting. ToR was granted by AP SEIAA vide letter No. SEIAA/AP/GNT/IND/05/2016/84 dated 10.10.2018.

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During a site visit, the project proponent noticed that geographical position submitted during the ToR application was different from the actual geographical position of the proposed project site. Hence, a presentation was made for ToR amendment (Corrigendum) on 08.01.2019 during the 123rd SEAC meeting to change the geographical position. ToR Amendment was granted in minutes of 114th meeting of SEIAA, Andhra Pradesh. Minutes of SEIAA and relevant documents are attached in **Annexure X**. As part of environmental clearance process, draft EIA report was prepared and submitted to concerned authorities and public hearing was held on dated 19/09/2019 at 11.00 AM at Project Site, Thana Annavaram, Nuzendla Mandal, Guntur District, Andhra Pradesh. The outcome of the public consultation process is given in **Annexure XI**.

1.8 STRUCTURE OF THE 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, its importance to the country 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 & infrastructure and the pollution potential.

Chapter-3: Describes the existing baseline status of various environmental and social parameters in the study area of 10 km radial periphery from proposed 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 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.

Chapter-8: Highlights benefits of the project.

Chapter-9: Environmental Cost Benefits, if recommended at scoping stage.

Chapter-10: Delineates the Environment Management Plan highlighting the mitigation measures and roles and responsibilities of the management.

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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. Y.J. Multiclave has proposed Common Bio-Medical Waste Treatment facility at Sy. No. 7/1 & 8/1, Tana Annavaram Village, Nuzendla Mandal, Guntur District, Andhra Pradesh. The project is proposed by Mr. Y. Srirama Murthy, proprietor of the company. Common Bio-Medical Waste Treatment Facilities (CBWTFs) offer advantage to health care establishments through more efficient treatment and disposal of BMW and through 'Economies of Scale' (significant decrease in cost of treatment per kilogram).

2.2 NEED OF THE PROJECT

The existing CBMWTF facility, Safe Environ located at Chinakakani (V), Mangalagiri (M), Guntur District covers about 700 Health Care Facilities (HCFs) with 13683 beds. There are about 4061 numbers of beds uncovered by the existing CBMWTF. In addition, there are number of veterinary hospitals, dispensaries, dental hospitals, Ayurvedic and Homeopathic hospitals which need to be covered under BMW Rules, 2016. Hence it is proposed to establish another Common Bio-Medical Treatment Facility in Guntur district. In-principle permission was obtained from APPCB vide letter no. 1/APPCB/HO/UH-IV/BMW/In-Principle/2018- dated 23.05.2018. Copy of this letter is enclosed in **Annexure III**.

2.3 LOCATION

2.3.1 General Location of the Site

M/s. Y.J. Multiclave has proposed a CBMWTF at Sy. No. 7/1 & 8/1, Tana Annavaram Village, Nuzendla Mandal, Guntur District, Andhra Pradesh. The location of the project site is shown in **MAP 2.1**.

2.3.2 Specific Location of Site with Project Boundary

Geographical location of project site is Latitude: 15°59'52.12"N, Longitude: 79°41'25.35"E. The base elevation of the project site is at ~ 75 m above mean sea level. The study area is mostly vacant land with few trees, shrubs, grasslands and some water bodies. The geographical location of the project site is shown in **MAP 2.2**.

2.3.3 Approach to the Site

The facility shall be located near Tana Annavaram Village, Nuzendla Mandal, Guntur district, Andhra Pradesh. Vinukonda railway station is nearby railway station to project site. The nearest airport is of Vijayawada (Gannavaram) airport. Salient features in the study area of the project site are given in **TABLE 2.1**.

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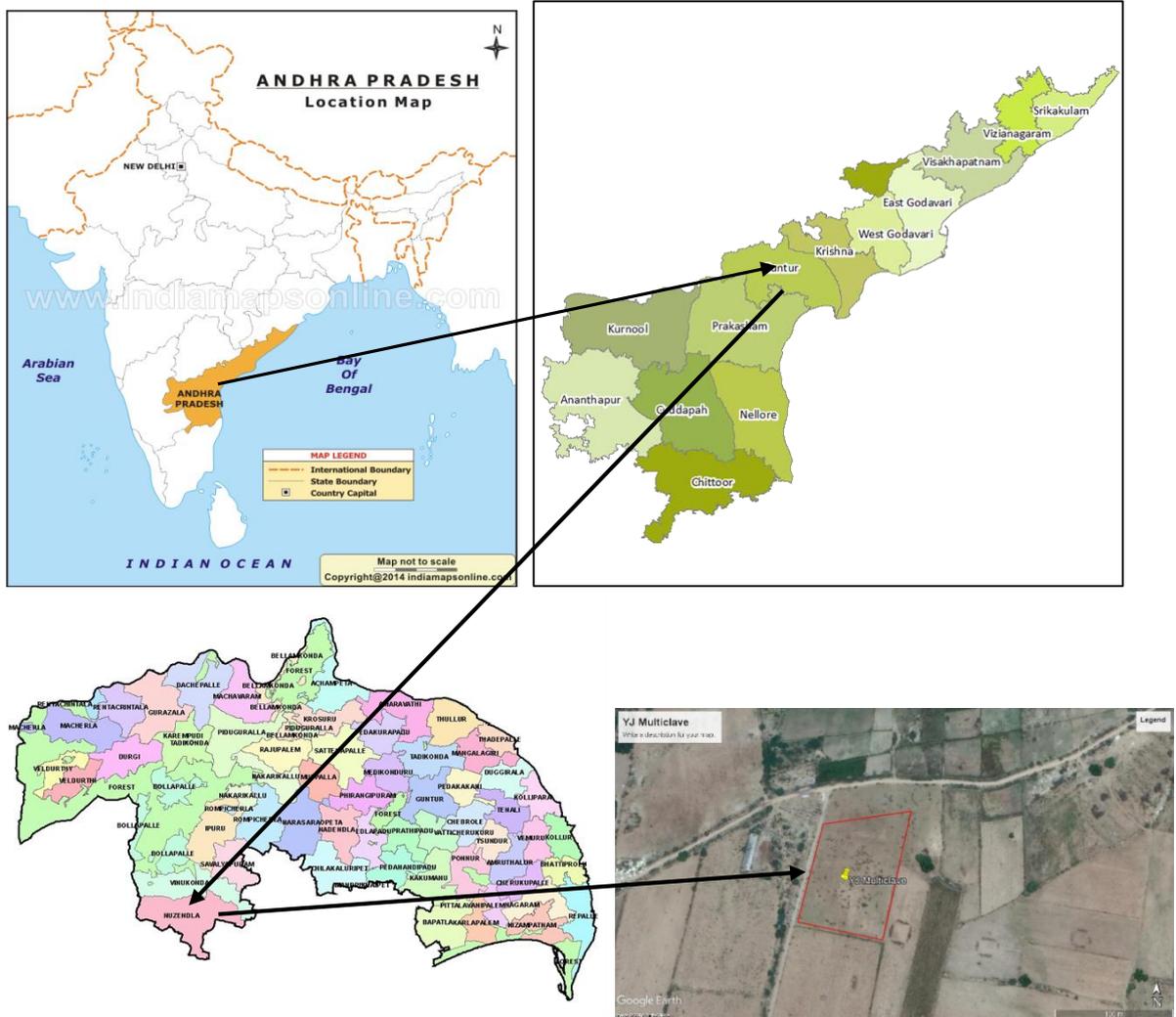
TABLE 2.1 - SALIENT FEATURES OF THE PROJECT SITE

Particulars	Details	Approx. Distance from Project Site
Geographical Co-ordinates	Latitude : 15°59'52.12" N Longitude : 79°41'25.35" E	-
Village / City / Industrial Area	Tana Annavaram Village	0.60 km (NE)
District	Guntur District	-
Nearest Water Body	Gundlakamma river Krishna river Bay of Bengal	0.30 km (NW) 57 km (NW) 71.2 km (SE)
Nearest Highway	State Highways 42 & 50 National Highway 16	1.66 km (NW) 41.14 km (ESE)
Nearest Railway Station & Railway line	Vinukonda railway station	9 km (NE)
Nearest Airport / Airbase	Vijayawada (Gannavaram) airport	131 km (NE)
Protected Area / Sanctuaries	No	-
CRZ applicability	No	-

Note: All the above mention distances are approximate aerial distances from the project site.

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MAP 2.1 - GENERAL LOCATION MAP OF PROJECT SITE



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MAP 2.2 - SPECIFIC LOCATION MAP WITH PROJECT BOUNDARY OF PROJECT SITE

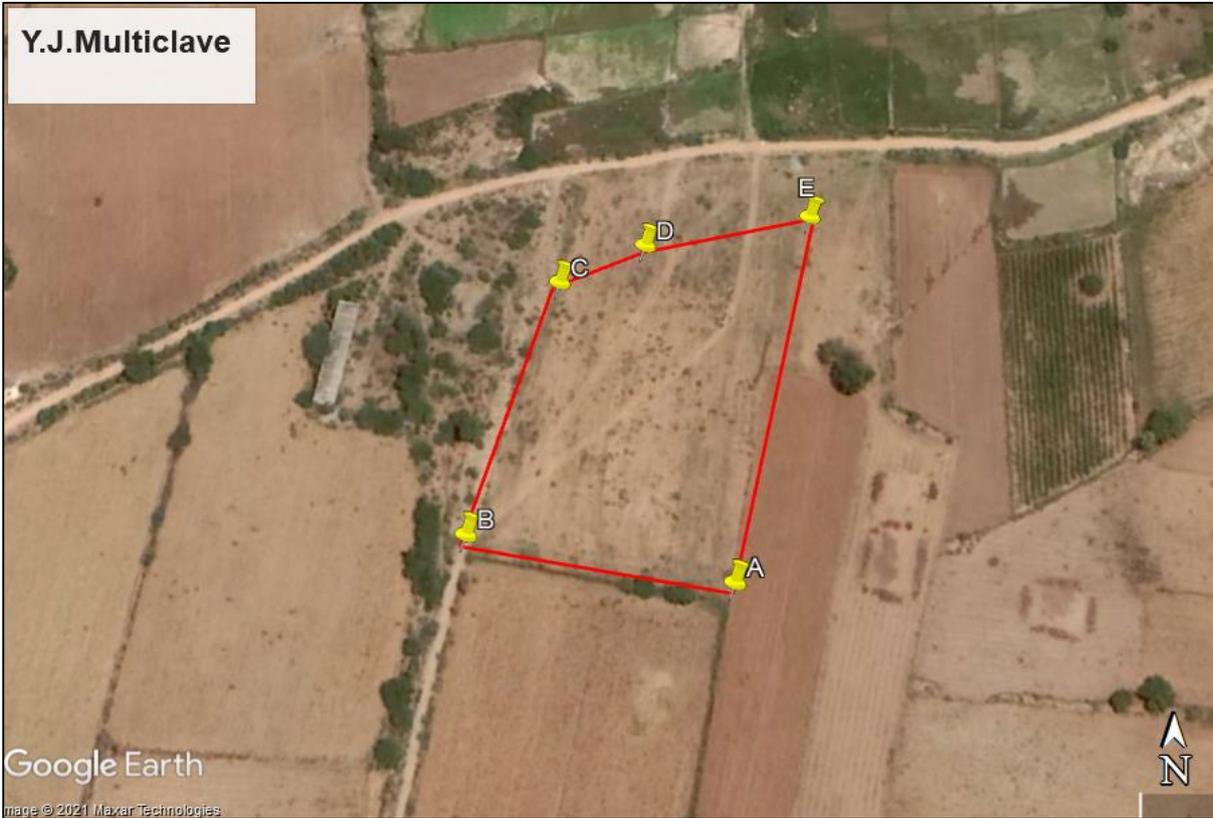


TABLE 2.2 - CO-ORDINATES OF PROJECT BOUNDARY

Point	Latitude	Longitude
A	15°59'50.62" N	79°41'26.36" E
B	15°59'51.09" N	79°41'23.69" E
C	15°59'53.68" N	79°41'24.54" E
D	15°59'54.08" N	79°41'25.42" E
E	15°59'54.39" N	79°41'27.14" E

2.4 SIZE OR MAGNITUDE OF OPERATION

Y.J. Multiclave proposes to set up a common bio-mzederal waste treatment facility with a capacity of 7 TPD consisting of following treatment units. List of treatment facilities proposed is given in **TABLE 2.3**.

TABLE 2.3 - LIST OF TREATMENT FACILITY COMPONENTS

Sr. No.	Process	Capacity
1	Incineration	330 kg/hr
2	Autoclave	250 kg/hr (750 L)

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3	Shredding	2 x 150 kg/hr
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2.4.1 Project Resources

2.4.1.1 Land

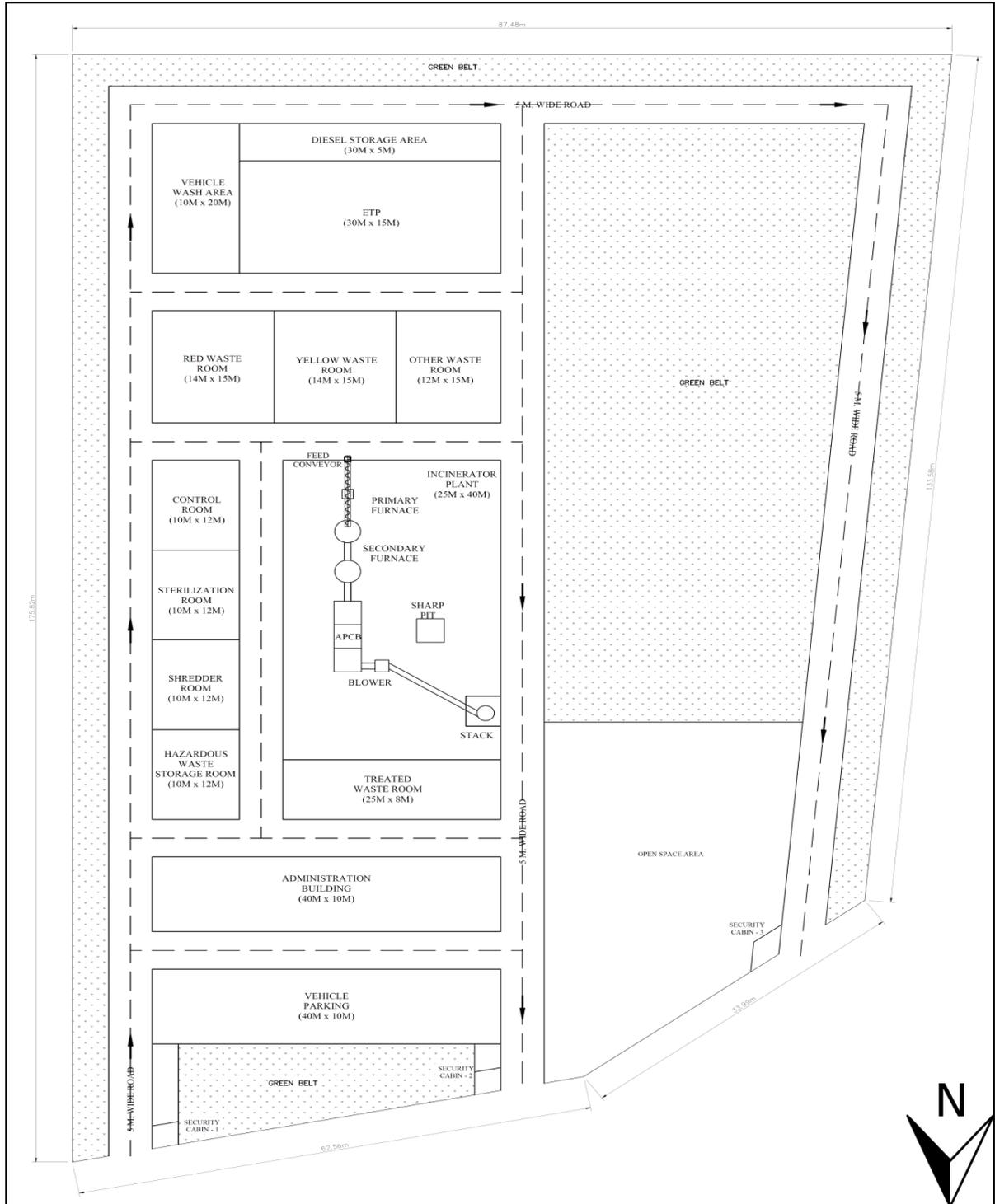
Proposed facility shall be set up in land of 3.3 acres i.e. 13354.6 m². **PHOTOGRAPHS 2.1** shows photographs of site. Layout plan of the project site is shown in **FIGURE 2.1** and attached as **Annexure VI**. Details of breakup of plot area are covered under following **TABLE 2.4**.

PHOTOGRAPHS 2.1 - PHOTOGRAPHS OF SITE



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FIGURE 2.1 - LAYOUT PLAN OF THE FACILITY



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TABLE 2.4 - AREA BREAKUP OF THE SITE

Sr. No.	Particular	Area in m²	% of Land Use
1	Incinerator Plant	1000	7.49
2	Incinerator Chimney	16	0.12
3	Diesel Storage Area	150	1.12
4	Effluent Treatment Plant	450	3.37
5	Vehicle Washing Area	200	1.49
6	Red Waste Room	210	1.58
7	Yellow Waste Room	210	1.58
8	Other Waste Room	180	1.35
9	Treated Waste Room	200	1.49
10	Control Room	120	0.9
11	Sterilization Room	120	0.9
12	Shredder Room	120	0.9
13	Hazardous Waste Storage Room	120	0.9
14	Administration Building	400	2.99
15	Vehicle Parking Area	400	2.99
16	Security	30.2	0.23
17	Roads and Open Spaces	4936.5	36.97
18	Greenbelt	4491.9	33.63
	Total	13354.6	100

(Source: Y.J. Multiclave)

2.4.1.2 Water

Water required for proposed project shall be taken from bore well in addition to reuse of treated wastewater. The total water requirement shall be 28 KLD consisting of 15 KLD of fresh water and 13 KLD of recycled water.

Detailed water balance and breakup of water consumption is provided in **Section 2.8**.

2.4.1.3 Energy (Power and Fuel) Requirement

75 KVA electrical power shall be supplied by APTRANSCO, while standby D.G. Set of capacity 65 KVA shall be installed for emergency power during load shut down. LDO for incinerator and Furnace Oil will be provided for D.G. Set.

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2.4.1.4 Raw Material and Treatment Chemicals

Following is list of chemicals to be used in the facility.

TABLE 2.5 - CHEMICALS TO BE USED IN THE CBMWTF

Sr. No.	Name of Chemical	Qty. Kg/Month	Area of Use
1	Caustic Lye	2500	Scrubber Tank and ETP for pH correction
2	Poly Aluminum Chloride (PAC)	100	ETP for treatment
3	Poly Electrolyte	50	ETP for treatment
4	Sodium Hypo Chlorite (10% Solution)	100	ETP and Vehicle washing

2.4.1.5 Local and Other Infrastructure

The proposed project will be near Tana Annavaram village which has good infrastructure facilities such as roads, electricity, water supply network.

2.5 PROPOSED SCHEDULE FOR APPROVAL AND IMPLEMENTATION

As a part of Environmental Clearance process, Y.J. Multiclave has uploaded and submitted relevant documents, namely Form - 1 (as per the EIA Notification, 2006, as amended), along with a Pre-Feasibility Report and proposed Terms of Reference (ToRs) for carrying out environmental studies, to the State Expert Appraisal Committee (SEAC) on 04.05.2016.

In AP SEAC meeting held on 07.06.2016, Y.J. Multiclave was recommended to obtain 'in-principle permission' from APPCB to set up CBMWTF. The proponent obtained the said 'in-principle permission' vide letter No. 1/APPCB/HO/UH-IV/BMW/In-Principle/2018- dated 23.05.2018. In AP SEAC meeting held on 30.06.2018, committee recommended to obtain remarks/comments (stamped letter) from District Medical and Health Officer of Guntur district with respect to Central Pollution Control Board revised guidelines - 21st December 2016 for the proposed CBMWTF.

Revised presentation for grant of ToR was made including the letter from DM & HO on 25.08.2018 during the 118th SEAC meeting. ToR was granted by AP SEIAA vide letter No. SEIAA/AP/GNT/IND/05/2016/84 dated 10.10.2018.

During a site visit, the project proponent noticed that geographical position submitted during the ToR application was different from the actual geographical position of the proposed project site. Hence, a presentation was made for ToR amendment (Corrigendum) on 08.01.2019 during the 123rd SEAC meeting to change the geographical position.

Y.J. Muticlave has approached us, ENPRO Enviro Tech and Engineers Pvt. Ltd., Surat to prepare EIA report. The proposed project falls under category B and project activity 7(da) as per EIA notification 2006, as amended time to time. ENPRO Enviro Tech and Engineers Pvt.

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Ltd. is NABET Accredited (NABET/EIA/1922/SA 0125 valid till 12th January, 2022) under this sector. ENPRO entered into agreement with Team Lab and Consultants, Hyderabad for use of base line monitoring data for the period October 2018 to December 2018. Team lab and consultants, Hyderabad is NABEL accredited laboratory (Certificate No. TC-5087) and recognized by MoEF & CC. ENPRO team visited site and carried out ground survey for the various aspects to be covered in EIA Report.

After receiving EC, proposed activity schedule is given below:

1. Site Development - 8 months after getting EC/CTE
2. Infrastructure - 6 months after site development
3. EMS Implementation - 4 months after development of infrastructure

2.6 PROPOSED TECHNOLOGY / PROCESS

Biomedical wastes are defined as "wastes generated during diagnosis, treatment or immunisation 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 Biomedical Waste Management Rules, 2016".

2.6.1 Waste Classification

Wastes generated by the hospitals 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 includes 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 Biomedical Waste Management Rules 2016 provides schedule of wastes with their colour coding, storage, treatment and disposal practice.

2.6.2 Collection, Transport and Storage

I. Collection:

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It is proposed to collect bio medical waste generated in Guntur District. The no. of beds is about 4061. 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 units must be allocated, and the coloured bags handed over by healthcare units must be collected in identical coloured containers with covers. Each bag shall be labelled 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 the recent draft guideline of CPCB, once it is finalized. The coloured containers will be labelled as per Schedule IV of the rules. Sharps shall be collected in puncture proof, leak proof and tamper proof containers. The person in charge of bio-medical waste collection will also have a log with him to keep track of information such as the name of the healthcare unit, the type and quantity of waste collected, the signature of the authorised person from the healthcare unit, the day and time of collection, and so on. The colour coding for biomedical waste and Segregation of biomedical waste is presented in **TABLE 2.6**.

TABLE 2.6 - COLOUR CODING AND SEGREGATION OF WASTES

Sr. No.	Category	Type of waste	Collection method
1	Yellow	a	Human Anatomical Waste
		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 b) Metallic body implants	Card board boxes with blue coloured marking.

- **Bar Code Labelling**

There shall be two types of bar code labelling:

1. Bar code or QR code label shall be 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

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2. Bar code or QR code labels shall be 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 shall be 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 shall 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 the colour coded bags or containers for handling bio-medical waste should 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 should have 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 BMW in the bags or containers. The colour mark or Text shall be placed at the top left corner of the bar code label.



In case of cytotoxic drugs, the alphabet 'C' should be 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 waste as "YELLOW" / "RED" / "WHITE" / "BLUE" printed on top left side of the bar code label.



Unique Number of HCF and its specification: Unique number to each HCF shall be developed and provided by concerned SPCB/PCC/DGAFMS. Unique number can be produced based on following criteria: -

- i. Name of the Health Care Facility (HCF): The name of the HCF shall be indicated by first five alphabets in the name of 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 shall be indicated by 6 digits local Pincode provided by Postal department. Followed by;
- iii. Name of the State/UT: Name of the State/UT should be in the form of two-digit alphabetical number (as given at Annexure-I). Followed by;

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- iv. Type of HCF: Type of HCF should be 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;

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: CBMWTFs should use central software to generate unique label sequential number. The operator of CBMWTF should 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 should be maintained for verification of SPCBs/PCCs.

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

- i. The bar code label should be pasted only at the centre or close to centre of the colour coded bag or container prescribed under the BMWM Rules, 2016 and further amendments made thereof.
- ii. Size of bar code label should be such that it should be able to accommodate desired information specified in this section.
- iii. The bar code / QR code should be black in colour and its back ground should be white colour and it should be clearly legible on the label.

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- iv. The bar code label should be tamper proof, water proof and its colour should not be faded in due course of at least for 48 hours after its use.
- v. The bar code label should be able to resist the prevailing atmospheric temperatures and should not fade its colour till its end of life.
- vi. Bar code labels should not have any traces of heavy metals or any other objectionable chemical constituent.
- vii. All bar code labels should be of good quality preferably every chromo paper label having specifications prescribed under these guidelines.
- viii. 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 should not peel off on its own or by normal abrasion during handling.

II. Transport:

The bio-medical waste collected in coloured containers will be transported to the facility in a fully covered dedicated vehicle for transportation of bio-medical waste 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 state pollution control board. It is proposed to provide 7 to 8 closed vehicles for transportation. The vehicles will be provided with: -

- Separate cabins for driver/staff and the bio-medical waste containers.
- The base of the waste cabin will be leak proof to avoid pilferage of liquid during transportation.
- The waste cabin may be designed for storing waste containers in tiers.
- The waste cabin shall be so designed that it is easy to wash and disinfect.
- The inner surface of the waste cabin will be maintained as a smooth surface to minimize water retention.
- The waste cabin shall have provisions for sufficient openings in the rear and/or sides so that waste containers can be easily loaded and unloaded.
- The vehicle shall be labelled with the bio-medical waste symbol (as per the Schedule III of the rules) and should display the name, address and telephone number of the CBMWTF.
- Each vehicle shall be provided with GPS system for tracking and recording of vehicle movement centrally from facility.

III. Disinfection & Destruction:

Upon receipt at the facility, containers having wastes will be unloaded. Wastes based on their colour codes shall be separated and properly treated and disposed off. Category – Yellow (as per Bio-Medical Waste (Management & Handling) Rules, 2016) shall be directly loaded into the incinerator while categories Red and White shall be loaded into the autoclave and category Blue shall be subjected to disinfection. Residue from these units shall be disposed into a landfill. Detailed process description of the treatment technologies is presented in the subsequent sections.

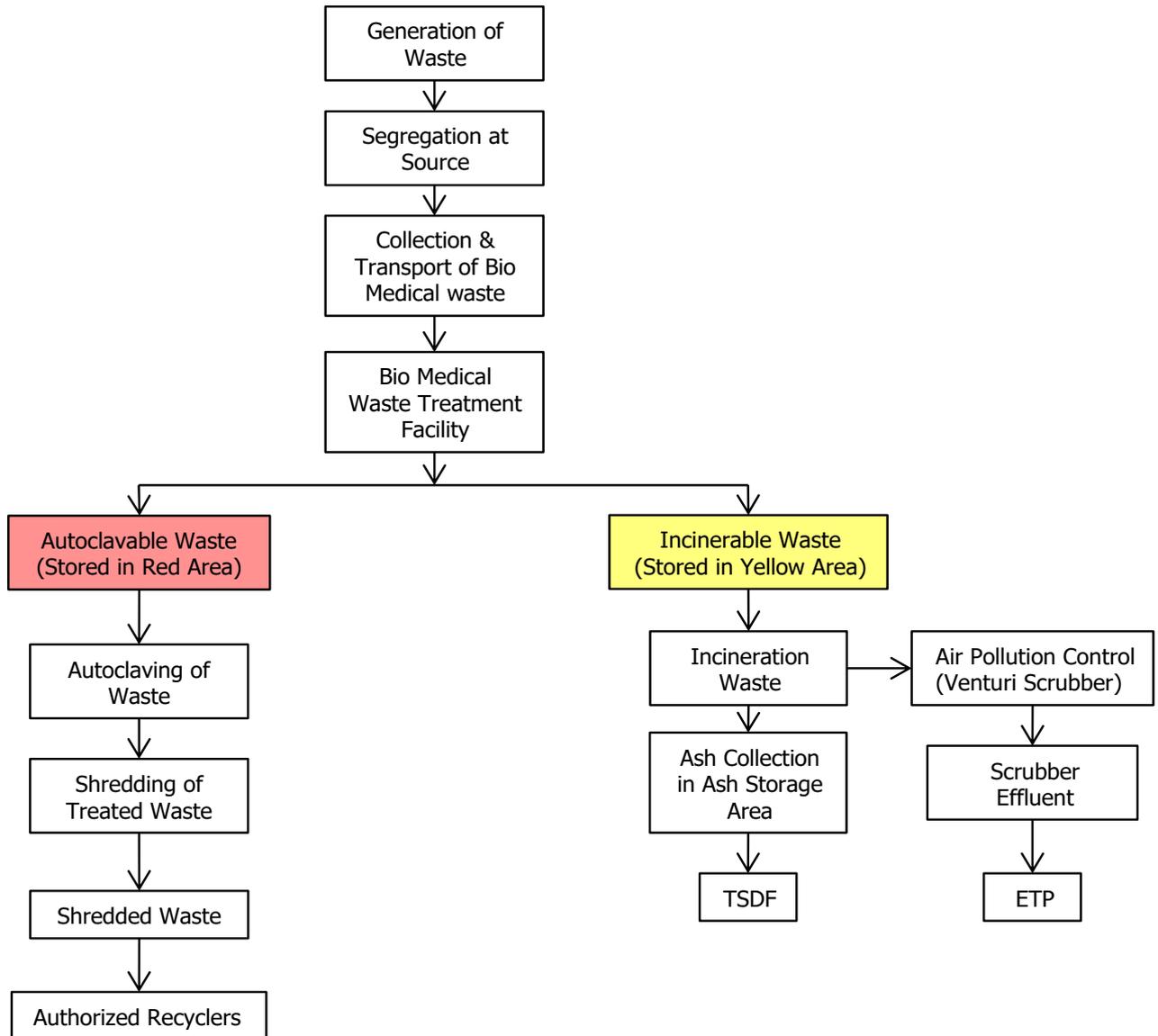
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IV. Storage:

All bio-medical wastes transported to the facility by vehicles shall be unload and stored as per type of waste. A storage room of 210 m² each shall be provided to store red and yellow category wastes and another room of 180 m² to store other wastes on site before treatment. The front portion of the room shall be utilized for unloading the wastes from the vehicle and back or side portion shall be utilized for shifting the wastes to the respective treatment equipment. The unloading area will be made impermeable with a garland drain connected to ETP, to carry liquid spillages during unloading. The liquid generated during handling of wastes and washing, will be diverted to the inlet of ETP. In the main storage room, wastes will be stacked with clear distinction as per the colour coding of the containers. The main storage room too will have provisions similar to that of equipment room such as roofing, well ventilated, easy to wash floors and walls, smooth and fine surfaces etc. Schematic diagram of bio-medical waste treatment is in **FIGURE 2.2**.

FIGURE 2.2 - SCHEMATIC DIAGRAM OF BIO-MEDICAL WASTE TREATMENT

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2.6.3 Treatment of Bio-Medical Waste

The primary methods of treatment and disposal of biomedical waste proposed are -

1. Incineration
2. Autoclaving
3. Shredding

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2.6.3.1 Medical Waste Incineration

Medical waste incineration involves the burning of wastes produced by hospitals, veterinary facilities and medical research facilities. These wastes include both infectious ("red bag") medical wastes as well as non-infectious, general housekeeping wastes.

The waste, which requires incineration, is stored in yellow non-chlorinated HDPE bags in storage area. The incinerator will be selected considering the following operating parameters:

- Combustion efficiency will be minimum 99%.
- Primary combustion chamber shall be maintained at minimum of 800 °C (\pm 50 °C) and secondary combustion chamber shall be maintained at minimum of 1050 °C (\pm 50 °C).
- Flue gas residence time in secondary chamber shall be minimum of 2 sec.
- TOC content of ash collected at bottom of furnace shall be less than 3% or their loss on ignition shall be less than 5% on dry weight basis.
- For online monitoring of flue gas emissions online monitoring system (CEMS) system shall be provided as per CPCB guideline.
- In general, incineration system shall be provided as per CPCB guideline.

Process Description of Incineration System:

The waste shall be conveyed on a belt and charged into the Primary Chamber of incinerator through the charging door. The primary chamber shall be lined with refractory and insulation bricks of IS-8 & IS-2042 standards. The air required for volatilization shall be supplied through an air duct and introduced through equally placed nozzles. Airflow shall be controlled with the help of air dampers. The primary chamber shall be fitted with a fuel oil burner, which shall have necessary instrumentations to function automatically. A forced draft fan shall be used to provide for combustion/volatilization of air. This fan shall also supply air required for the dilution of flue gases before venturi scrubber. The combustion air shall be controlled to have minimum turbulence, restricting fly ash. The fly ash collected in Primary Chamber shall be removed from the dashing door. Inside primary chamber a min. of 800 °C \pm 50 °C temperature shall be maintained.

The volatiles/gases emitted from the primary chamber shall pass through the neck of the secondary chamber, which shall also be lined with refractory and insulation bricks. The secondary chamber will be designed to ensure that flue gas residence time of min. two seconds is provided. The secondary chamber will operate at a temperature of 1050 °C \pm 50 °C. The gases will be completely burnt and safe gases then shall be let out of the incinerator unit.

The volatile matter has a low flash point and hence gets liberated in the primary combustion chamber. This shall later be burnt in the secondary chamber at a high temperature and in the presence of excess air. Fixed carbons are the non-volatile portion of the waste and are completely incinerated in primary chamber only. The moisture present in the waste is evaporated in the primary chamber and passes through the secondary chamber and gets

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released as super-heated water vapour. Sterilized ash and non-combustible material shall remain in the primary chamber. To prevent them from flying out along with gases, non-turbulent conditions shall be maintained in the primary chamber. Depending upon the type of waste destroyed in the incinerator the sterile ash content ranges between 5-10 %.

The flue gases then pass through the downstream air pollution control system, consisting of high pressure drop Venturi Scrubber for removal of particulate matter and partially acidic gases by absorption with caustic solution and removal of balance acidic gases in packed bed scrubber. Then gases are let out through an I.D. fan followed by 30 m height stack.

Gas Quencher system with feed pump and liquid feed tank shall be provided to quench and cool flue gas by evaporation of liquid in organic effluent by evaporative cooling. Effluent generated from the incineration plant will be sprayed in hot gas to get saturated gas at the outlet and solid particles at the bottom of the tower.

Technical Specifications of Incinerator is presented in **TABLE 2.7**.

TABLE 2.7 - TECHNICAL SPECIFICATION OF INCINERATOR

Incinerator		
1	Type of Waste	Biomedical Waste
2	Burning Capacity	330 kg/hr
3	Hearth Area	> 4.5 m ²
4	Auxiliary Fuel	LDO
5	Type of Burner Operation	Monoblock fully automatic burners
6	Temperature	
	➤ Primary Chamber	800 ± 50 °C
	➤ Secondary Chamber	1050 ± 50 °C
7	Incinerator Design Type	Stationary Furnace (both chambers will be placed on floor for easy maintenance and service)
Primary Chamber		
1	Type	Static Solid Hearth
2	Material of Construction	Mild Steel, 5mm thick
3	Refractory Thickness	115 mm thick
4	Material	Refractory bricks confirming to IS-8
5	Temperature Resistance	1100 °C
6	Insulation Thickness	115 mm thick
7	Material	Insulation bricks confirming to IS-2042
8	Waste Charging	Manual and Automatic Feeding System - Hydraulic operated with bin lifting system
9	Ash Removal	Manual - extension system provided
Secondary Chamber		
1	Type	Static Solid Hearth
2	Material of Construction	Mild Steel, 5 mm thick
3	Refractory Thickness	115 mm thick
4	Material	Refractory bricks confirming to IS-8

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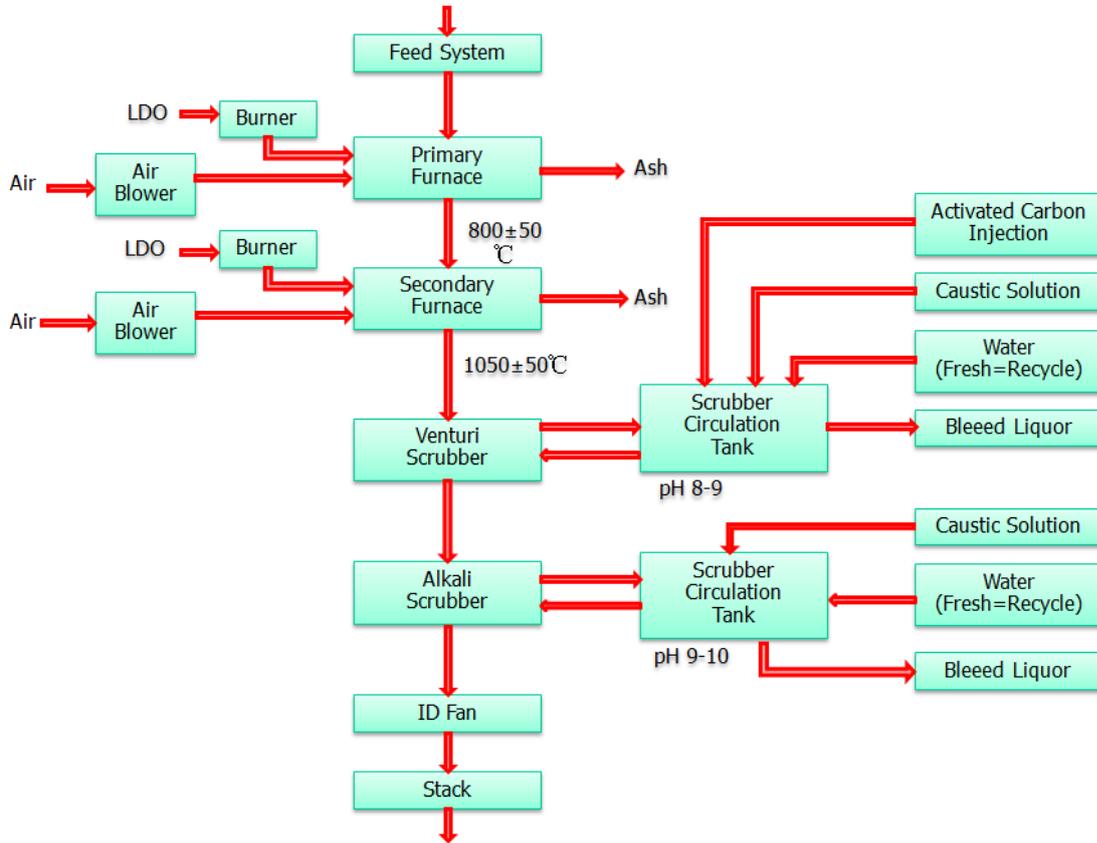
5	Temperature Resistance	1200 °C
6	Insulation Thickness	115 mm
7	Material	Insulation bricks confirming to IS-2042
8	Residence Time for flue gases	2 seconds
Emergency Stack		
1	Material of Construction	Mild Steel, 3 mm thick
Venturi Scrubber		
1	Type	High Pressure Jet Type
2	Material of Construction	Stainless Steel 316 L
3	Temperature of Outlet	100-150 °C
4	Scrubbing Media	Water with 5% Caustic
Alkali Scrubber		
1	MOC	Mild Steel rubber lined
2	Water re-circulation pump with motor	Provided
3	Interconnecting piping	PPR
4	Packing media	Intalox Saddles/Pall rings
5	Interconnecting ducting	Mild Steel Rubber lined
6	Scrubbing Media	Water
I.D. Fan		
1	Type	High Pressure Centrifugal type
2	Material of Construction	Stainless Steel Impeller and Mild Steel Rubber lined casing
3	Drive	Belt Driven
Combustion Fan		
1	Type	Centrifugal
2	Modulation	Manual damper control
3	Material of Construction	Mild Steel
4	Drive	Direct drive
Burners		
1	No. of burners	3 Nos. - 2 for Primary Chamber 1 for Secondary Chamber
2	Type	Monoblock fully automatic oil fired
3	Fuel	Diesel
Chimney		
1	Material of Construction	Mild Steel
2	Type	Self-supporting
3	Height	30 m from ground level
4	Ladder	Provided till the top
5	Other Standard Accessories	Aviation lamp, lightning arrestor, stack drain, inspection platform, sampling port
6	Optional - Inside Protection	3 mm thick rubber lining from inside
7	Thickness	Bottom 10 m - 8 mm Top 20 m - 6 mm Base plate - 25 mm

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8	Top Diameter	400 mm
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(Source: Y.J. Multiclave)

FIGURE 2.3 - PROCESS FLOW DIAGRAM OF INCINERATION SYSTEM



2.6.3.2 Autoclave

The primary purpose of autoclave is to sterilize / disinfect the waste with steam. Microorganisms which contribute to infection do not survive beyond 80 °C. However, as a precaution, Bio-Medical Waste (Management & Handling) Rules, 2016 has stipulated a temperature of 121 °C with 15 psi pressure and 60 min. duration to ensure distribution of temperature. At this temperature and pressure, microorganisms are completely destroyed and thus render the wastes infection free. The disinfected waste shall then 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 / food grade purposes. All the process control conditions will be as per the applicable Bio-medical Waste Rules. It is proposed to install a horizontal rectangular autoclave with single hinge door. Capacity of autoclave shall be 750 L. Technical Specifications of Autoclave is presented in **TABLE 2.8**.

TABLE 2.8 - TECHNICAL SPECIFICATIONS OF AUTOCLAVE

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1	Model	Single Hinge Door, Automatic Standard model Vacuum Pump with Condenser, Pressure transmitter along with SS Carriage & Trolley
2	Capacity	750 L
3	Size	750 x 750 x 1500 mm
Working Parameters		
1	Chamber Working Pressure	1.06 kg/cm ²
2	Jacket Working Pressure	1.5 kg/cm ²
3	Chamber Working Temperature	121 °C
4	Residence Time	60 min
Hydro Test		
1	Chamber	One & half times the Working Pressure
2	Jacket	Twice the Working Pressure
3	Chamber and Back Plate	Sterilizing Chamber is fabricated from S.S. 304 Quality with full argon welding
4	Jacket	Jacket is fabricated from M.S. Quality
5	Insulation	Resin Bonded Rock Wool insulation of 50 mm thickness
6	Sensor	PT 100 sensors are used for PLC and manual control
7	Manual Backup	Control System is provided with a manual backup in case of PLC Failure. Here all Valves, Pumps etc. can be operated with individual switches

(Source: Y.J. Multiclave)

2.6.3.3 Shredding

Medical waste that is subjected to an autoclave is often also subjected to a compaction process, such as shredding, after treatment so that it is no longer recognizable and cannot be re-used for 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 disposed to landfill. 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. Shredder is equipped with hopper of adequate size to accept the material to be shredded. The hopper is also provided with a lid, which can be locked during operation. The hopper is well designed to take care of volume and weight of the material. The hopper directs the materials to the cutting chamber. The shredded waste is then packed in black coloured HDPE bags. Technical Specifications of Shredder is presented in **TABLE 2.9**.

TABLE 2.9 - TECHNICAL SPECIFICATIONS OF SHREDDER

1	Nos.	2
2	Capacity	150 kg/hr
3	Blades	Combined Hook/Shear Blades
4	Safety Features	a. Auto Reverse System b. Interlocks to avoid aerosolizing

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		c. Low Noise, Non Ballistic d. Auto Shut Off
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(Source: Y.J. Multiclave)

2.7 GASEOUS EMISSION AND ITS CONTROL

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

During operational phase, gaseous emissions shall emit from operation of incinerator and stand-by DG set. Likely major air pollutants from incineration system shall be PM, HCl and NO_x and PM, SO₂ and NO_x from DG set stack.

Capacity of incinerator shall be 330 kg/hr and DG set shall be of 65 KVA. Adequate stack height will be provided to DG set as per CPCB norms.

The flue gases from incinerator will pass through the downstream air pollution control system, consisting of high pressure drop Venturi Scrubber for removal of particulate matter and partial acidic gases by absorption with 5% caustic solution, followed by packed bed scrubber for removal of complete acidic gases from flue gas. Provision is provided for injection of activated carbon powder in scrubbing system for adsorption of remote chances of presence of Hg vapours. Spent carbon from the circulating slurry will be filtered and collected through side stream filter. Gases from air pollution control system having concentration of pollutants within the prescribed norms of emission as per CPCB guideline will be let out through an I.D. fan followed by 30 m height stack.

Details of the proposed stacks, fuel to be used and quantity of fuel used, air pollution control measures (APCM) and expected pollutants are tabulated in **Table 2.10**.

TABLE 2.10 - DETAILS OF STACKS, EMISSIONS, FUEL USED AND APCM ATTACHED

Sr. No.	Stack Attached to	Stack Height and Diameter	Fuel Consumption	Emissions	Air Pollution Control System
1	Incinerator : 330 kg/hr	Height: 30 m Dia: 400 mm	LDO	Flue Gas Flow: 3071 Nm ³ /hr PM: 0.040 g/s HCl: 0.040 g/s NO _x : 0.34 g/s	High Pressure Drop Venturi scrubber and packed bed scrubber followed by ID Fan and stack height of 30 m
2	DG set : 65 KVA	Height: 2 m Dia: 100 mm	Furnace Oil	PM, SO ₂ , NO _x	Adequate stack height. Operated only during load shut

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					down as stand-by
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TABLE 2.11 - EMISSION STANDARDS

Sr. No.	Parameter	Standards	
		Limiting Concentration in mg/Nm ³ , unless stated	Sampling Duration in minutes, unless stated
1	Particulate Matter	50	30 or 1 Nm ³ of sample volume, whichever is more
2	Nitrogen Oxides NO and NO ₂ expressed as NO ₂	400	30 for online sampling or grab sample
3	HCl	50	30 or 1 Nm ³ of sample volume, whichever is more
4	Total Dioxins and Furans	0.1 ng TEQ / Nm ³ (at 11% O ₂)	8 hours or 5 Nm ³ of sample volume, whichever is more
5	Hg and its compounds	0.05	2 hours or 1 Nm ³ of sample volume, whichever is more.

(Ref.: Common BMW Treatment and Disposal Guideline)

2.8 WATER CONSUMPTION, WASTE WATER GENERATION, TREATMENT OF WASTE WATER & DISPOSAL DETAILS

Water shall be drawn from the bore well within the premises in addition to reuse the treated waste water. Total water requirement will be 28 KLD consisting of 15 KLD fresh water and 13 KLD recycled water. Total waste water generation will be 17.3 KLD, in which 1.8 KLD domestic waste water will be sent to soak pit and septic tank system and 15.5 KLD waste water will be treated in effluent treatment plant. Water is required for scrubber, floor washing, domestic usage, gardening and 10% hypo solution will be used for washing of vehicles. For drawing of water from bore well, project proponent is required take permission from CGWA of state / central government, as applicable.

Water consumption and waste water generation for different heads are tabulated in **TABLE 2.12**. Water Balance Diagram is provided in **FIGURE 2.4**.

TABLE 2.12 - WATER CONSUMPTION AND WASTE WATER GENERATION

Sr. No.	Description	Water Consumption (KLD)		Waste Water Generation (KLD)
		Fresh	Recycled	
1	Washing (Vehicle and Floor)	2	1	2.5
2	Scrubber for Incinerator	9	12	13
3	Domestic	2	-	1.8
4	Gardening	2	-	-
		15	13	

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	Total	28	17.3

Following measures shall be taken to reduce fresh water demand:

- Maximize use of treated waste water back to process.
- Use of drip irrigation / sprinkling system for greenbelt development, which will reduce the fresh water demand.

2.8.1 Process Description of Effluent Treatment Plant

The waste water 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 shall be provided.

Effluent generated from the facility shall be collected in an underground effluent collection cum equalization tank. From here effluent shall be 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 shall be separated from top. Waste water from oil and grease trap shall be taken to flash mixer where PAC shall be dosed for flocculation of suspended solids. From flash mixer, effluent shall be taken to inlet of flocculator where Polyelectrolyte shall be dosed for coagulation and for making large flocs. Flocculator is a baffle wall channel, allowing gentle mixing of waste water stream. From flocculator, effluent shall be taken to Primary Settling Tank. Here precipitated solids shall settle under gravity.

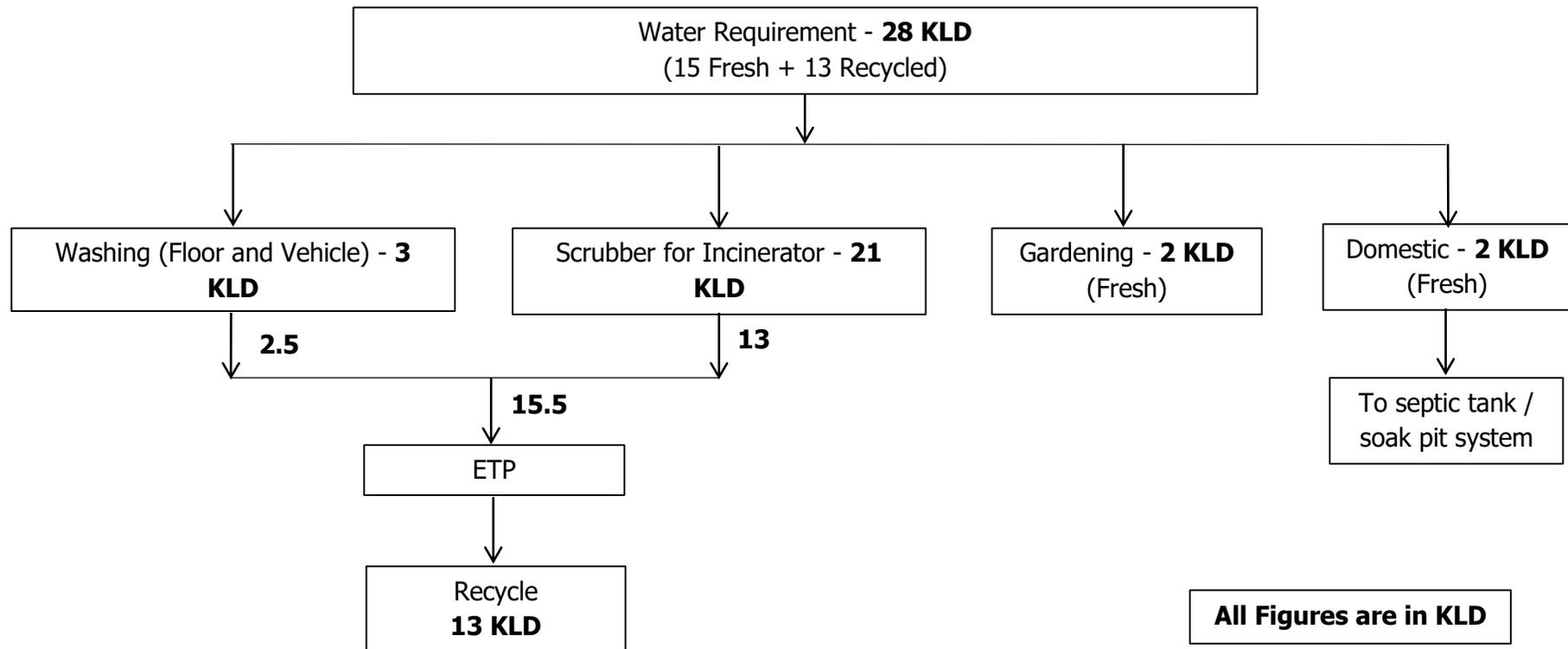
Supernatant from primary settling tank shall be taken to the inlet of Secondary Treatment Plant consisting of Aeration Tank. In Aeration Tank, soluble biodegradable component of effluent shall be subjected to biological treatment in presence of Biomass, Nutrient and Oxygen. Air required shall be supplied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

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

Sludge slurry generated from primary settling tank and biological treatment shall be collected on sludge drying bed. Leachate from sludge drying bed shall be 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 2.4 - WATER BALANCE DIAGRAM



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TABLE 2.13 - CHARACTERISTICS OF EFFLUENT

Capacity: 20 KLD

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/L	100 - 200	250	<30
3	Chemical Oxygen Demand (COD)	mg/L	400 - 700	800	<250
4	Suspended Solids	mg/L	200 - 400	400	<100
5	Oil and Grease	mg/L	10 - 20	20	10
6	Bio-assay Test	-	-		90% Survival of fish after 96 hrs in 100% effluent

(Source: Based on Pilot study from other similar BMW facility)

TABLE 2.14 - LIST OF EFFLUENT TREATMENT PLANT UNITS

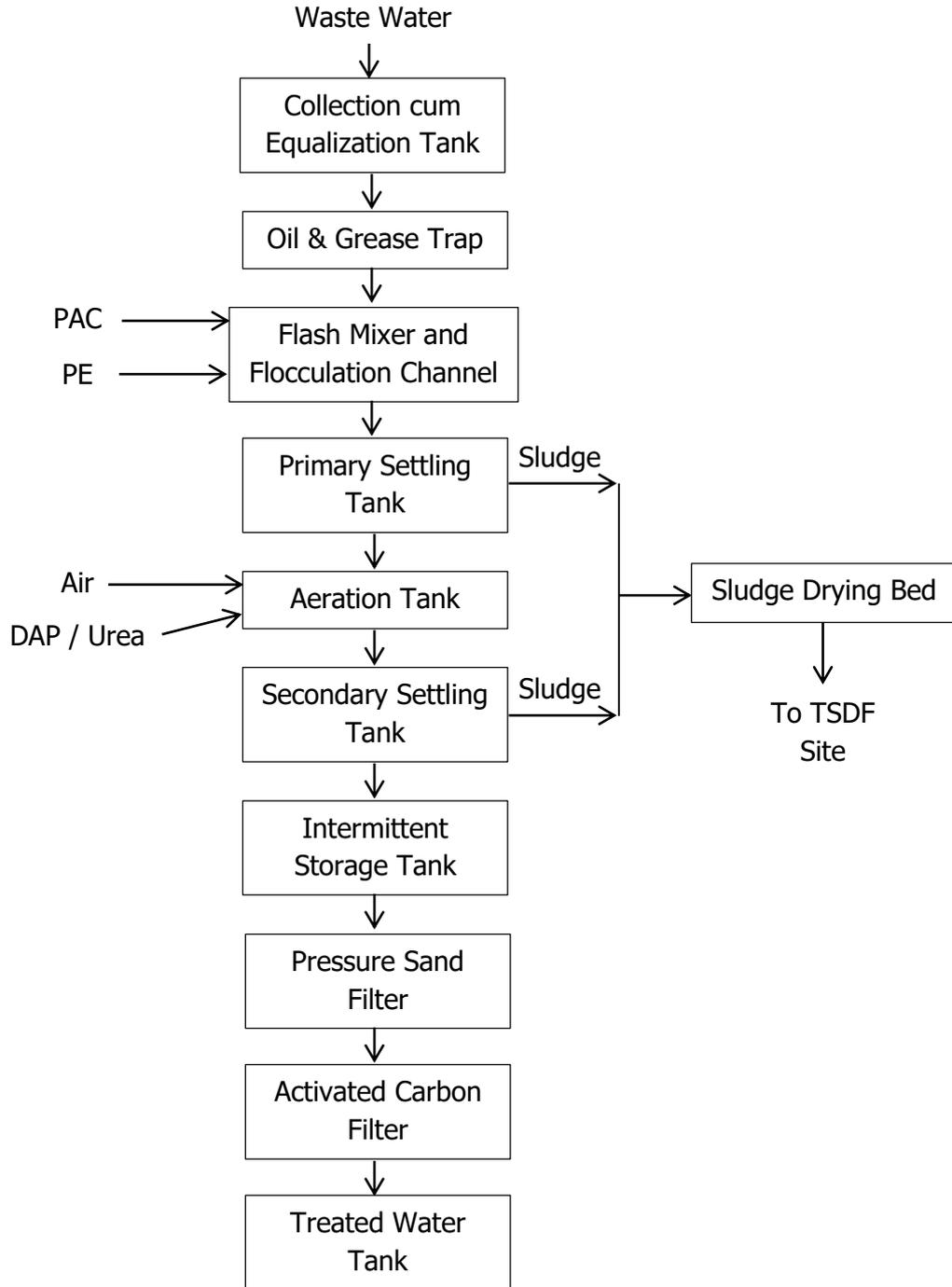
Sr.	Equipment	Capacity	Design Basis	Dimension	Qty	MOC
1	Waste Water Collection cum Equalization Tank	Flow : 20 m ³ /day	HRT: 24 h	Length: 3 m Width: 3 m Height: 2.5 m Volume: 22.5 m ³	1	RCC, provided with baffle wall arrangement for removal of oil and grease
2	Feed Pump	Flow : 20 m ³ /day	Operating Hours: 12 h/day	Capacity: 1 m ³ /h Head: 10 MLC	2 (1 W + 1 S)	CI/SS316 (2 Nos)
3	Flash Mixer	Flow : 20 m ³ /day	Operating Hours: 12 h/day HRT: 10 min	Capacity : 500 L Agitated Tank	1	HDPE
4	Flocculation Channel	Flow : 20 m ³ /day	Operating Hours: 12 h/day HRT: 20 min	Length: 4 m, Width: 0.5 m, Depth: 0.5 m Baffle wall channel provided peripheral to Primary Settling Tank	1	MS-Epoxy Painted
5	Primary Settling Tank	Flow : 20 m ³ /day	HRT: 4 h Based on 1 m ³ /h Flow Settling Volume : 4 m ³ /min	Length: 2 m Width: 2 m Height: 2 m Hopper depth: 1.0 m	1	MS Epoxy Painted / RCC Type: Rectangular, Hopper Bottom Settling Tank
6	Aeration Tank	Flow : 20 m ³ /day	F/M Ratio: 0.12 MLSS: 3000 mg/L HRT : 15 h	Length: 2.5 m Width: 2.5 m Height: 2.5 m Volume: 15.6 m ³	1	RCC

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7	Secondary Settling Tank	Flow : 20 m ³ /day	HRT: 4 h Based on 1 m ³ /h Flow Settling Volume : 4 m ³ /min	Length: 2 m Width: 2 m Height: 2 m Hopper depth: 1.0 m	1	MS Epoxy Painted / RCC Type: Rectangular, Hopper Bottom Settling Tank
8	Intermittent Storage Tank		HRT: 1 h Based on 1 m ³ /h Flow	1000 L Capacity	1	HDPE
9	PSF Feed Pump	Flow : 20 m ³ /day	Operating Hours: 12 h/day	Capacity: 1 m ³ /h Head: 10 MLC	2 (1 W + 1 S)	CI/SS316 (2 Nos)
10	Pressure Sand Filter	Flow : 1 m ³ /h	Filtration velocity: 12 m/h	Diameter : 0.5 m	1	Media: Graded sand
11	Activated Carbon Filter	Flow : 1 m ³ /h	Filtration velocity: 12 m/h	Diameter : 0.5 m	1	Media: Activated carbon on graded sand
12	Treated Water Tank	Flow : 20 m ³ /day	HRT: 24 h	Length: 3 m Width: 3 m Height: 2.5 m Volume: 22.5 m ³		RCC
13	Air Blower	Flow : 20 m ³ /day	Diffuser SOTE 5% per meter depth	Type: Twin lobe Capacity: 40 Nm ³ /h Head: 3500 mmwgc Motor: 3 HP	2 (1W+1S)	CI
14	Dosing Tanks	Flow : 20 m ³ /day	One Day	Capacity: 100 L each for PAC, PE, DAP/Urea, Hypo	4	HDPE provided with manual stirrer
15	Sludge Drying Bed	10 kg/day sludge on dry basis	7 day drying cycle	Rectangular, Sand Gravity type sludge drying bed (Covered with shed) 2 m x 2 m x 0.8 m Provided with bottom leachate collection system	2	Masonry Wall with Impervious Bottom, Filled with graded gravel and sand

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FIGURE 2.5 - BLOCK DIAGRAM OF EFFLUENT TREATMENT PLANT



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2.9 SOLID AND HAZARDOUS WASTE MANAGEMENT

List of solid waste generated from facility, their storage and disposal plan is provided as under in **TABLE 2.15**.

TABLE 2.15 - CATEGORIZATION, STORAGE AND DISPOSAL OF SOLID WASTE

Cat. No.*	Type of Hazardous and Other Waste	Source	Quantity Generated	Method of Disposal
36.2	Incinerator Ash	Incinerator	90 kg/day	Send to TSDF
34.3	ETP Sludge	ETP area	15 kg/day	Send to TSDF
-	Glass and Plastic Waste (after Autoclave and Shredding)	Shredder	3 T/day	Send to Authorized Recyclers
-	Spent Activated Carbon	ETP area	50 kg/month	Send to TSDF
-	Sharps after Autoclave and Shredding	Shredder	5 kg/day	Send to iron foundry / to TSDF
5.1	Waste Oil	From Plant & Machineries	15 L/month	Send to Authorized Recyclers
-	Used Batteries		4 nos/year	Send to Authorized Recyclers

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

2.9.1 Noise Generation

The sources of noise from the project can be from following activities: -

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

Following measures are proposed for minimization of noise generation at source

- ID fan, FD Fan and ETP Air Blower shall be selected such that their noise generation shall be less than 85 dB at 1 m distance from the equipment.
- DG Set shall be provided with Acoustic Enclosure.
- Other equipment shall be provided in covered shed / building to minimize transmission of noise outside factory premises.

Additionally, facility shall have greenbelt cover at periphery of the plot for reducing transmission of noise outside the premises.

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CHAPTER 3

DESCRIPTION OF THE ENVIRONMENT

3.1 INTRODUCTION

This chapter illustrates the baseline status of environmental quality in the vicinity of project site which serves as the basis for identification, prediction and evaluation of impacts. The baseline environmental quality is assessed through field studies within the impact zone for various components of the environment viz. air, noise, water, land, geo-hydrology, and ecology and socio-economic. Information of baseline environmental status of the study area is useful for Impact Assessment process of assessing and predicting the environmental consequences of the significant actions. Significant action depicts direct adverse changes caused by the action and its effect on the health of the biota including flora, fauna and human being, socio-economic conditions, current use of land and resources, physical and cultural heritage properties and biophysical surroundings.

3.2 METHODOLOGY

The baseline environmental quality was assessed during 1st October 2018 to 31st December 2018 after reconnaissance in September 2018 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 **FIGURE 3.1**.

Water, soil, noise and ambient air samples were collected and analysed by M/s. Team Labs and Consultants. The methodology of data collection and analysis adopted is given in **TABLE 3.1**. Data about micrometeorology, prevailing land use and land cover, flora - fauna and socio-economic status of the study area was also studied during this period.

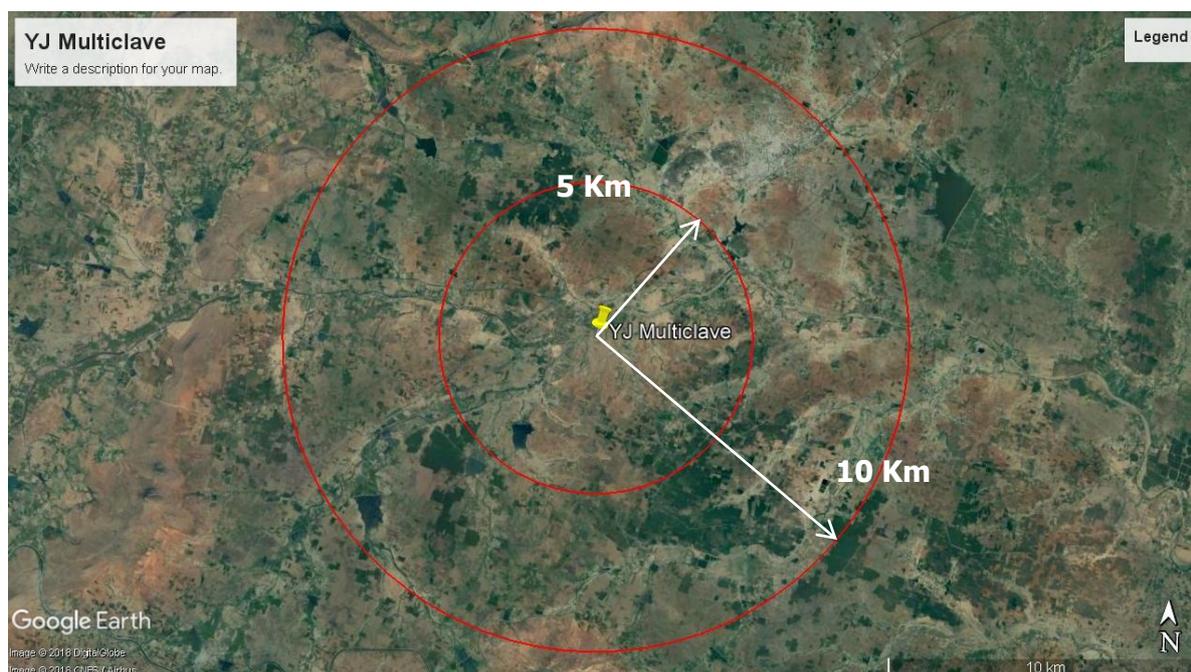
TABLE 3.1 - METHODOLOGY OF DATA COLLECTION

Attribute	Methods	
	Sampling / Preservation	Analysis
A. Water		
Ground Water	Standard Methods for Examination of Water and Waste water	IS 3025 & Standard Methods for Examination of Water and Waste water
Surface Water		
B. Climate & Meteorology	Site-specific meteorological data for the project site have been collected using Weather Station for period from 1 st October 2018 to 31 st December 2018	NA
C. Ambient Air Quality	As per IS: 5182	As per IS: 5182
D. Noise	Sound level meter	Survey carried out as per EPA 1986

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E. Land Use & Land Cover	Land use map prepared by field area expert by visual image interpretation using data of IRS P6 LISSIV, NRSC Satellite image, Hyderabad
F. Ecology & Biodiversity Data	Primary data collection by site visit and Secondary data verification
G. Socio - economic Data	Primary data collection by site visit and Secondary data verification

FIGURE 3.1 - LOCATION MAP OF PROJECT SITE WITH STUDY AREA



3.3 WATER

3.3.1 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: Lakes, ponds, rivers, streams etc.

Ground water: Accumulation in deeper strata of ground / aquifers

3.3.2 Location of Water Monitoring Stations

The locations of water sample monitoring stations in the study area are tabulated in **TABLE 3.2** and shown in **FIGURE 3.2**.

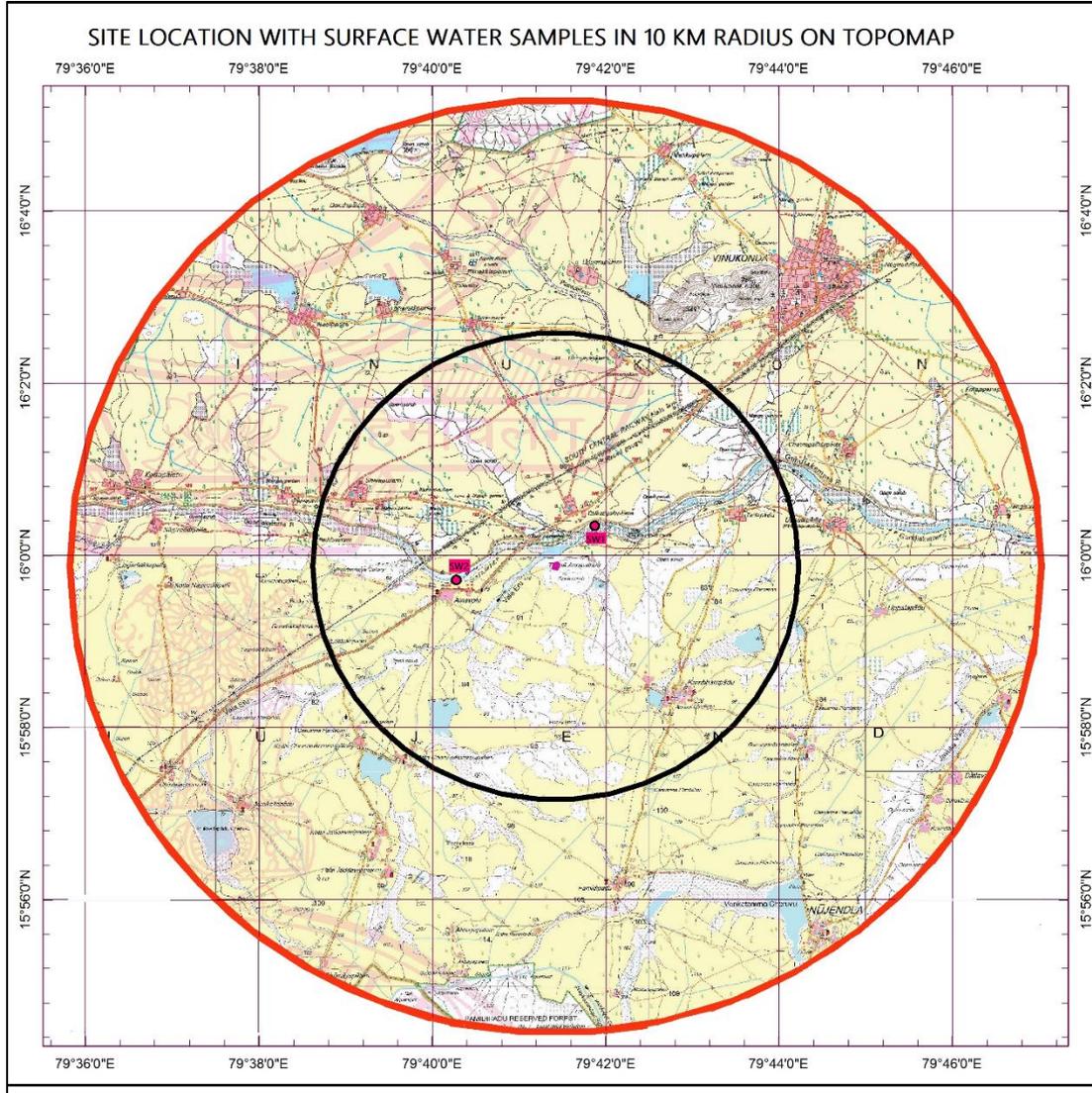
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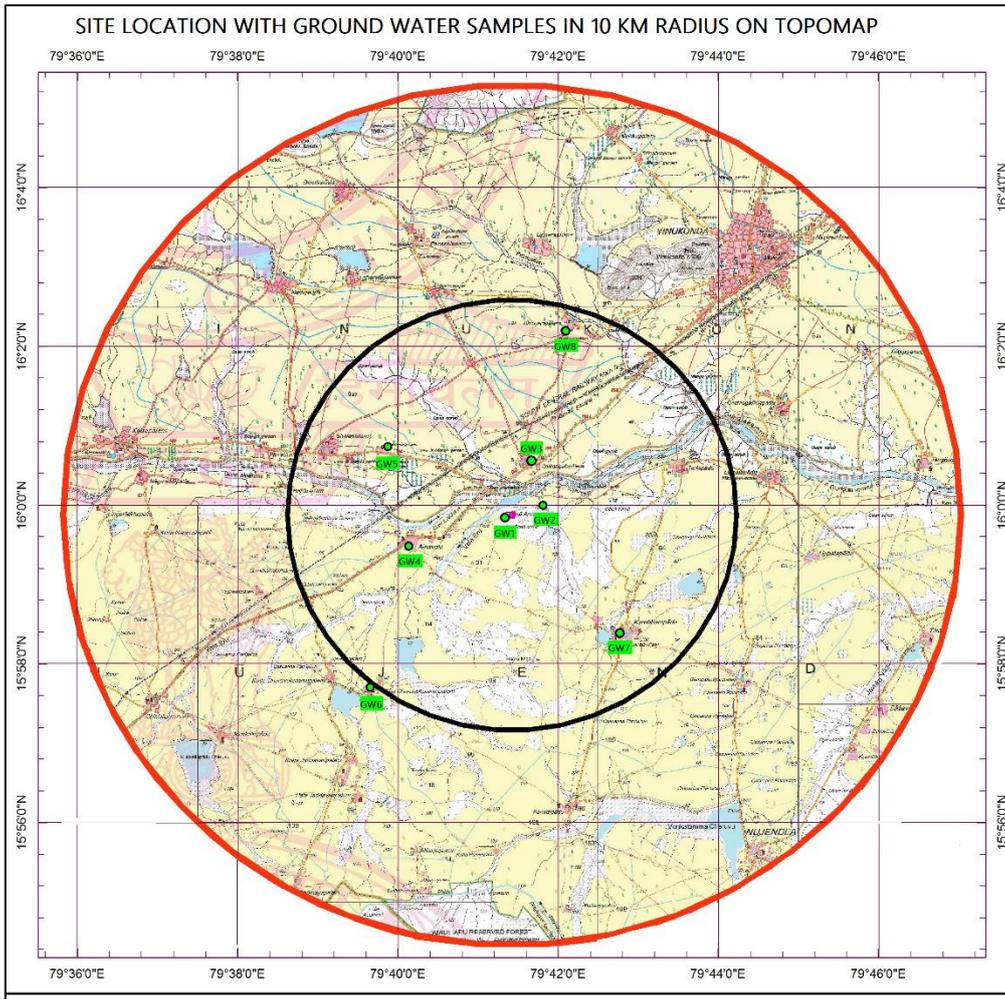
TABLE 3.2 - DETAILS OF WATER SAMPLING LOCATIONS

Stn. Code	Location	Latitude	Longitude	Direction wrt Proj. Site	Aerial Dist. from Proj. Site (in km)
Surface Water					
SW1	Gundlakamma upstream	16° 0'21.48"N	79°41'57.14"E	W	1.5
SW2	Gundlakamma downstream	15°59'44.53"N	79°40'13.08"E	NE	2.1
Ground Water					
GW1	Project Site (Tube well)	15°59'52.19"N	79°41'25.16"E	-	0
GW2	Tana Annavaram (Hand Pump)	15°59'58.65"N	79°41'47.46"E	NE	0.7
GW3	Chikatigalapalem (Hand Pump)	16° 0'31.86"N	79°43'28.14"E	NE	1.3
GW4	Ainavolu (Hand Pump)	15°59'31.56"N	79°40'14.24"E	SW	2.2
GW5	Ramireddypalem (Hand Pump)	16° 0'40.28"N	79°39'9.26"E	NW	4.2
GW6	Patacheruvukom mupalem (Hand Pump)	15°56'32.93"N	79°39'22.65"E	SW	4.7
GW7	Kambhampadu (Hand Pump)	15°58'26.43"N	79°42'49.37"E	SE	3.4
GW8	Timmayapalem (Hand Pump)	16° 2'14.85"N	79°42'8.35"E	NE	4.6



FIGURE 3.2 - SAMPLING LOCATIONS FOR SURFACE WATER & GROUND WATER





3.3.3 Results

As described in earlier section of this chapter, the standard methods (APHA, AWWA 2007) prescribed for surface and ground water sampling, preservation as well as analytical procedures for various parameters were followed in this study. Results are enlisted in **TABLE 3.3** and **TABLE 3.4**.

TABLE 3.3 - SURFACE WATER QUALITY OF STUDY AREA

Sr. No.	Location →		SW-1	SW-2	IS 2296: 1982
	Parameters	Units			
1	Temperature	°C	31	32	-
2	pH (at 30 °C)	-	7.38	7.36	6.5 - 8.5
3	Colour	Hazen	1	1	300
4	Turbidity	NTU	0.4	0.6	-
5	Total Solids	mg/L	425	436	-
6	Total Dissolved Solids	mg/L	435	380	1500
7	Total Suspended Solids	mg/L	16	17	-

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Sr. No.	Location →		SW-1	SW-2	IS 2296: 1982
	Parameters	Units			
8	Calcium (as Ca)	mg/L	40	40	-
9	Chloride (as Cl)	mg/L	182	180	600
10	Fluoride (as F)	mg/L	0.29	0.28	1.5
11	Magnesium (as Mg)	mg/L	16	18	-
12	Total Alkalinity (as CaCO ₃)	mg/L	250	110	-
13	Total Hardness (as CaCO ₃)	mg/L	165	175	-
14	Oil and Grease	mg/L	< 0.1	< 0.1	0.1
15	Dissolved Oxygen	mg/L	5.5	5.3	4
16	Chemical Oxygen Demand	mg/L	36	32	-
17	BOD 3 days at 27±1 °C	mg/L	3	2.8	3
18	Sodium (as Na)	mg/L	92	90	-
19	Potassium (as K)	mg/L	4.9	4.9	-
20	Silica (as SiO ₂)	mg/L	4.2	3.7	-
21	Sodium Absorption Ratio (SAR)	-	3.1	3	-
22	Sulphates (as SO ₄)	mg/L	85	90	400
23	Nitrate (as NO ₃)	mg/L	3.2	3	50
24	Residual free Chlorine	mg/L	< 0.2	< 0.2	-
25	Mineral Oil	mg/L	Nil	Nil	-
26	Aluminium (as Al)	mg/L	< 0.5	< 0.5	-
27	Hexavalent Chromium (as Cr ⁺⁶)	mg/L	< 0.05	< 0.05	0.05
28	Copper (as Cu)	mg/L	0.01	0.01	1.5
29	Iron (as Fe)	mg/L	0.1	0.5	50
30	Lead (as Pb)	mg/L	< 0.01	< 0.01	0.1
31	Manganese (as Mn)	mg/L	0.01	0.01	-
32	Zinc (as Zn)	mg/L	0.61	0.65	15

(- indicates limit not specified in IS 2296:1982)

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TABLE 3.4 - GROUND WATER QUALITY OF STUDY AREA

Sr. No.	Location →		IS 10500: 2012		GW-1	GW-2	GW-3	GW-4	GW-5	GW-6	GW-7	GW-8
	Parameters	Units	Desirable	Permissible								
1	Temperature	°C	-	-	32	30	30	29	28	27	28	27
2	pH	-	6.5-8.5	No Relaxation	7.12	7.3	7.07	7.06	7.25	7.12	6.84	6.8
3	Colour	Hazen	5	15	1	1	1	1	1	1	1	1
4	Turbidity	NTU	1	5	0.4	0.3	0.6	0.5	0.3	0.2	< 0.1	< 0.1
5	Total Solids	mg/L	-	-	701	784	869	422	775	459	575	766
6	Total Dissolved Solids	mg/L	500	2000	690	770	856	410	765	446	563	752
7	Total Suspended Solids	mg/L	-	-	11	14	13	12	10	13	12	14
8	Iron (as Fe)	mg/L	0.3	No relaxation	0.2	0.28	0.23	0.1	0.27	0.34	0.39	0.24
9	Chloride (as Cl)	mg/L	250	1000	242	350	301	201	310	160	184	252
10	Fluoride (as F)	mg/L	1.0	1.5	0.65	0.28	0.28	0.31	0.42	0.39	0.82	0.64
11	Calcium (as Ca)	mg/L	75	200	53	60	24	40	50	46	64	70
12	Magnesium (as Mg)	mg/L	30	100	44	71	26	30	40	10	44	46
13	Calcium/Magnesium	-	-	-	1.2	0.85	0.92	1.32	1.25	4.73	1.46	1.52
14	Total Alkalinity (as CaCO ₃)	mg/L	200	600	249	247	260	150	360	115	80	105
15	Total Hardness (as CaCO ₃)	mg/L	200	600	315	443	168	225	290	155	340	365
16	Zinc as Zn	mg/L	5	15	0.11	0.16	0.16	0.12	0.13	0.15	0.04	0.1
17	Boron (as B)	mg/L	0.5	1.0	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
18	Sodium (as Na)	mg/L	-	-	84	67	154	85	140	82	69	132
19	Potassium (as K)	mg/L	-	-	11	13	78	6.8	15	6.7	14	11
20	Manganese (as Mn)	mg/L	0.1	0.3	0.07	0.1	0.02	< 0.01	0.04	< 0.01	< 0.01	< 0.01

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Sr. No.	Location →		IS 10500: 2012		GW-1	GW-2	GW-3	GW-4	GW-5	GW-6	GW-7	GW-8
	Parameters	Units	Desirable	Permissible								
21	Lead (as Pb)	mg/L	0.01	No relaxation	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
22	Sodium Absorption Ration (SAR)	-	-	-	2.1	1.4	5.2	2.5	3.6	2.9	1.9	3.5
23	Silica (as SiO ₂)	mg/L	-	-	8	9.8	9	3.7	11	2.7	5.4	11
24	Nitrate (as NO ₃)	mg/L	45	No relaxation	5.9	6.7	16	3.1	13	2.1	48	48
25	Sulphate (as SO ₄)	mg/L	200	400	91	42	88	105	85	90	100	129
26	Aluminium (as Al)	mg/L	0.03	0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

(- indicates limit not specified in IS 10500:2012)

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3.3.4 Interpretation

It is observed that the surface water source needs water treatment plant consisting of clarification, sand filtration, carbon treatment and disinfection, before it is used as domestic purposes because DO and BOD levels are at permissible limit. Based on ground water sample analysis results, it is observed that at more than 50 % of the stations, results of some parameters such as TDS, Magnesium, Alkalinity, Chloride, Hardness are above desirable limit of drinking water standards (IS 10500:2012) but below permissible limit of same. Iron and Nitrate levels were slightly higher than desirable limit in 2 stations. Therefore, it is advisable that, ground water can be used as drinking water after treatment through RO plant.

3.4 METEOROLOGY

3.4.1 Introduction

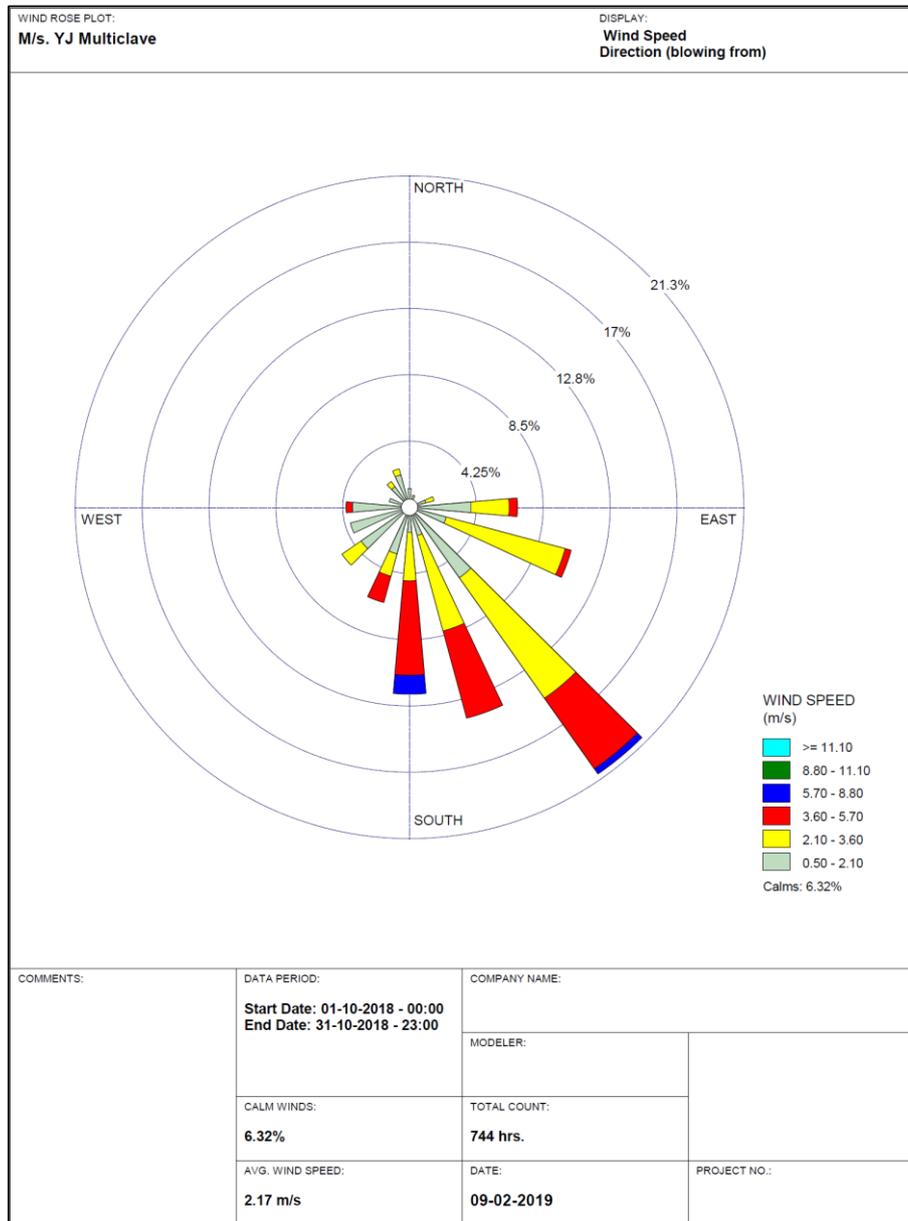
Meteorology is the interdisciplinary scientific study of the atmosphere and is an important tool in studying environmental phenomena like pollutant dispersion and diffusion. When the EIA study is planned for any project, meteorological data are very important and shall be collected through the entire period of the baseline study. Typically for EIA, micrometeorological data is required to be collected as these data are essential to formulate the pollutant dispersion models. Besides, it also helps in understanding the current trend in climatologically variable as well as prevailing ambient air quality issues and forecasting.

3.4.2 Result

For site-specific meteorological data, for period of 1st October 2018 to 31st December 2018 was given by Team Labs & Consultants. The 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. The wind rose diagram for the study period is shown in **FIGURE 3.3, FIGURE 3.4, FIGURE 3.5, TFIGURE 3.6** and **TABLE 3.5**.

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FIGURE 3.3 – WIND ROSE DIAGRAM FOR OCTOBER, 2018 MONTH (POST MONSOON SEASON)



3.4.3 Interpretation

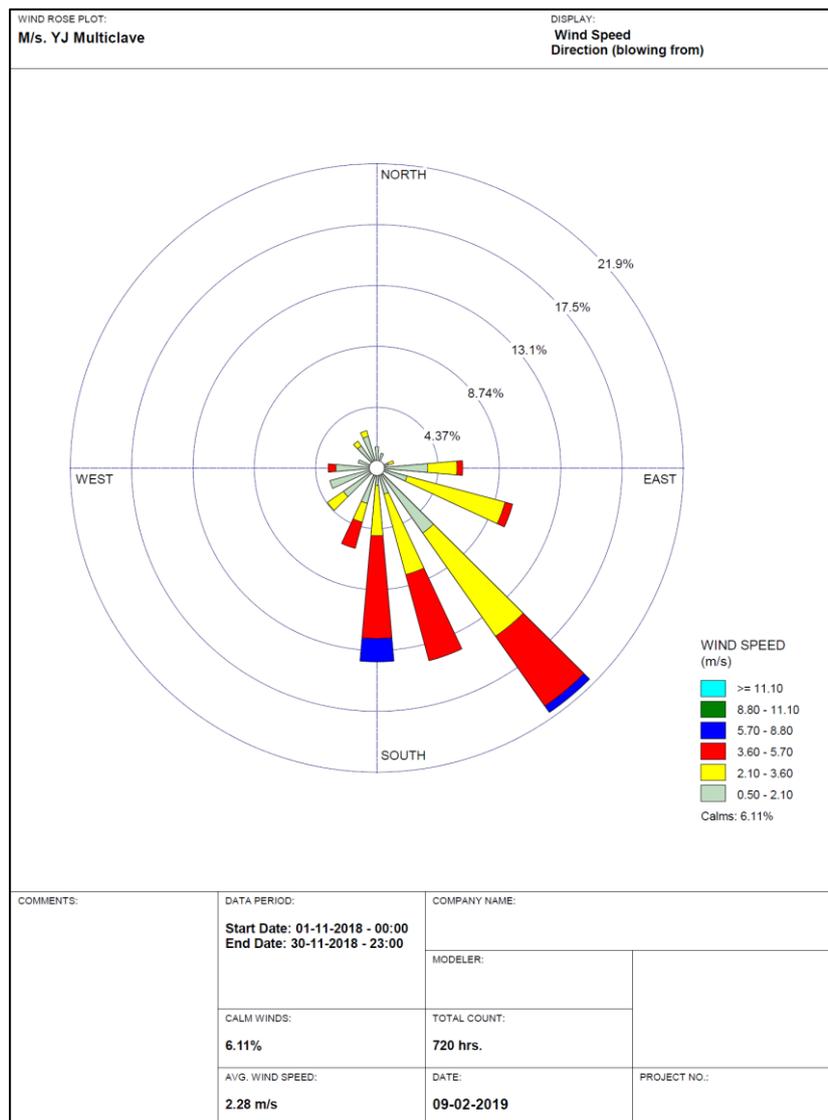
Wind Pattern: The 24 hourly wind rose diagram for the October month and resultant vector of wind rose diagram indicates that the predominant wind direction from South-East to North-West. The average wind speed during the period was 2.17 m/s with 6.32 % calm condition.

Temperature: During the study period of October 2018, the temperature has varied in the range from 22.6 °C to 33.6 °C and with average of 28.18 °C.

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Relative Humidity: During the study period of October 2018, the relative humidity has varied in the range from 52 % to 71 %.

FIGURE 3.4 – WIND ROSE DIAGRAM FOR NOVEMBER, 2018 MONTH (POST MONSOON SEASON)



3.4.4 Interpretation

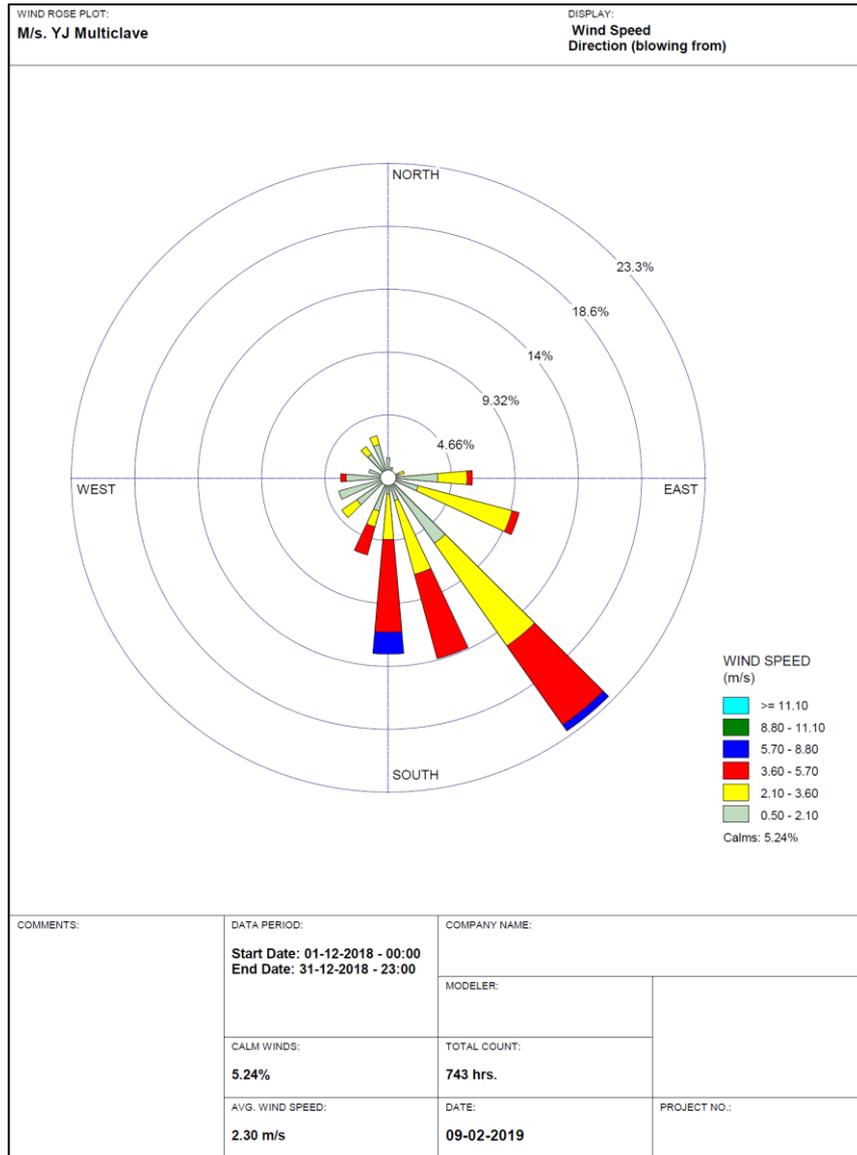
Wind Pattern: The 24 hourly wind rose diagram for the November month and resultant vector of wind rose diagram indicates that the predominant wind direction from South-East to North-West. The average wind speed during the period was 2.28 m/s with 6.11 % calm condition.

Temperature: During the study period of November 2018, the temperature has varied in the range from 22.6 °C to 33.6 °C and with average of 28.23 °C.

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Relative Humidity: During the study period of November 2018, the relative humidity has varied in the range from 52 % to 71 %.

FIGURE 3.5 – WIND ROSE DIAGRAM FOR DECEMBER, 2018 MONTH (POST MONSOON SEASON)



3.4.5 Interpretation

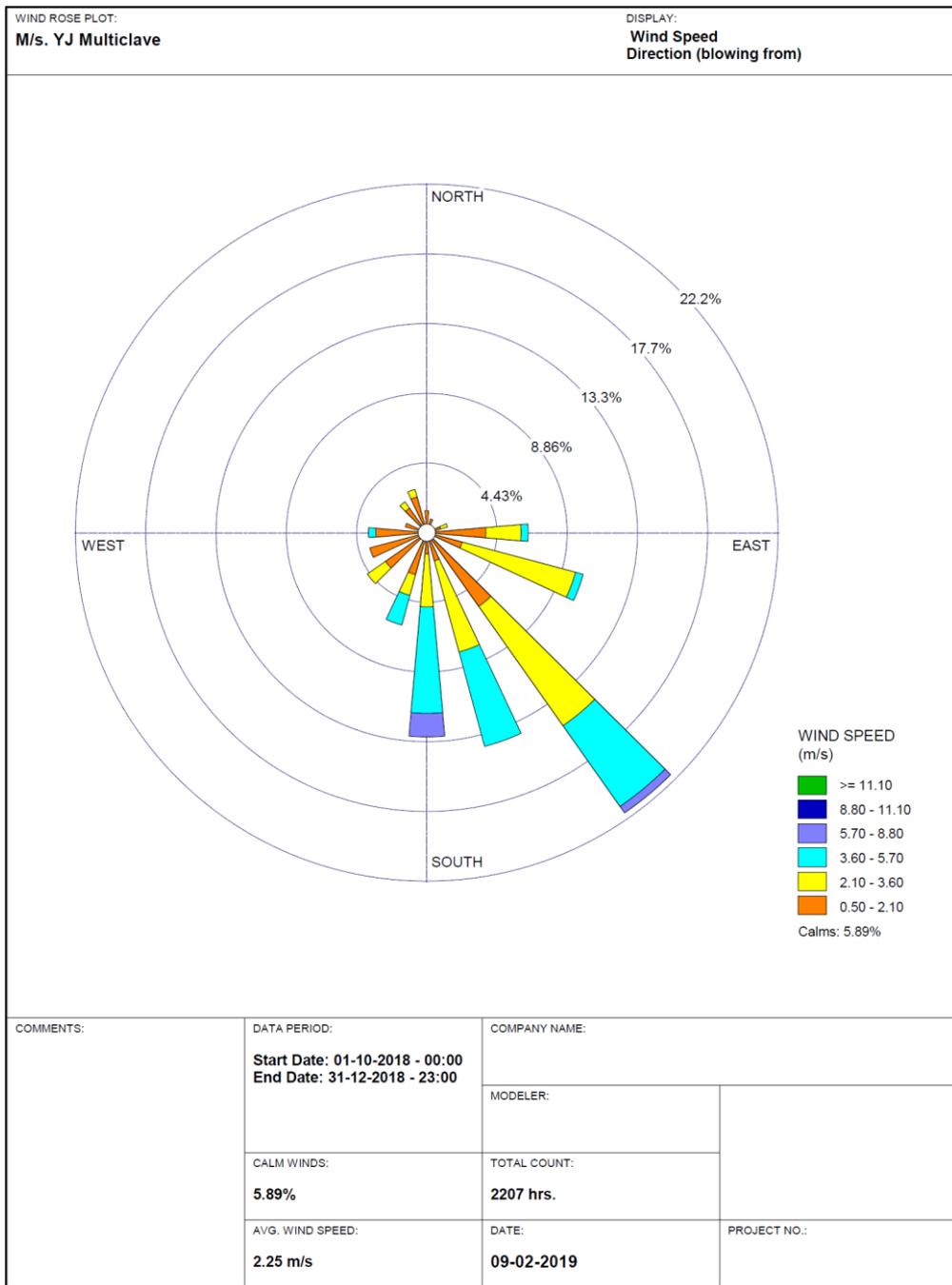
Wind Pattern: The 24 hourly wind rose diagram for the December month and resultant vector of wind rose diagram indicates that the predominant wind direction from South-East to North-West. The average wind speed during the period was 2.30 m/s with 5.24 % calm condition.

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Temperature: During the study period of December 2018, the temperature has varied in the range from 22.6 °C to 33.6 °C and with average of 26.52 °C.

Relative Humidity: During the study period of December 2018, the relative humidity has varied in the range from 52 % to 71 %.

FIGURE 3.6 – WIND ROSE DIAGRAM FOR OCTOBER-DECEMBER, 2018 MONTH (POST MONSOON SEASON)



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3.4.6 Interpretation

Wind Pattern: The 24 hourly wind rose diagram for the study period and resultant vector of wind rose diagram indicates that the predominant wind direction from South-East to North-West. The average wind speed during the period was 2.25 m/s with 5.89 % calm condition.

Temperature: During the study period of October 2018 to December 2018, the temperature has varied in the range from 22.6 °C to 33.6 °C and with average of 27.64 °C.

Relative Humidity: During the study period of October 2018 to December 2018, the relative humidity has varied in the range from 52 % to 71 %.

3.5 AMBIENT AIR

3.5.1 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

Based on above considerations

1. Six ambient air quality-monitoring stations have been selected

- One AAQM station was setup in the downwind direction,
- Four in cross wind direction - 2 on either side,
- One was at Project Site itself.

2. Ambient Air quality has been assessed based on the pollutants: PM₁₀, PM_{2.5}, Sulphur Dioxide (SO₂), Oxides of Nitrogen (NO_x) and VOC.

3.5.2 Ambient Air Quality Monitoring Locations

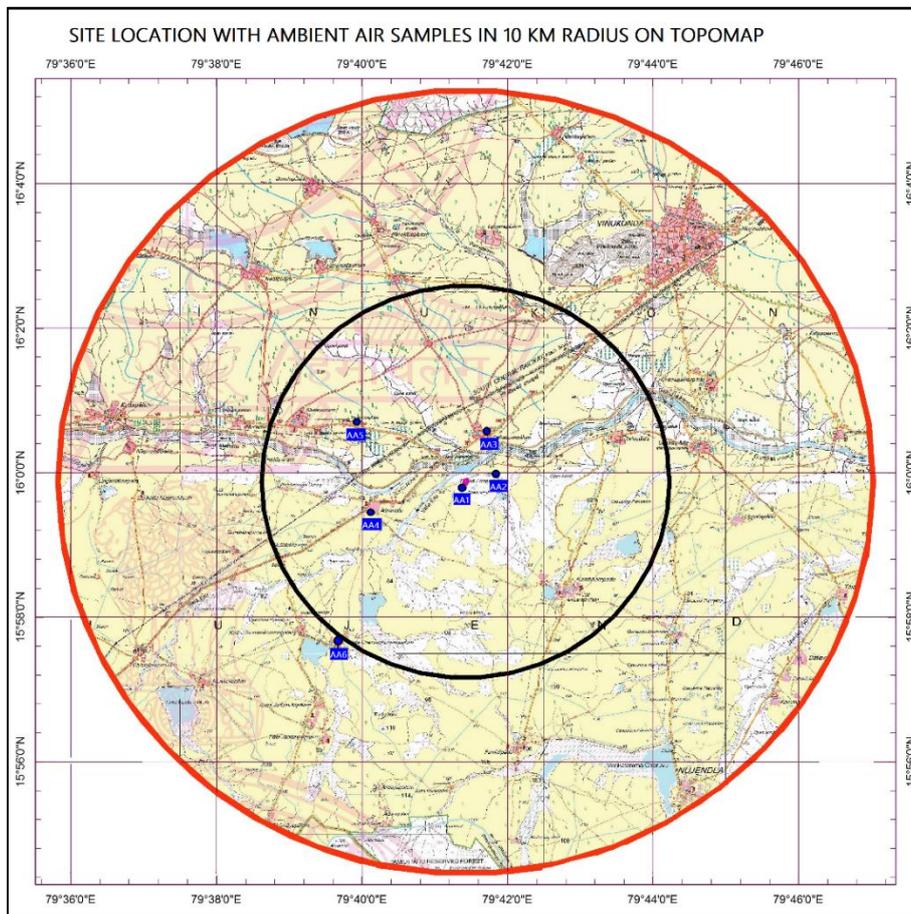
The locations for AAQM were decided based on the prescribed guidelines. For this EIA, the purpose is to ascertain the baseline pollutant concentrations in ambient air. Accordingly, the criterion was selected to ascertain quality of air at important human settlements. Monitoring locations for Ambient Air Quality are given below in **TABLE 3.5** as well as **FIGURE 3.7**.

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TABLE 3.5 - AAQM LOCATIONS

AAQM Station	Location	Distance from Project Site (km)	Co-ordinates	Justification for Selection of Station
AA1	Project Site	0	Latitude: 15°59'52.19"N Longitude: 79°41'25.16"E	Core Station
AA2	Tana Annavaram village	0.7	Latitude: 15°59'58.65"N Longitude: 79°41'47.46"E	Crosswind
AA3	Chikatigalapalem village	1.3	Latitude: 16° 0'31.86"N Longitude: 79°43'28.14"E	Crosswind
AA4	Ainavolu village	2.2	Latitude: 15°59'31.56"N Longitude: 79°40'14.24"E	Crosswind
AA5	Ramireddypalem village	4.2	Latitude: 16° 0'40.28"N Longitude: 79°39'9.26"E	Downwind
AA6	Patacheruvukom mupalem village	4.7	Latitude: 15°56'32.93"N Longitude: 79°39'22.65"E	Crosswind

FIGURE 3.7 - MONITORING LOCATIONS FOR AMBIENT AIR QUALITY



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3.5.3 Results

PM₁₀, PM_{2.5}, SO₂, NO_x, VOC were monitored twice a week at each location. Sampling was carried out during the study period from 1st October, 2018 to 31st December 2018. Samples thus collected were analysed at NABL approved laboratory by following Standard Procedures as described at **TABLE 3.6**. Results of PM₁₀, PM_{2.5}, SO₂, NO_x and VOC are tabulated in **TABLE 3.7**.

TABLE 3.6 - METHODOLOGY OF ANALYSING AMBIENT AIR MONITORING PARAMETERS

Sampling Parameters	Method of Measurement
PM₁₀	Gravimetric
PM_{2.5}	Gravimetric
SO₂	Improved West and Gaeke Method
NO_x	Jacob & Hochheiser modified (NaOH-NaAsO ₂) Method
VOC	Gas Chromatography

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TABLE 3.7 - AMBIENT AIR QUALITY MONITORING RESULTS

Station Code	CPCB Limit → Location	Parameters & Results				
		PM ₁₀ (µg/m ³) 100 µg/m ³	PM _{2.5} (µg/m ³) 60 µg/m ³	SO ₂ (µg/m ³) 80 µg/m ³	NO _x (µg/m ³) 80 µg/m ³	VOC (ppm) ppm
		24 Hours	24 Hours	24 Hours	24 Hours	
AA1	Project Site (M/s. YJ Multiclave)					
	Min	41	14	9	9	BDL
	Max	52	16	11	14	BDL
	Average	46.62	14.73	9.65	10.27	BDL
AA2	Tana Annavaram					
	Min	44	14	9	9	BDL
	Max	52	16	12	14	BDL
	Average	47.77	14.81	9.96	10.58	BDL
AA3	Chikatigalapalem					
	Min	44	14	9	9	BDL
	Max	49	16	11	13	BDL
	Average	46.35	14.69	9.62	10.04	BDL
AA4	Ainavolu					
	Min	41	14	9	9	BDL
	Max	49	16	11	13	BDL
	Average	44.38	14.81	10.42	10.62	BDL
AA5	Ramireddypalem					
	Min	41	14	9	9	BDL
	Max	49	16	11	13	BDL
	Average	45.73	14.58	10.42	10.62	BDL

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Station Code	CPCB Limit → Location	Parameters & Results				
		PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	VOC (ppm)
		100 µg/m ³ 24 Hours	60 µg/m ³ 24 Hours	80 µg/m ³ 24 Hours	80 µg/m ³ 24 Hours	ppm
AA6	Patacheruvukomupalem					
	Min	44	14	9	9	BDL
	Max	49	16	11	13	BDL
	Average	46.12	14.69	10.31	10.65	BDL

Note: Minimum reportable readings are 31 µg/m³ for PM₁₀, 15 µg/m³ for PM_{2.5}, 9 µg/m³ for SO₂, 9 µg/m³ for NO_x
BDL = Below Detectable Limit

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3.5.4 Interpretation of Results

Based on the results presented at **TABLE 3.7**, the baseline ambient air quality, with reference to the parameters namely PM₁₀, PM_{2.5}, SO₂, NO_x, VOC has been determined and discussed here under:

1. Particulate Matter:

- **PM₁₀:** The PM₁₀ concentration ranges between 41 to 52 µg/m³ within the study area during the period of sampling. Proposed project area is completely village area and surrounding area is mostly cover with vegetation and forest area. That might be the reason for lower concentration of PM in study area. The average, PM₁₀ concentration remains well below the stipulated standards of NAAQS [24 hr.].
- **PM_{2.5}:** The PM_{2.5} concentration ranges between 14 to 16 µg/m³ within the study area during the period of sampling. The average PM_{2.5} concentration remains well below the stipulated standards of NAAQS [24 hr.] at all the monitoring locations.

2. Gaseous Pollutants:

- **SO₂:** The minimum and maximum concentration of SO₂ ranges between 9 to 12 µg/m³. The average remains wells within the stipulated value of 80 µg/m³ at all the monitoring locations.
- **NO_x:** The minimum and maximum concentration of NO_x ranges between 9 to 14 µg/m³. The average remains wells within the stipulated value of 80 µg/m³at all the monitoring locations.
- **VOC:** The concentration of VOC is found Below Detectable Limit.

3.6 NOISE

3.6.1 Introduction

As per Noise Pollution [Regulation and Control] Rules, 2000 notified by the Ministry of Environment and Forests, New Delhi, on 14th February, 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.

3.6.2 Noise Sampling Locations

The noise levels were measured at project site and the different locations falling within the study area as shown in **FIGURE 3.8**. The details of the sampling locations are given in **TABLE 3.8**.

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FIGURE 3.8 - LOCATION MAP OF NOISE LEVEL MONITORING STATIONS

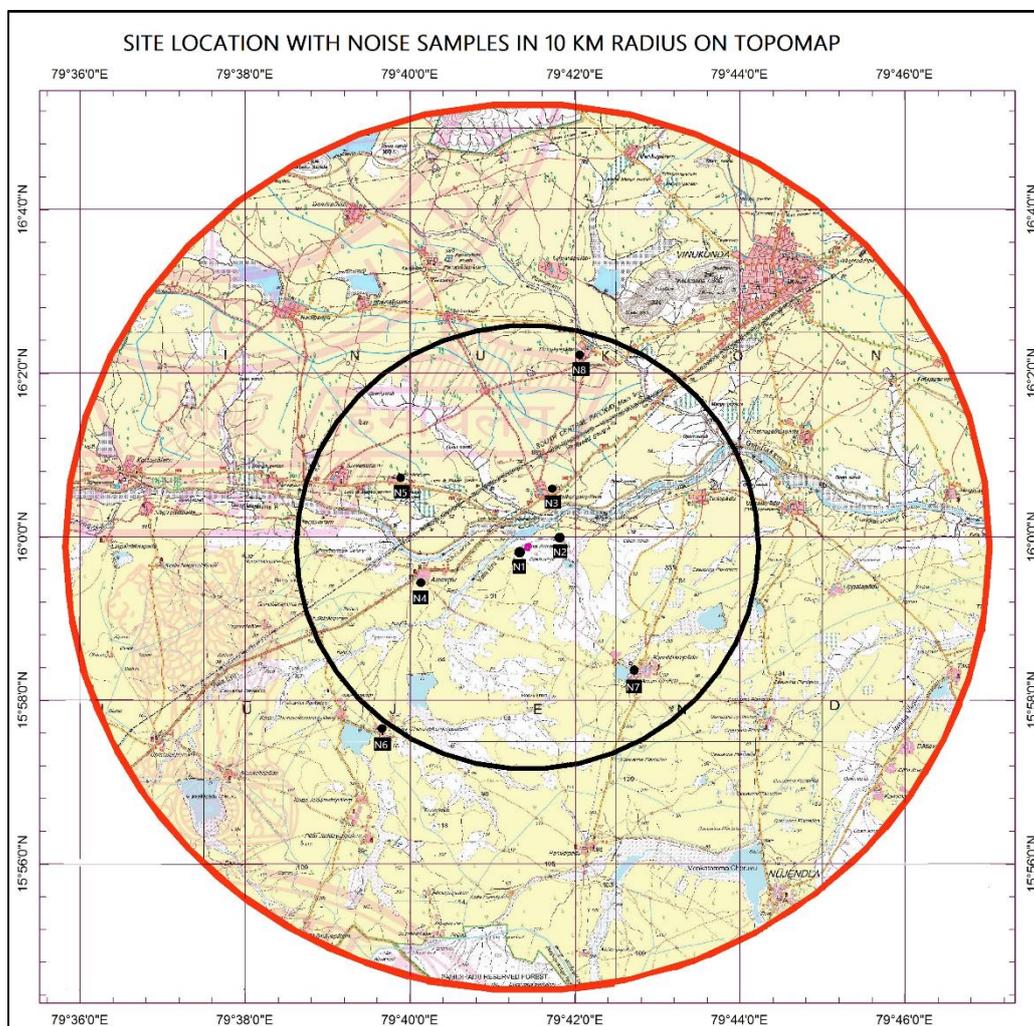


TABLE 3.8- LOCATION OF NOISE LEVEL MONITORING STATIONS

Station Code	Location	Distance from Project Site	Co-ordinates
NL1	Project Site	0	Latitude: 15°59'52.19"N Longitude: 79°41'25.16"E
NL2	Tana Annavaram village	0.7	Latitude: 15°59'58.65"N Longitude: 79°41'47.46"E
NL3	Chikatigalapalem village	1.3	Latitude: 16° 0'31.86"N Longitude: 79°43'28.14"E
NL4	Ainavolu village	2.2	Latitude: 15°59'31.56"N Longitude: 79°40'14.24"E
NL5	Ramireddypalem village	4.2	Latitude: 16° 0'40.28"N Longitude: 79°39'9.26"E

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Station Code	Location	Distance from Project Site	Co-ordinates
NL6	Patacheruvukommupalem village	4.7	Latitude: 15°56'32.93"N Longitude: 79°39'22.65"E
NL7	Kambhampadu village	3.4	Latitude: 15°58'26.43"N Longitude: 79°42'49.37"E
NL8	Timmayapalem village	4.6	Latitude: 16° 2'14.85"N Longitude: 79°42'8.35"E

3.6.3 Results

The equivalent noise levels, Leq [day] and Leq [night] have been monitored and the results are tabulated in **TABLE 3.9**. Noise levels were measured using Sound Level Meter.

TABLE 3.9 - NOISE LEVELS AT PROJECT SITE & STUDY AREA

Sr. No.	Location (Category of Area)	CPCB Noise Limits in dB(A) Leq		Noise Level in dB(A) Leq	
		Day Time	Night Time	Day time	Night Time
1	Project Site	75.0	70.0	48	39
2	Tana Annavaram village	55.0	45.0	53	42
3	Chikatigalapalem village	55.0	45.0	48	38
4	Ainavolu village	55.0	45.0	49	40
5	Ramireddypalem village	55.0	45.0	47	39
6	Patacheruvukommupalem village	55.0	45.0	53	40
7	Kambhampadu village	55.0	45.0	52	39
8	Timmayapalem village	55.0	45.0	41	38

3.6.4 Interpretation

It is evident from the above tables that the equivalent noise level of villages varies from 41 to 53 dB [A] and 38 to 42 dB [A] during day and night time respectively. Within the village location the noise level varied at the same place at different times due to fluctuations in traffic movements as well as due to domestic activities going on in the study area.

3.7 LAND ENVIRONMENT

3.7.1 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

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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 project, it is very essential to determine the existing status of soil quality and existing stress through a study of soil quality assessment. Considering this, soil samples were collected from eight locations of study area once in study period. The collected soil samples were analysed by laboratory of M/s. Team Labs & Consultants. Analysis was done for physical properties and chemical characteristics. The details about the sampling points are given in **TABLE 3.10** and **FIGURE 3.9**.

TABLE 3.10 – LOCATION OF SOIL SAMPLING

Stn Code	Location	Co-ordinates	Elevation	Distance from site (km)
S1	Project Site	Latitude: 15°59'52.19"N Longitude: 79°41'25.16"E	75	0
S2	Tana Annavaram	Latitude: 15°59'58.65"N Longitude: 79°41'47.46"E	75	0.7
S3	Chikatigalapalem	Latitude: 16° 0'31.86"N Longitude: 79°43'28.14"E	71	1.3
S4	Ainavolu	Latitude: 15°59'31.56"N Longitude: 79°40'14.24"E	78	2.2
S5	Ramireddypalem	Latitude: 16° 0'40.28"N Longitude: 79°39'9.26"E	87	4.2
S6	Patacheruvukommupalem	Latitude: 15°56'32.93"N Longitude: 79°39'22.65"E	103	4.7
S7	Kambhampadu	Latitude: 15°58'26.43"N Longitude: 79°42'49.37"E	95	3.4
S8	Timmayapalem	Latitude: 16° 2'14.85"N Longitude: 79°42'8.35"E	75	4.6

FIGURE 3.9 - SAMPLING LOCATIONS FOR SOIL



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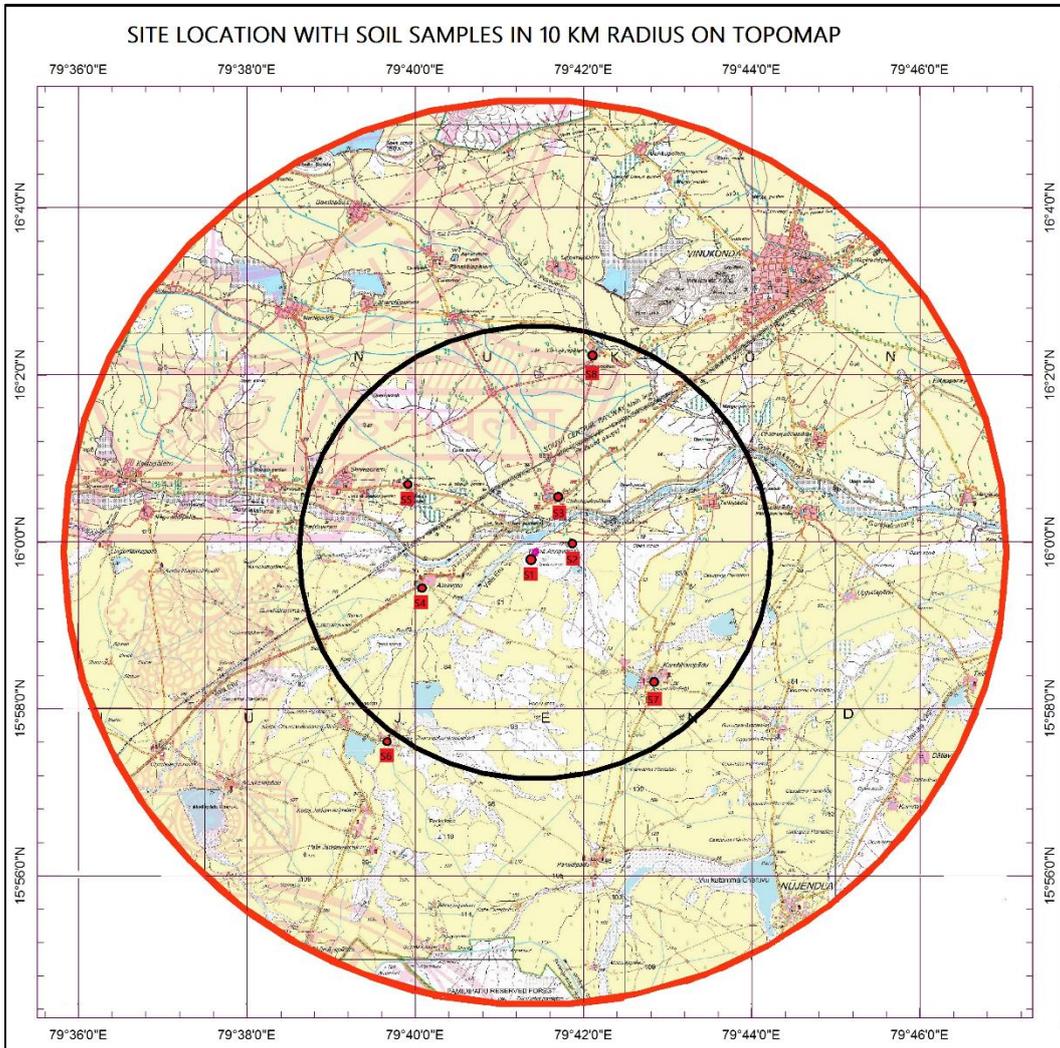
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3.7.2 Results

The results of physical and chemical analysis carried out as per standards procedure is given in **TABLE 3.11** and **TABLE 3.12** respectively.

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TABLE 3.11 - PHYSICAL QUALITIES OF SOIL SAMPLES

Sr. No.	Parameters	Unit	S1	S2	S3	S4	S5	S6	S7	S8
1	Textural Analysis	--	Sandy Loam	Sandy Clay Loam	Silt Loam	Loam	Clay Loam	Sandy Loam	Sandy Loam	Sandy Loam
2	Sand	%	53	59	28	51	43	58	63	64
3	Silt	%	29	18	54	30	22	26	21	24
4	Clay	%	18	23	18	19	35	16	16	12
5	Porosity	%	50	46	46	53	50	53	56	60
6	Moisture Content	%	0.23	0.22	0.39	1.19	0.43	0.41	1.7	13.6
7	Water Holding Capacity	%	0.23	0.22	0.38	1.17	0.43	0.41	1.6	12
8	Organic Matter	%	1.5	1.0	1.5	3.5	1.9	2.8	2.48	1.14
9	Infiltration Rate	mm/hr	22	19	11	16	10	26	20	14
10	Bulk Density	g/cc	1.33	1.43	1.43	1.25	1.33	1.25	1.18	1.05

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TABLE 3.12 - CHEMICAL QUALITIES OF SOIL SAMPLES

Sr. No.	Parameter	Units	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8
1	pH	-	7.95	7.69	7.71	7.81	8.17	7.68	6.56	6.12
2	Electrical Conductivity (EC)	dS/m	0.130	0.148	0.171	0.145	0.230	0.299	0.129	0.137
3	Cation-Exchange Capacity (CEC)	Cmol(+)/kg	2.35	2.84	4.07	3.76	4.93	2.56	4.61	3.94
4	Organic Carbon	%	0.85	0.58	0.89	2.10	1.1	1.60	1.44	0.66
5	Nitrogen (as N)	%	0.14	0.12	0.22	0.17	0.11	0.26	0.19	0.08
6	Carbon / Nitrogen Ratio (C/N)	-	6.1	4.8	4.0	12.4	10.0	6.2	7.6	8.2
7	Phosphorus (as P)	mg/kg	3.30	1.03	0.59	3.18	0.81	1.18	0.34	0.49
8	Potassium (as K)	mg/kg	95	194	207	140	173	184	216	165
9	Sodium (as Na)	mg/kg	103	42	111	89	466	133	425	339
10	Calcium (as Ca)	mg/kg	270	390	560	530	360	260	205	179
11	Magnesium (as Mg)	mg/kg	36	24	30	43	79	24	146	145
12	Calcium / Magnesium Ratio	-	7.5	16.25	18.7	12.32	4.56	10.83	1.40	1.23
13	Sodium Absorption Ratio (SAR)	-	1.56	0.56	1.23	1.00	5.80	2.11	5.55	4.57
14	Chlorides (as Cl)	mg/kg	3209	1773	2570	1773	2748	71	394	369
15	Sulphates (as SO ₄)	mg/kg	12	9.2	14	12	15	14	116	16
16	Iron (as Fe)	mg/kg	680	697	692	702	707	667	695	627
17	Manganese (as Mn)	mg/kg	225	186	265	359	325	177	65	82
18	Zinc (as Zn)	mg/kg	16	13	17	20	16	19	34	29
19	Organic Matter	%	1.5	1.0	1.5	3.5	1.9	2.8	2.48	1.14

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From the analytical data of eight soil samples finding of soil qualities are as follows:

The test results of soil samples collected in the impact area are interpreted referring to the book; "Interpreting soil test results". The reference tables are given in **TABLE 3.13**. The pH of soil samples ranges from mildly acidic to mildly alkaline. The Cation Exchange Capacity of the soils is very low contributed mainly by potassium exchangeable ions. The levels of Nitrogen and Potassium in most of the soil samples is low to medium. Calcium / Magnesium ratios of the samples reflect Magnesium deficiency in 4 samples, low in Magnesium in 1 sample and low Calcium in 3 samples. The soil texture is predominantly sandy loam.

TABLE 3.13 - SOIL TEST RESULTS - REFERENCE TABLES

General interpretation of pH measured		
pH	Range	Classification
	<4.5	Extremely Acidic
	4.51 -5.0	Very Strong Acidic
	5.1-5.5	Strong Acid
	5.6- 6.0	Moderately Acid
	6.1-6.5	Slightly acid
	6.6-7.3	Neutral
	7.4-7.8	Mildly Alkaline
	7.9 -8.4	Moderately Alkaline
	8.5-9.0	Strongly Alkaline
	>9.0	Very Strongly Alkaline

Source: Bruce and Rayment (1982)

Ca/Mg Ratio	
	Description
<1	Ca Deficient
1-4	Ca (Low)
4-6	Balanced
6-10	Mg (Low)
>10	Mg deficient

Source: Eckert (1987)

Rating of Total Nitrogen	
Rating (% by W)	Description
<0.05	Very low
0.05-0.15	Low
0.15-0.25	Medium
0.25-0.50	High
>0.5	Very High

Source: Bruce and Rayment (1982)

Rating for Cation Exchange Capacity	
	CEC (Cmol(+))/kg
Very low	<6 *
Low	6-12
Moderate	12-25
High	25-40
Very High	>40

Source: Metson (1961)

* Soils with CEC less than three are often low in fertility and susceptible to soil acidification.

Extractable Potassium (K)	
	K
low	<150 ppm* (< 0.4 meq/100 g soil)
medium	150–250 ppm (0.4–0.6 meq/100 g soil)
high	250–800 ppm (0.6–2.0 meq/100 g soil)
excessive	>800 ppm (>2.0 meq/100 g soil)

Source: Abbott (1989)

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3.7.3 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:

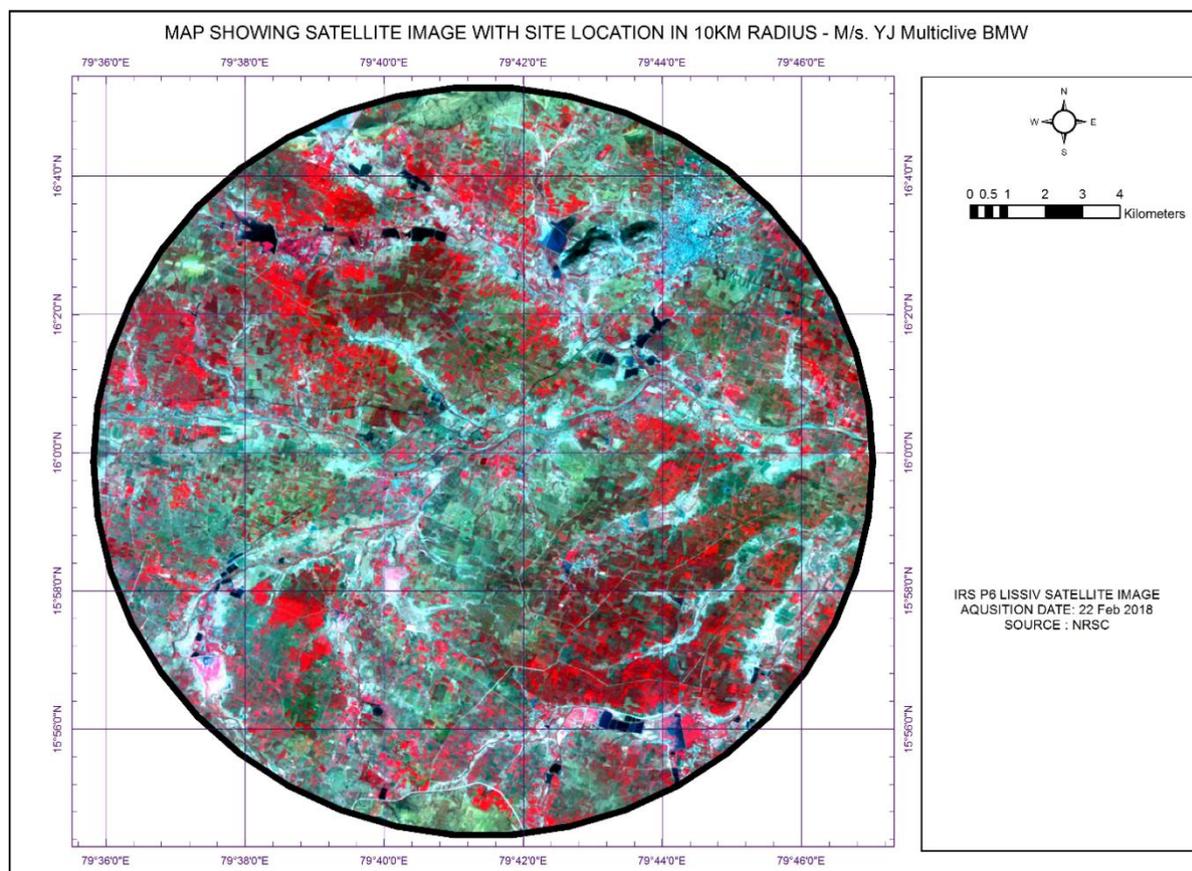
- Determine the present Land Use pattern
- Analyse the impacts on Land Use due to the proposed project in the study area
- Study area with proposed unit as epicentre, 10 km radius from the core area boundaries is considered for land use study.

Satellite Data: The Satellite IRS P-6 LISSIV images are obtained from National Remote Sensing Centre (NRSC) Hyderabad. The latitude and longitude as observed in the site by GPS are 15°59'52.12" N and 79°41'25.35" E. The satellite image of the site is presented in **MAP 3.1**.

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 D44B9,D44B13,E44T12,E44T16.

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MAP 3.1 - SATELLITE IMAGE OF PROJECT SITE AND STUDY AREA

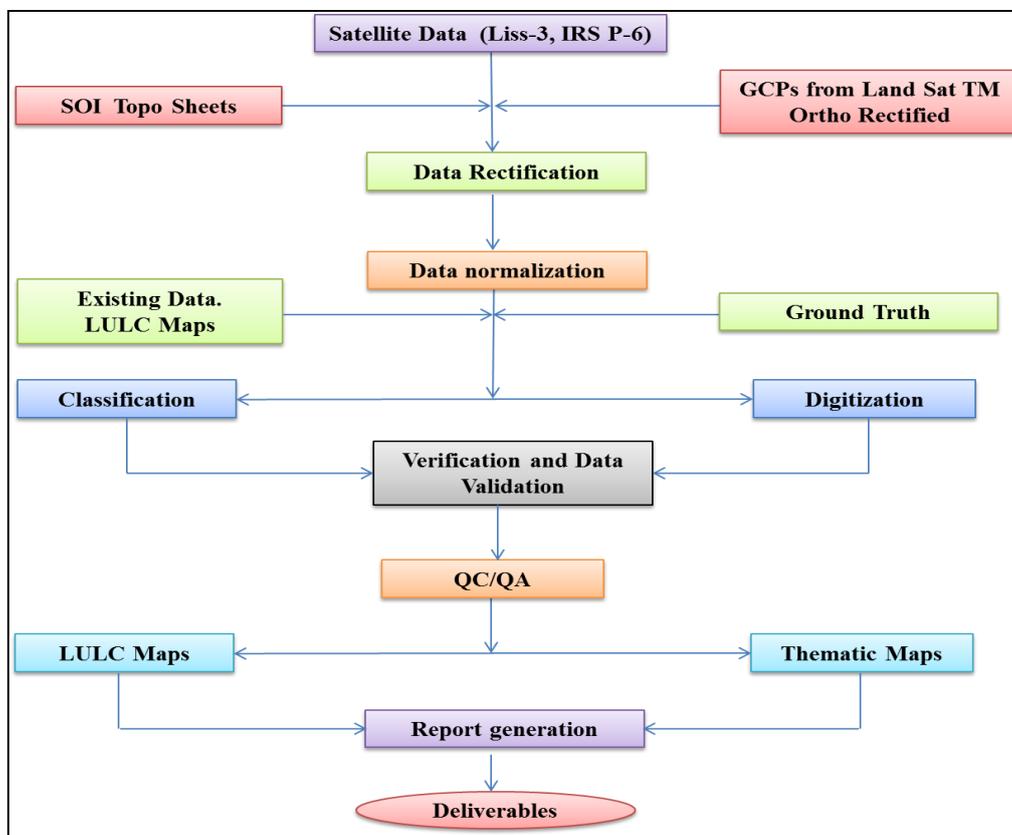


Methodology: The overall methodology (**FIGURE 3.10**) adopted and followed to achieve the objectives of the present study involves the following:

- 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 neighbourhood resampling technique
- 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, labelling, mosaicking, quality checking, data integration etc. are done, finally Land Use areas are measured in sq.km.

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FIGURE 3.10 - FLOW CHART OF METHODOLOGY



3.7.4 Land Use Map Analysis

Land Use Map Analysis is carried out based on the image colour, texture, tone etc. Following steps are used to analyse the Land Use pattern of study area:

- 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 colour combinations using Image interpreter-Utilities and Layer stack option available in ERDAS
- Identification of 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 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.

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3.7.4.1 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 forms 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. The topomap of the study area is given in **MAP 3.2**.

Map showing site location, various water bodies, drainage, human habitations and roads in the study area are shown in **MAP 3.3**. Water bodies like Gundlakamma river, Vala Eru and Venkatamma Cheruvu are located in 1.0 km radius from proposed project site. There is a road network connecting built-up areas and industries. The terrain conditions are red sandy loamy soil, flat terrain and also there is a drainage network around the site location.

There are no national parks and wild life sanctuaries located in the study area. There are 2 reserved forests located in the study area - Pamidipadu in South and Vinukonda in North. (**MAP 3.4**)



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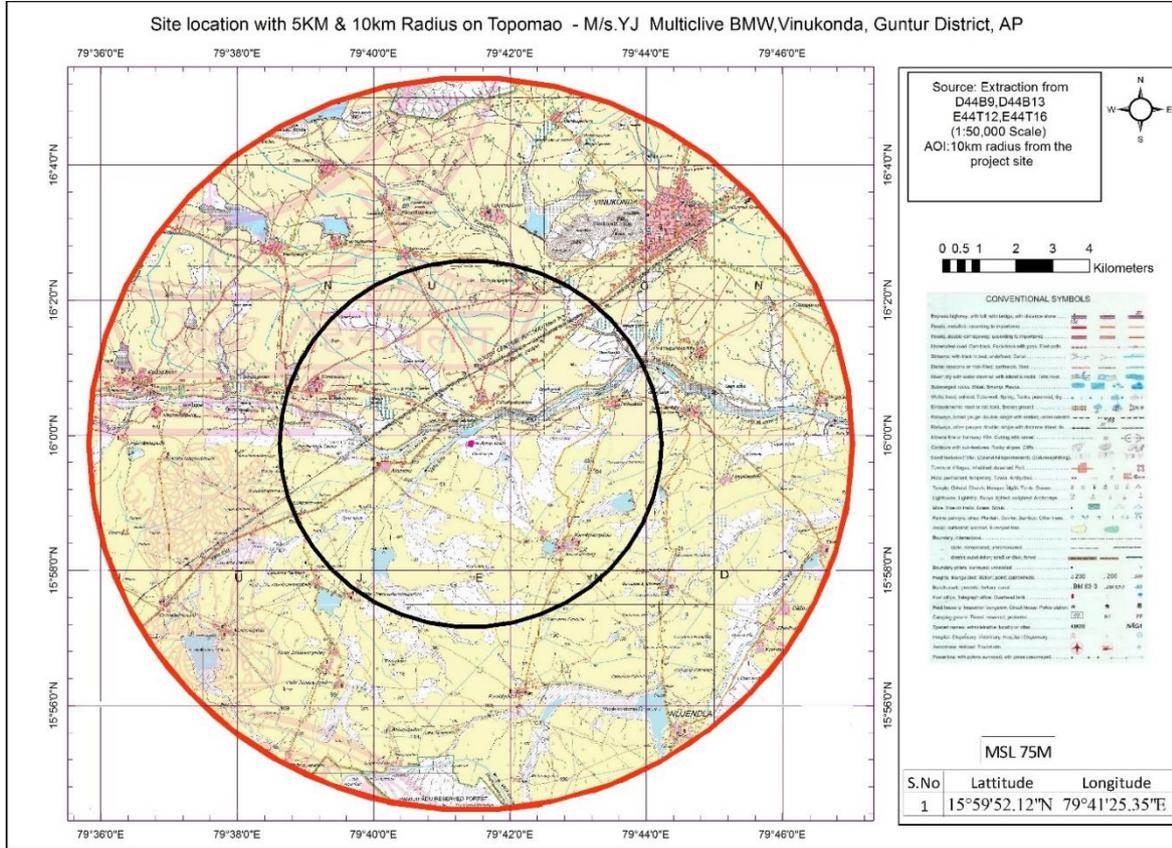
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MAP 3.2 - SITE LOCATION WITHIN 10 KM RADIUS ON TOPOMAP





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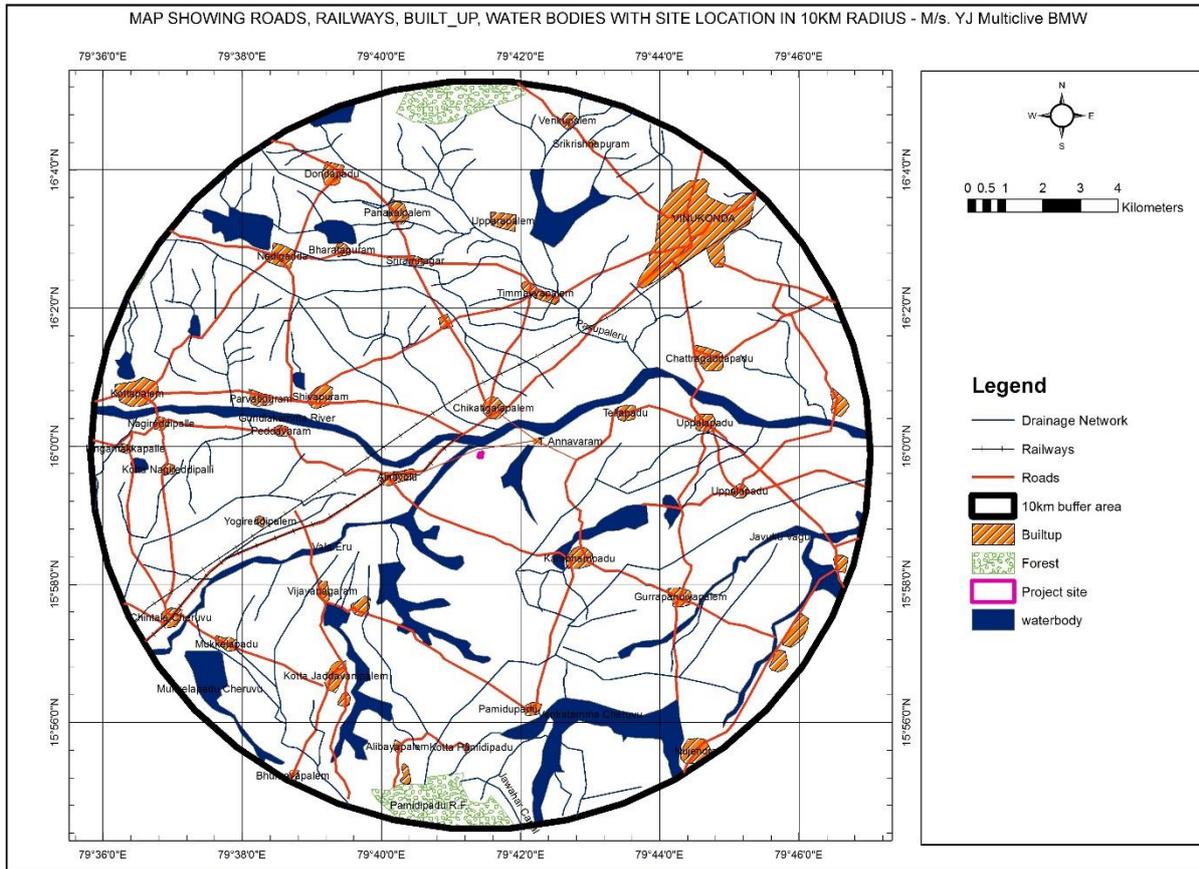
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MAP 3.3 - MAP SHOWING ROADS, RAILWAYS, BUILT UP, WATER BODIES IN STUDY AREA





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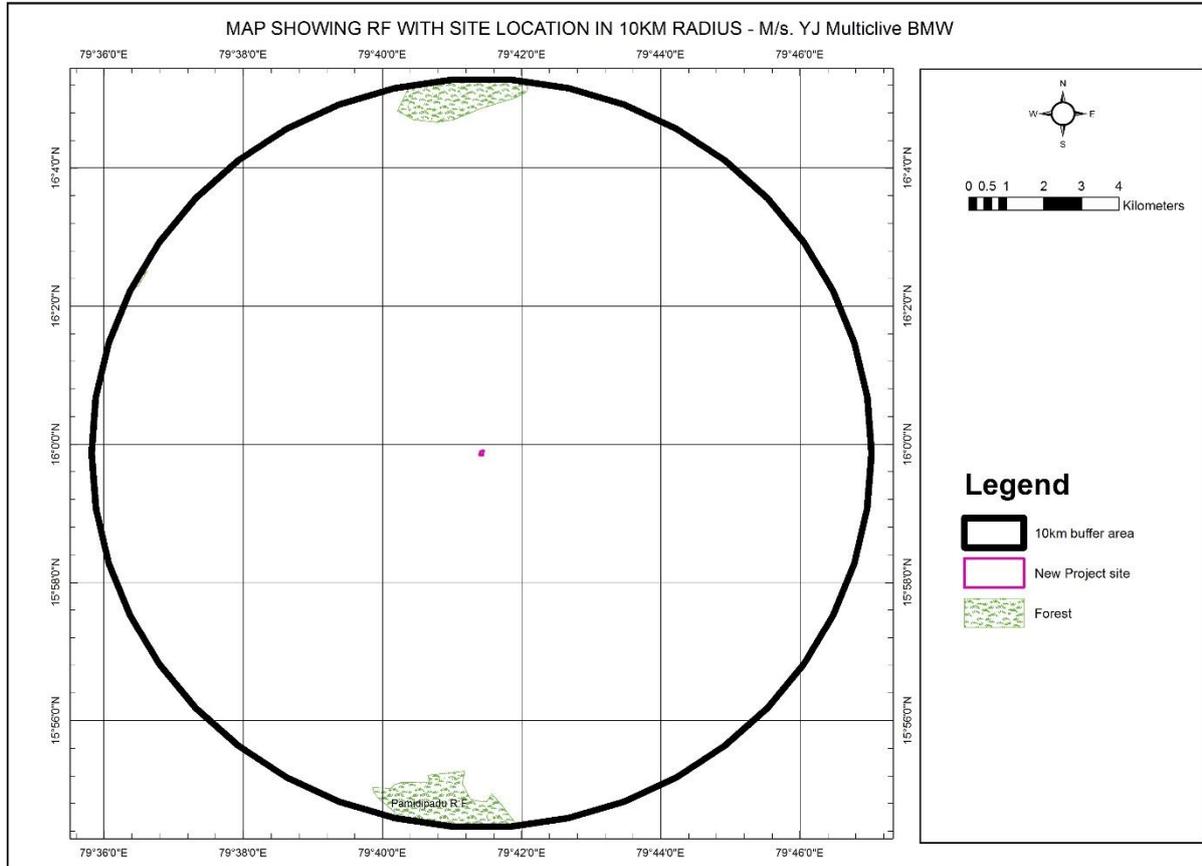
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MAP 3.4 - MAP SHOWING RESERVED FORESTS IN STUDY AREA**3.7.4.2 Contour Map and Elevations of Study Area**

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 have been verified. Thereafter final contour map was prepared with combination of Toposheet and SRTM with contour interval of 10 m. Project site contour is about 75 m above MSL and the study area contours vary from 60 m to 220 m above MSL. From the project site the high range hill area was observed towards North West direction and the lowest contours were observed in South direction. While the remaining areas showed variations with respect to contours. Contour Map and Elevations of Study Area is presented in **MAP 3.5**.



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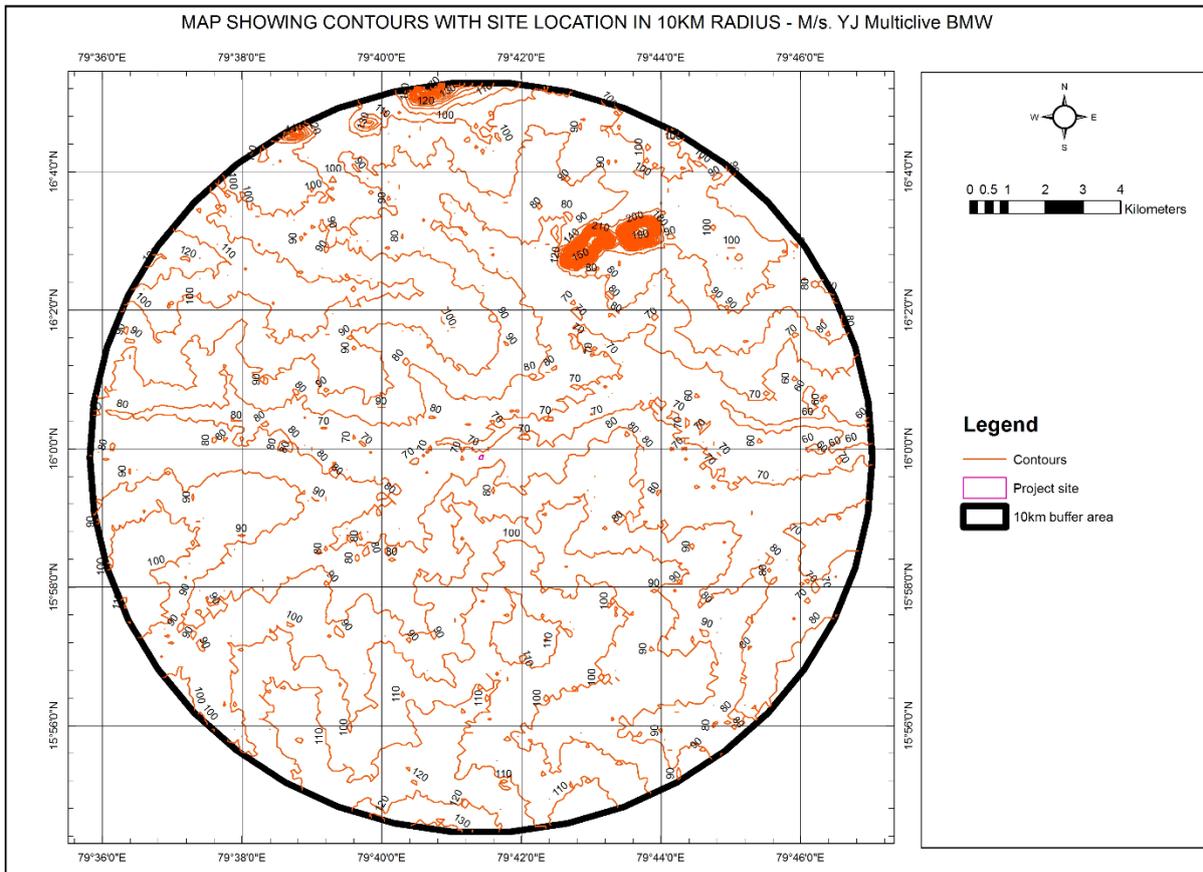
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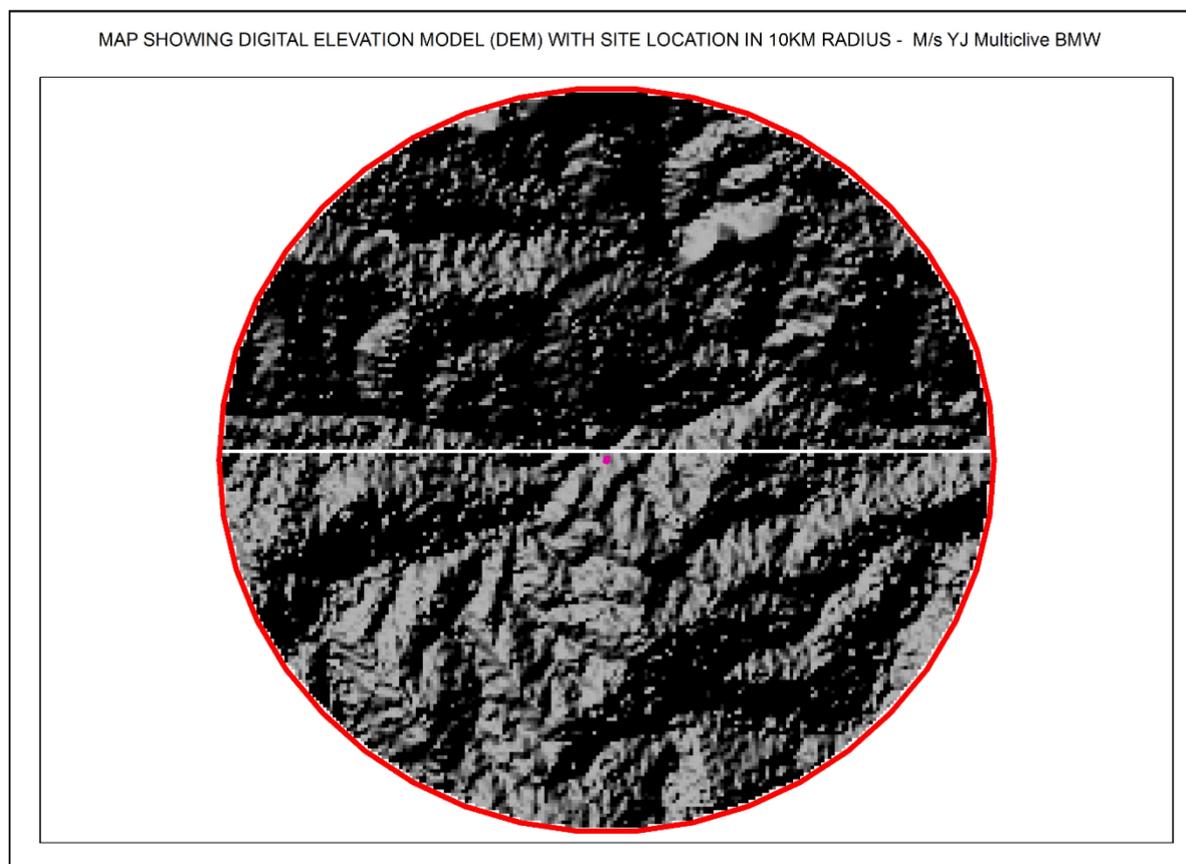
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MAP 3.5 - CONTOUR MAP OF SITE LOCATION WITHIN 10 KM STUDY AREA**3.7.4.3 Topography (Digital Elevation Model)**

A Digital Elevation Model (DEM) is a digital representation of ground surface topography or terrain (**MAP 3.6**). 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 3.6 - MAP SHOWING DIGITAL ELEVATION MODEL OF STUDY AREA



3.7.4.4 Land Use Land Cover Statistics of Study Area

Map showing the Land Use Land Cover classification in the study area is given in **MAP 3.7**. The area is mostly covered with agricultural land and open scrub around 42% and 6 % respectively of the total area which is taken up for cultivation but is temporarily allowed to rest, un-cropped for one or more season, but not less than one year. Thus, total cultivable land is 42%. Stony waste land covers 4%, roads cover 9%, settlement (built-up area) located around the edges of agricultural land covers 9% and forest area covers 3% of the total study area. It is an area of human habitation developed due to non-agricultural use and has a cover of buildings, transport and communication, utilities in association with water, vegetation and vacant lands. The railway lines cover 5%, rockynob covers 3%, boulders cover 4% and plantation covers 2% of the total study area. The proposed project is on open scrub and does not have any significant impact on the surrounding villages and habitation. The water bodies cover 13% of the total area. Some of the water bodies are Gundlakamma river, Vala Eru and Venkatamma Cheruvu. 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 study area are presented in **TABLE 3.14** and depicted in **MAP 3.7**.



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MAP 3.7 - MAP SHOWING LAND USE LAND COVER IN STUDY AREA

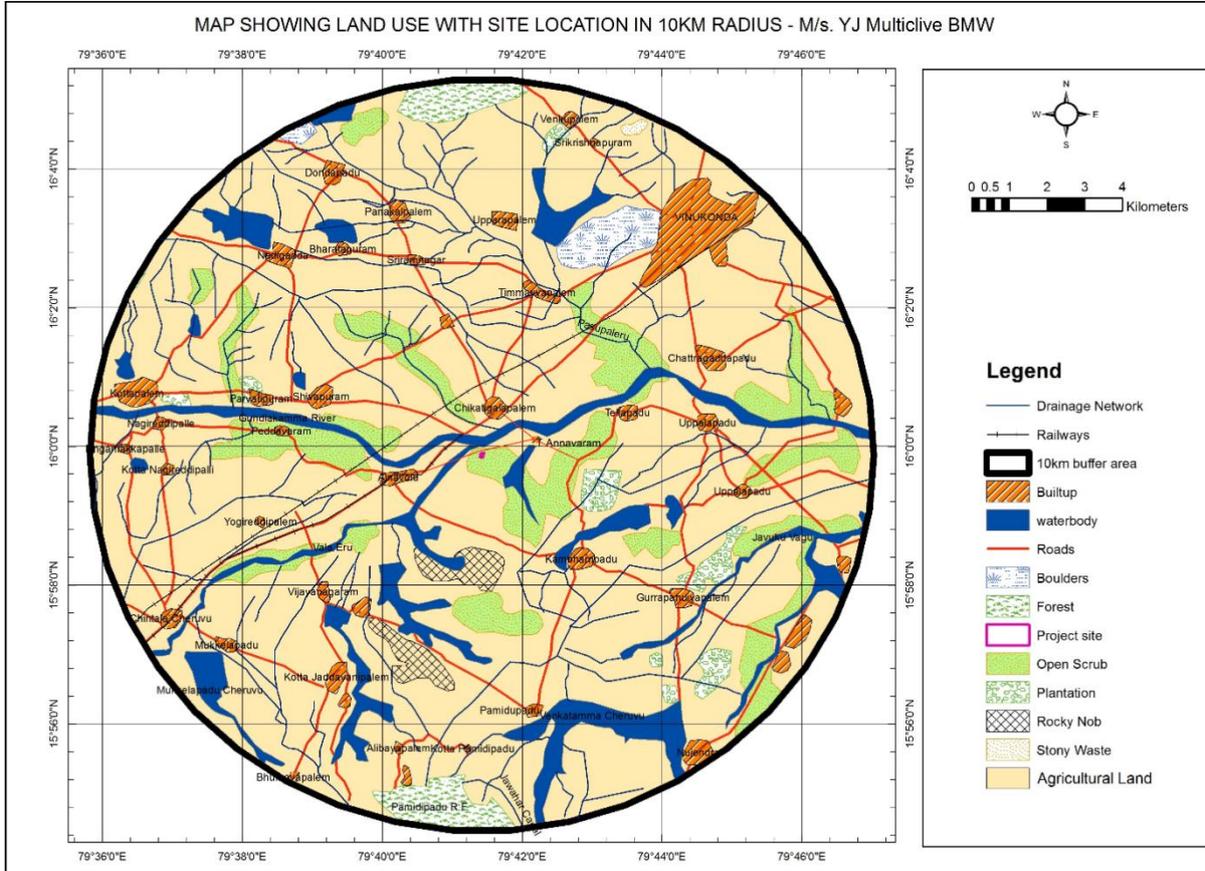


TABLE 3.14 - LAND USE LAND COVER STATISTICS IN STUDY AREA

Sr. No.	LULC Class	Area (Ha)	Area (%)
1	Water Bodies	4168.31	13
2	Agricultural Land	13180.44	42
3	Open Scurb	1873.13	6
4	Industries	900.12	3
5	Built-up (Settlement)	2934.13	9
6	Boulders	1281.00	4
7	Stony Waste	1153.69	4
8	Roads	2666.75	9
9	Plantation	753.69	2
10	Railways	1566.75	5
11	Rockynob	953.69	3
Total		31431.7	100

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3.8 ECOLOGY & BIODIVERSITY

3.8.1 Flora & Fauna

Ecological studies are one of the important aspects of Environmental Impact Assessment with a view to conserve environmental quality and biodiversity. The present objective is to study an area of 10 km radius from the proposed project site. Ecological systems show complex inter-relationships between biotic and abiotic components including dependence, competition and mutualism. Biotic components comprise of both plant and animal communities, which interact not only within and between themselves but also with the abiotic components viz. physical and chemical components of the environment.

The assessment of flora and fauna of the study area was done as per the MoEFCC guidelines. The main aim of Conservation of Biodiversity is to ensure "No Net Loss" as per Convention on Biological Diversity (CBD), the Ramsar Convention and the Convention on Migratory Species (CMS). Any further loss of biodiversity is unacceptable. Biodiversity must be conserved to ensure it survives, continuing to provide services, values and benefits for current and future generations. This objective is considered during the present ecological assessment.

3.8.2 Scope of Work

Scope of work is to identify ecologically sensitive receptors based on literature survey and field investigations, quantification of impacts on flora and fauna in core and buffer zones and to suggest appropriate mitigation measures with conservation and management plan.

Biological assessment of the site was done to identify whether there are any **rare, endangered, endemic, threatened (REET)** species of flora or fauna in the project site or core area (upto 5 km radius from project site boundary) as well as its buffer zone (5 km to 10 km radius from project site boundary). The study is also designed to suggest suitable mitigation measures and conservation plan, if necessary for REET species, if any.

3.8.3 Secondary Data

Secondary data verified from Guntur district forest working plan vol. II (2005-15). The faunal species (particularly higher mammals and birds) present in and around the study area were discussed with elderly people from nearby villages.

3.8.4 Methodology

Basic Frame Work of Data Collection

Study of study area was carried out through random sampling method (100 m X 10 m) near road side, pond side, agriculture, plantations and village woodland. Statistical analysis was conducted near the 2 reserve forests present in the study area. A reconnaissance survey has been made randomly to observe the ecologically sensitive habitats during monsoon season 2018. General interviews were made with local people on seasonal migratory birds, native animals and medicinal plants. The species observed were recorded in field data sheets. No physical damage created to flora and fauna during the data collection. It was done through

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field observations only and listing out the floral and faunal species by using standard protocol. The steps include information on project and site, desktop study, secondary data collection, primary survey, data interpretation, identification and quantification of impacts, suggesting mitigation measures, greenbelt plan and conservation plan for endangered species (if any).

Survey Types used

1. Belt transect (100 X 10 m) near reserve forest blocks
2. Random sampling method (For major flora and fauna near agricultural, human habitations and road side)
3. Point count method for birds near water bodies

Equipment / Instruments / Software deployed

- Digital Camera (NIKON 42 X zoom)
- GPS (Accurate readings available in Mobile and inbuilt camera)
- Binoculars (OLYMPUS 10 X 50 DPSI)
- Field observation book, Field guides, Pen, Measuring tape etc.

Floral Survey Method

The primary data was collected by visual observations (documented in the field data sheets) as well as through discussion with villagers. For floral study, belt transect method (100 m X 10 m) has been adopted near major vegetation zone and near reserve forests. List of identified floral species observed at each transect is documented and photographed. The unidentified species are compared with standard floras and expert groups. The final list of species was prepared by primary observations during survey and authentic secondary data taken from the latest Forest department working plan of the region, BSI authenticated books and other published literature from reputed journals etc.

Faunal Survey Method

The assessment of fauna was carried out by field observations (direct sightings) and/or by indirect evidences like droppings, skeletal remains etc. As the animals are migratory, habitats used by protected, important or sensitive species for breeding, nesting, foraging, resting, migration are ascertained. Birds were recorded by point count method during dawn and dusk and compared with published literature. No quantitative assessment done for mammals, reptiles and other vertebrate species. The primary data was compared with authenticated secondary data and locals. Scheduling of species done according to Indian Wildlife Protection act (1972) and checked the regional, national and global status of the species.

Rationale for Survey Method

The proposed project site is open scrub land surrounded by agricultural land and human habitations. There are 2 reserved forests within the study area - Pamidipadu R.F. at 9.6 km SW direction and Vinukonda R.F. at 7.96 km in North direction. Gundlakamma river is at a distance of 0.3 km in Northern direction. The possible impacts of the proposed project on the surrounding agricultural ecosystem and river are also studied.

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3.8.5 Field Observation

The study has been carried out to assess the present floristic composition in the region. During the present study, a total of 170 floral species were recorded. The project site consists of barren / uncultivable / waste land.

Core Zone: The proposed project site is a private land with no vegetation. Few weed species are present here. The entire area is with terrestrial vegetation is without any forest or agriculture land and it was devoid of any ecologically sensitive biological resources. No REET species present in the core zone. No migratory corridors or breeding grounds for faunal species present here. The common butterflies, dragonflies, lizards, birds and smaller mammals are observed.

The most commonly seen flora in the project site are *Achyranthes aspera*, *Hyptis suaveolens*, *Tridax procumbens*. Various common types of grasses present near the site are found throughout the region. Paddy, tobacco and mirchi are mainly cultivated in the region.

The faunal composition generally with arboreal and semi arboreal based animals. Some very common small animals such as rats, snakes, skinks and lizards are commonly found here. In aves, Mynas, Red vented bulbuls, Black drango and Indian Robin are present.

Buffer Zone: Buffer zone is mostly with human habitations and agricultural fields. *Azadirachta indica*, *Ficus hispida*, *Borassus flabellifer*, *Prosopis juliflora*, *Pongamia pinnata*, *Dalbergia sisoo*, *Phoenix sylvestris*, *Albizia lebeck*, *Acacia nilotica* are dominant here. Eucalyptus is widely spread over buffer zone. Some scattered bushes of *Euphorbia tirucalli*, *Balanites roxburghii*, *Opuntia dillenii*, *Prosopis juliflora*, *Datura metel* and *Zizyphus numularia* are also predominant here. *Pergularia daemia* and *Ipomoea nil* are climbers commonly present here.

Buffer area is mainly rural environment with few aquatic bodies. Most of the region is covered with agricultural land and villages. Hence, vegetative survey was mainly conducted near road side, pond side and near agricultural areas. There are no endangered and endemic plants present in the buffer and core zones. There are few medicinal, timber / fuel wood, fodder and other socio-economic purposes. The faunal composition was also estimated based on the direct and indirect evidences.

Status of Reserve Forests:

There are two reserve forests within the study area - Pamidipadu R.F. at 9.6 km SW direction and Vinukonda R.F. at 7.96 km in North direction which cover 3% of the study area. These two RFs are dense mixed scrub forest types with predominant species such as *Borassus flabellifer*, *Prosopis juliflora*, *Dalbergia sisoo*, *Phoenix sylvestris*, *Acacia nilotica*, *Balanites roxburghii*, *Opuntia dillenii*, *Datura metel* and *Zizyphus numularia*. There are no REET species present as per secondary data. Few common birds and lizards are sighted during the field visit.

Fauna within the Core and Buffer Zones:

Throughout the study area, there are no direct evidence of wild animal species observed. In mammals, three striped squirrels are sighted apart from few reptilian species. From the secondary source (local people near villages), it is also revealed that presence of common

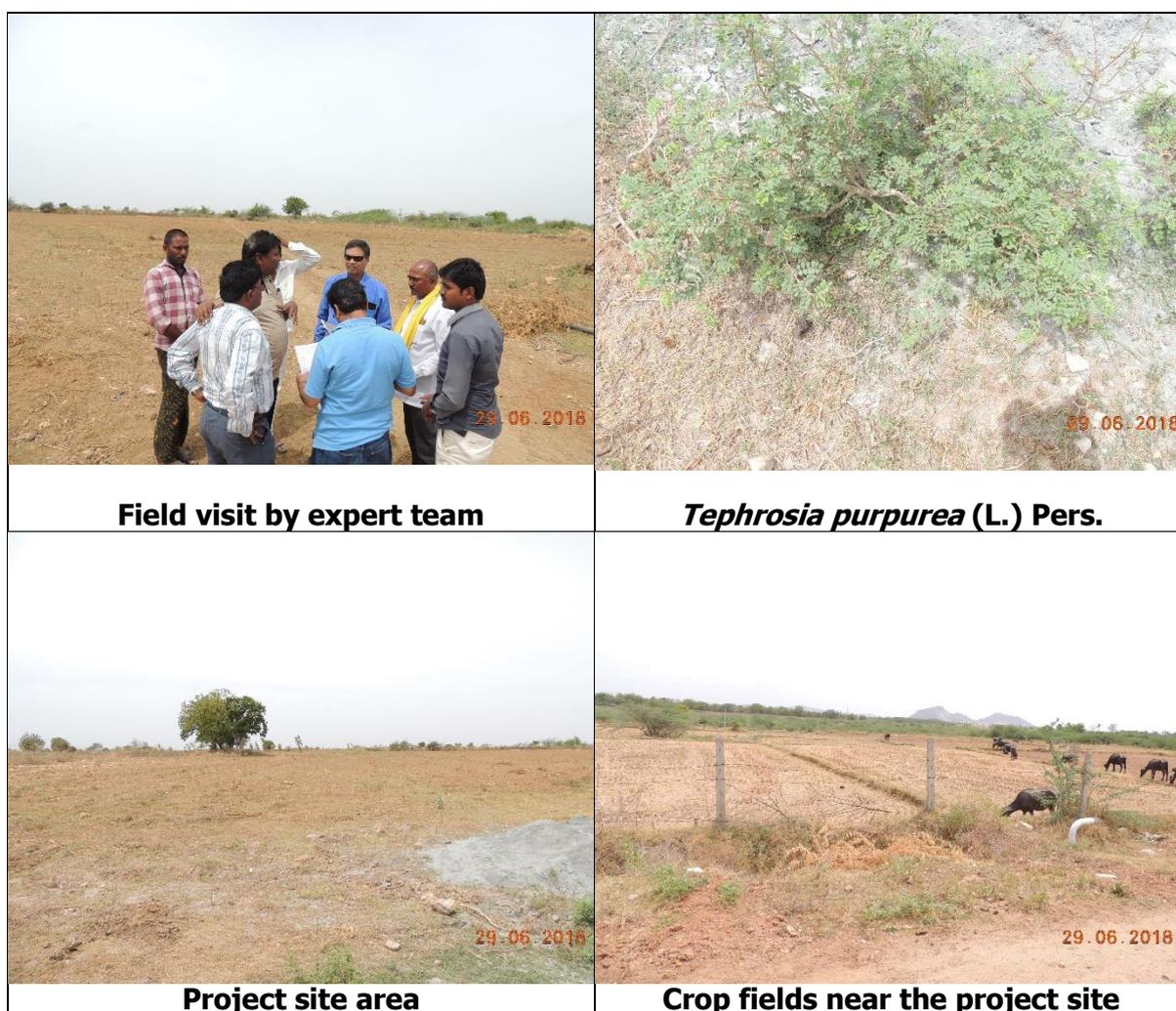
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snakes exists here. The faunal composition generally with arboreal and semi arboreal based animals. Within the core zone common mongoose, squirrels are sighted apart from few reptilian species. Common bird species such as Grey herons, Paddy egrets, Green bee eaters, Indian rollers, White headed babblers, Weaver birds, Mynas, Black drangos, Crows are sighted here. Butterflies and dragonflies are fairly common near herbs and flowering shrubs.

Endemic, Threatened and Endangered Species

From the present survey, it appears that none of the terrestrial species are under endemic, endangered and threatened species, and not listed in the Schedule I of the Indian Wildlife (Protection) Act, 1972 as amended in 1991.

PHOTOGRAPHS 3.1 - FIELD PHOTOGRAPHS



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3.8.6 Quantitative Analysis

The study area is mainly focused through secondary data validation from primary observations. Checklist is prepared and marked the species noticed during rapid assessment. 16 transects were plotted in all sampling points and finalized the number of transects through Area-Species graph.

Among trees species *Azadirachta indica* (54.6), *Borassus flabellifer* (26.3), *Acacia nilotica* (25.9), *Phoenix sylvestris* (25.6), *Prosopis juliflora* (25.6). These five tree species were significant in occupying majority of space and resources being represented by 1/3rd of total IVI in sampled area. Top 10 tree species showing highest IVI are shown in **TABLE 3.15** and **FIGURE 3.11**.

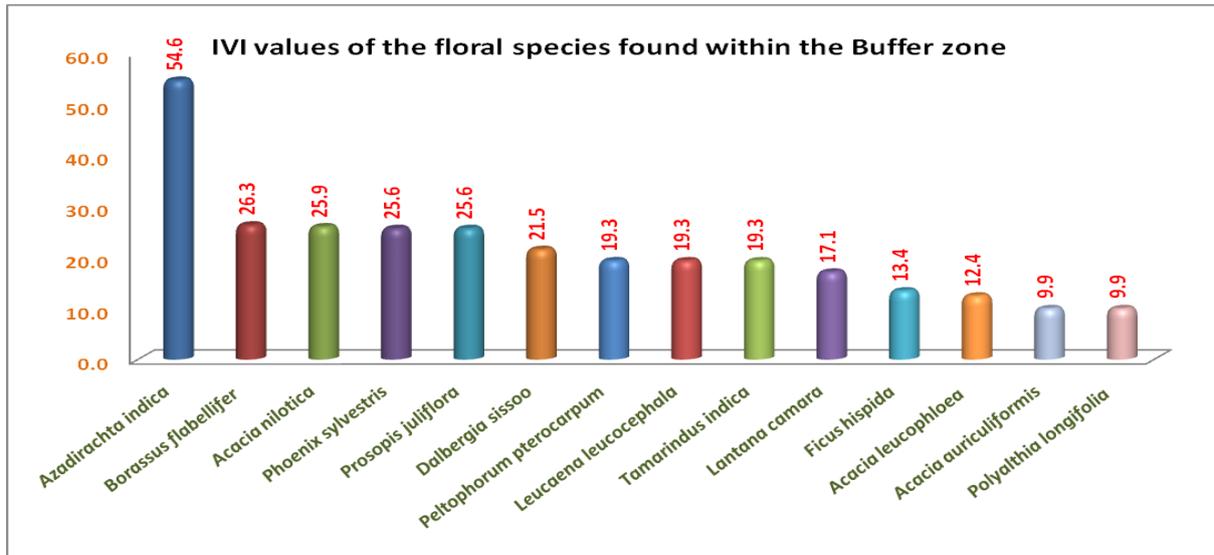
TABLE 3.15 - PHYTOSOCIOLOGICAL DATA OF TREES IN STUDY AREA

Sr. No	Scientific Name	Density	Rel. Density	Frequency	Rel. Frequency	Abundance	Rel. Abundance	IVI	Schannon Index
1	<i>Acacia auriculiformis</i>	0.20	1.94	20.00	2.99	1.00	4.99	9.92	0.077
2	<i>Acacia leucophloea</i>	0.30	2.91	30.00	4.48	1.00	4.99	12.38	0.103
3	<i>Acacia nilotica</i>	0.90	8.74	40.00	5.97	2.25	11.22	25.93	0.213
4	<i>Azadirachta indica</i>	2.70	26.21	100.0	14.93	2.70	13.47	54.61	0.351
5	<i>Borassus flabellifer</i>	0.90	8.74	80.00	11.94	1.13	5.61	26.29	0.213
6	<i>Dalbergia sissoo</i>	0.70	6.80	40.00	5.97	1.75	8.73	21.50	0.183
7	<i>Ficus hispida</i>	0.30	2.91	20.00	2.99	1.50	7.48	13.38	0.103
8	<i>Leucaena leucocephala</i>	0.60	5.83	50.00	7.46	1.20	5.99	19.27	0.166

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Sr. No	Scientific Name	Density	Rel. Density	Frequency	Rel. Frequency	Abundance	Rel. Abundance	IVI	Schannon Index
9	<i>Peltophorum pterocarpum</i>	0.60	5.83	40.00	5.97	1.50	7.48	19.28	0.166
10	<i>Phoenix sylvestris</i>	0.90	8.74	70.00	10.45	1.29	6.41	25.60	0.213
11	<i>Polyalthia longifolia</i>	0.20	1.94	20.00	2.99	1.00	4.99	9.92	0.077
12	<i>Prosopis juliflora</i>	0.90	8.74	70.00	10.45	1.29	6.41	25.60	0.213
13	<i>Tamarindus indica</i>	0.60	5.83	50.00	7.46	1.20	5.99	19.27	0.166
14	<i>Lantana camara</i>	0.50	4.85	40.00	5.97	1.25	6.24	17.06	0.147
			100		100		100	300	2.388

FIGURE 3.11 - GRAPH SHOWING IMPORTANT VALUE INDEX OF DOMINANT TREE SPECIES IN STUDY AREA



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FIGURE 3.12 - GRAPH SHOWING HABIT WISE NO. OF SPECIES IN STUDY AREA

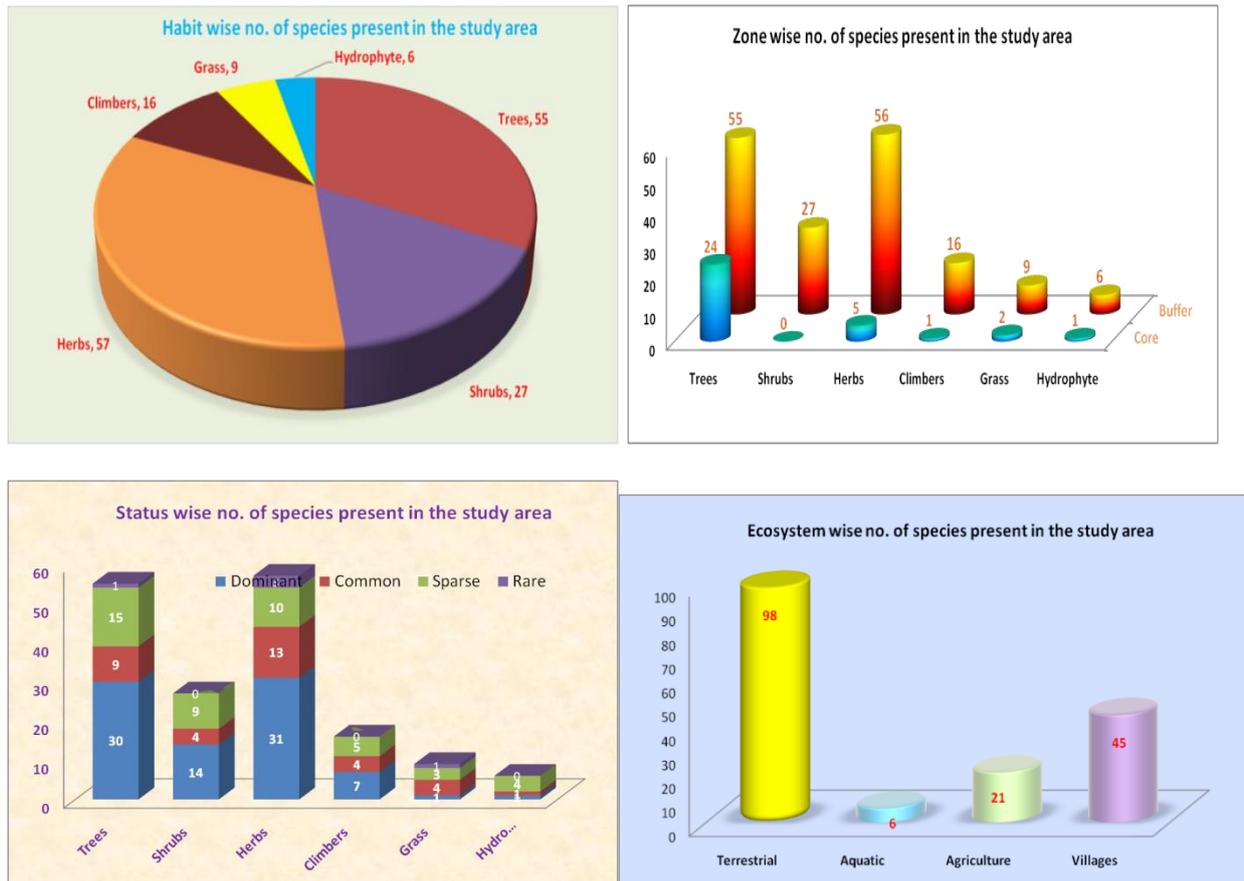


TABLE 3.16 - BIODIVERSITY INDICES VALUES OF THE SAMPLING SITES IN STUDY AREA

A	A/F value	0.030
B	Shannon H	2.537
	Simpson 1-D	0.910
C	Dominance D	0.090
	Evenness $e^{H/S}$	0.903

3.8.7 Distribution Pattern (A/F ratio)

The ratio between abundance and frequency was used to interpret the distribution pattern of species (Whitford, 1949). Abundance to frequency ratio (A/F) has been calculated to assess the distribution pattern of species and depending upon the ratios, distribution may be regular (<0.025), random (0.025-0.05) and contagious (>0.05). In natural conditions, contagious distribution is most common type of distribution due to significant variation in environmental conditions (Odum, 1971). Distribution pattern of species in the study area is identified as **random distribution** as the value of A/F ratio is **0.030**. This distribution of species is random because of several ecosystems randomly distributed in the study area.

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The Shannon indices value of study area is **2.537** indicates **moderate diversity** (normal diversity in ecological studies is 1.5 to 3.5 range (Kerkhoff, 2010)). As there are 2 RFs in the buffer zone of study area, diversity is more near undisturbed habitats.

Population size and Dominance of the species is **9%** and Evenness is around **90%** (indicates the species are evenly distributed in the study area). This might be due to contiguous patches of natural species such *Azadirachta indica*, *Prosopis juliflora* (near the villages), *Peltophorum pterocarpum*, *Delonix regia* and *Subabul* (near roadside).

Frequency indicates AC<D>E as per the Raunkiaer's law of frequency classification indicates that species diversity is distributed maximum for 20 to 40%.

3.8.8 Terrestrial Fauna

The presence or absence of an animal or plant in a certain region depends on its ecological and geographical setting. Wild animals can exist in a region only if prevailing set of conditions are congenial for their survival and perpetuation. Diversity of the species and their abundance is largely dependent on the availability of required habitats.

Terrestrial Fauna of Core Area and Buffer Zone:

As the animals, especially vertebrates move from place to place in search of food, shelter, mate or other biological needs, separate lists for core and buffer areas are not feasible. Though there are two reserved forest blocks in the buffer zone, they are in the form of small and isolated patches. As these forest blocks are surrounded by villages on all sides, they are subject to biotic pressures of grazing and cutting. As such there are no chances of occurrence of any rare or endangered or endemic or threatened (REET) species within the core or buffer area. There are no Sanctuaries, National Parks, Tiger Reserve or Biosphere Reserve or Elephant Corridor or other protected areas within 10 km radius from core area. It is evident from the available records, reports and circumstantial evidence that the entire study area including the core and buffer areas were free from any endangered animals. There were no resident birds other than common bird species such as Paddy egrets, Green bee eaters, Indian rollers, Parakeets, Common babblers, Weaver birds, Mynas, Black drangos, Crows, Sparrows. 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 come under the REET category. Some of the birds listed were rare locally but they do not fall under any of the REET categories.

Effect on Migratory Corridors, Nesting and Breeding Sites:

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.

Effect on REET Species:

From the list, no Rare or Endangered or Endemic or Threatened (REET) species or any species listed in Schedule I of the Wildlife (Protection) Act. Hence, species specific and habitat specific mitigation measures are not needed in this connection. The project site does not overlap with any of the recognized Ramsar sites. The construction phase does not envisage excavation or alteration in water bodies hence shall not entail changes in aquatic biodiversity. The construction does not involve diversion or change in the major rivers, canals, backwaters and

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creeks. Considering these predicted impacts, a comprehensive greenbelt development plan is proposed which shall improve the existing status of ecosystems and associated biodiversity in the nearby area.

Mammals:

All the listed mammals are of Least Concern under IUCN and Schedule - II, IV or V under Indian Wildlife Protection Act (1972) (* directly observed bird from the study area)

TABLE 3.17 - LIST OF MAMMALS & THEIR CONSERVATION STATUS

Scientific Name	Common Name	Family	WPA Status	IUCN
<i>Herpestes javanicus</i>	Common Indian Mongoose*	Herpestidae	Sch II	LC
<i>Lepus nigricollis</i>	Black-naped Hare	Leporidae	Sch IV	LC
<i>Bendicota bengalensis</i>	Indian mole rat	Muridae		LC
<i>Bendicota indica</i>	Bandicoot rat	Muridae		LC
<i>Mus booduga</i>	Little Indian Field mouse	Muridae	Sch V	LC
<i>Mus musculus</i>	House Mouse*	Muridae	Sch V	LC
<i>Rattus rattus</i>	House rat*	Muridae		LC
<i>Funambulus palmarum</i>	Three striped palm squirrel*	Sciuridae		LC

Status assigned by the IUCN, where - CR - Critically Endangered; EN - Endangered; LC - Least Concern; NT - Near Threatened; VU - Vulnerable, DA - Data Deficient, NE - Not Evaluated

Sources:

- Andhra Pradesh State Forest Department Working plan data
- **Vivek Menon (2014)**, *Indian Mammals: A Field Guide*. Hachette Book Publishing India Pvt. Ltd., Gurgaon, India, pp 1-522; IUCN (2015).
- *The IUCN Red List of Threatened Species*. Version 2015-4; *Schedules I to VI: Indian Wildlife (Protection) Act, 1972*.

Aves:

All the listed birds are of Least Concern under IUCN and Schedule - IV under Indian Wildlife Protection Act (1972) (* directly observed bird from the study area)

TABLE 3.18 - LIST OF BIRDS AND THEIR CONSERVATION STATUS

Scientific Name	Common Name	IUCN	IWLP
<i>Apus affinis</i>	House Swift	LC	Sch-IV
<i>Cypsiurus balasiensis</i>	Asian Palm Swift	LC	Sch-IV
<i>Vanellus indicus</i>	Red-wattled Lapwing*	LC	Sch-IV
<i>Streptopelia decaocto</i>	Eurasian Collared Dove*	LC	Sch-IV
<i>Halcyon symensis</i>	White-breasted Kingfisher*	LC	Sch-IV
<i>Coracias benghalensis</i>	Indian Roller*	LC	Sch-IV

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Scientific Name	Common Name	IUCN	IWLP
<i>Cuculus micropterus</i>	Indian Cuckoo	LC	Sch-IV
<i>Eudynamys scolopacea</i>	Asian Koel	LC	Sch-IV
<i>Ictinaetus malayensis</i>	Black Eagle	LC	Sch-IV
<i>Milvus migrans</i>	Black Kite	LC	Sch-IV
<i>Corvus splendens</i>	House Crow*	LC	Sch-V
<i>Dicrurus adsimilis</i>	Black Drongo*	LC	Sch-IV
<i>Nectarinia asiatica</i>	Purple Sunbird*	LC	Sch-IV
<i>Ploceus philippininus</i>	Baya Weaver*	LC	Sch-IV
<i>Pycnonotus cafer</i>	Red-vented Bulbul*	LC	Sch-IV
<i>Acridotheres tristis</i>	Common Myna*	LC	Sch-IV
<i>Turdoides caudatus</i>	Common Babbler	LC	Sch-IV
<i>Copsychus saularis</i>	Oriental Magpie Robin*	LC	Sch-IV
<i>Saxicoloides fulicata</i>	Indian Robin*	LC	Sch-IV
<i>Ardea alba</i>	Large Egret*	LC	Sch-IV
<i>Ardeola grayii</i>	Pond Heron*	LC	Sch-IV

Status assigned by the IUCN, where - CR - Critically Endangered; EN - Endangered; LC - Least Concern; NT - Near Threatened; VU - Vulnerable, DA - Data Deficient, NE - Not Evaluated

Sources:

- **Grimmett, R., Inskipp, C and T. Inskipp, 2001**, *Pocket Guides to the Birds of the Indian Subcontinent*. Cristopher Helm Publishers, Oxford University Press, 384pp.

**TABLE 3.19 - LIST OF REPTILES EITHER SPOTTED OR REPORTED FROM THE STUDY AREA
(* INDICATES DIRECT OBSERVATIONS)**

Sr. No.	Scientific Name	Common Name	IUCN	IWPA
1.	<i>Ahaetulla nasuta</i>	Green whip snake	LC	
2.	<i>Naja naja</i>	Indian Cobra	LC	II
3.	<i>Daboia siamensis</i>	Russel Viper	LC	II
4.	<i>Dendrelaphis tristis</i>	Tree Snake	LC	
5.	<i>Ptyas mucosa</i>	Common Rat snake	LC	II
6.	<i>Amphiesma stolata</i>	Buffstriped keelback	LC	
7.	<i>Trimeresurus</i>	Green pit viper	LC	IV
8.	<i>Typhlops hypomethes</i>	Common blind snake	LC	IV
9.	<i>Varanus bengalensis</i>	Common Indian monitor*	LC	II
10.	<i>Chamaeleo zeylanicus</i>	Chameleon*	LC	II
11.	<i>Mabuya carinata</i>	Common Skink*	LC	
12.	<i>Calotes rouxi</i>	Forest Calottes*	LC	
13.	<i>Calotes versicolor</i>	Common garden lizard*	LC	
14.	<i>Hemimidactylus brooki</i>	House gecko*	LC	

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Sr. No.	Scientific Name	Common Name	IUCN	IWPA
15.	<i>Hemidactylus forenatus</i>	Southern House Gecko	LC	

TABLE 3.20 - LIST OF AMPHIBIANS EITHER SPOTTED OR REPORTED FROM THE STUDY AREA

Sr. No.	Scientific Name	Common Name	IUCN	IWPA
1.	<i>Duttaphrynus melanostictus</i>	Asian common toad	LC	Sch-IV
2.	<i>Euphlyctis hexadactylus</i>	Indian green frog	LC	Sch-IV
3.	<i>Hoplobatrachus tigerinus</i>	Indian bullfrog	LC	Sch-IV
4.	<i>Polypedates maculatus</i>	Indian Tree Frog*	LC	Sch-IV

Status assigned by the IUCN, where - CR - Critically Endangered; EN - Endangered; LC - Least Concern; NT - Near Threatened; VU - Vulnerable, DA - Data Deficient, NE - Not Evaluated

Sources:

- **Indraneil Das (2002)**, *Snakes & Other Reptiles of India*. New Holland Publishers (UK) Ltd pp. 1-144
- **Romulus Whitaker & Ashok Captain (2006)**, *Snakes of India*. Dreko Books, Chennai, pp 1-146; IUCN (2015)
- *The IUCN Red List of Threatened Species*. Version 2015-4; *Schedules I to VI: Indian Wildlife (Protection) Act, 1972*.

TABLE 3.21 - LIST OF BUTTERFLIES EITHER SPOTTED OR REPORTED FROM THE STUDY AREA

(* ALL THE LISTED ARE FROM PRIMARY SURVEY DURING RESEARCH IN STUDY AREA)

Scientific Name	Common Name	Family
<i>Castalius rosimon rosimon</i> Fabricus	Continental Common Pierrot	Lycaenidae
<i>Catochrysops strabo strabo</i> Fabricus	Oriental Forget-me-not	Lycaenidae
<i>Jamides celeno celeno</i> Fabricus	Oriental Common Cerulean	Lycaenidae
<i>Tarucus nara</i> Kollar	Rounded Pierrot	Lycaenidae
<i>Zizeeria karsandra</i> Moore	Dark Grass Blue	Lycaenidae
<i>Zizina otis indica</i> Fabricus	Lesser Grass Blue	Lycaenidae
<i>Danaus chrysippus chrysippus</i> Linnaeus	Plain Tiger	Nymphalidae
<i>Danaus genutia genutia</i> Cramer	Striped Tiger	Nymphalidae
<i>Euploea core core</i> Cramer	Common Crow	Nymphalidae
<i>Tirumala limniace exoticus</i> Gmelin	Blue Tiger	Nymphalidae
<i>Acraea violae</i> Fabricus	Tawny Coster	Nymphalidae
<i>Phalanta phalantha phalantha</i> Drury	Common Leopard	Nymphalidae
<i>Euthalia aconthea meridionalis</i> Fruhstorfer	Baron	Nymphalidae
<i>Moduza procris undifragus</i> Fruhstorfer	Commander	Nymphalidae

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Scientific Name	Common Name	Family
<i>Neptis hylas varmona</i> Moore	Common Sailer	Nymphalidae
<i>Hypolimnas bolina jacintha</i> Drury	Oriental Great Eggfly	Nymphalidae
<i>Hypolimnas misippus</i> Linnaeus	Danaid Eggfly	Nymphalidae
<i>Junonia lemonias lemonias</i> Linnaeus	Chinese Lemon Pansy	Nymphalidae
<i>Junonia orithya ocyale</i> Hubener	Dark Blue Pansy	Nymphalidae
<i>Melanitis leda leda</i> Drury	Oriental Common Evening Brown	Nymphalidae
<i>Graphium nomius nomius</i> Esper	Indian Spot Sword Tail	Papilionidae
<i>Papilio demoleus</i> Linnaeus	Lime Butterfly	Papilionidae
<i>Catopsilia pomona pomona</i> Fabricus	Common Emigrant	Pieridae
<i>Colias fieldii fieldii</i> Menetries	Himalyan Dark Clouded Yellow	Pieridae
<i>Colotis etrida</i> Boisduval	Small Orange Tip	Pieridae
<i>Colotis eucharis eucharis</i> Fabricus	Plain Orange Tip	Pieridae
<i>Delias eucharis</i> Drury	Common Jezebel	Pieridae

Sources:

- Butterflies list is from direct field observations (2010-11)
- Species classification and scientific nomenclature are as per **Kunte (2000)** and **Gunathilagaraj et al (1998)**
- All scientific names are in accordance to **Varshney (1983)** and common English names follow **Wynter-Blyth (1957)**
- Classification of butterflies is as per **Gaonkar (1996)**

3.9 GEOLOGY & HYDROLOGY STUDIES

3.9.1 Geomorphology

The study area can be geomorphologically divided into three units based on relief, slope factor and soil. The three groups are (i) hilly region (ii) pediplain region and (iii) fluvial land forms.

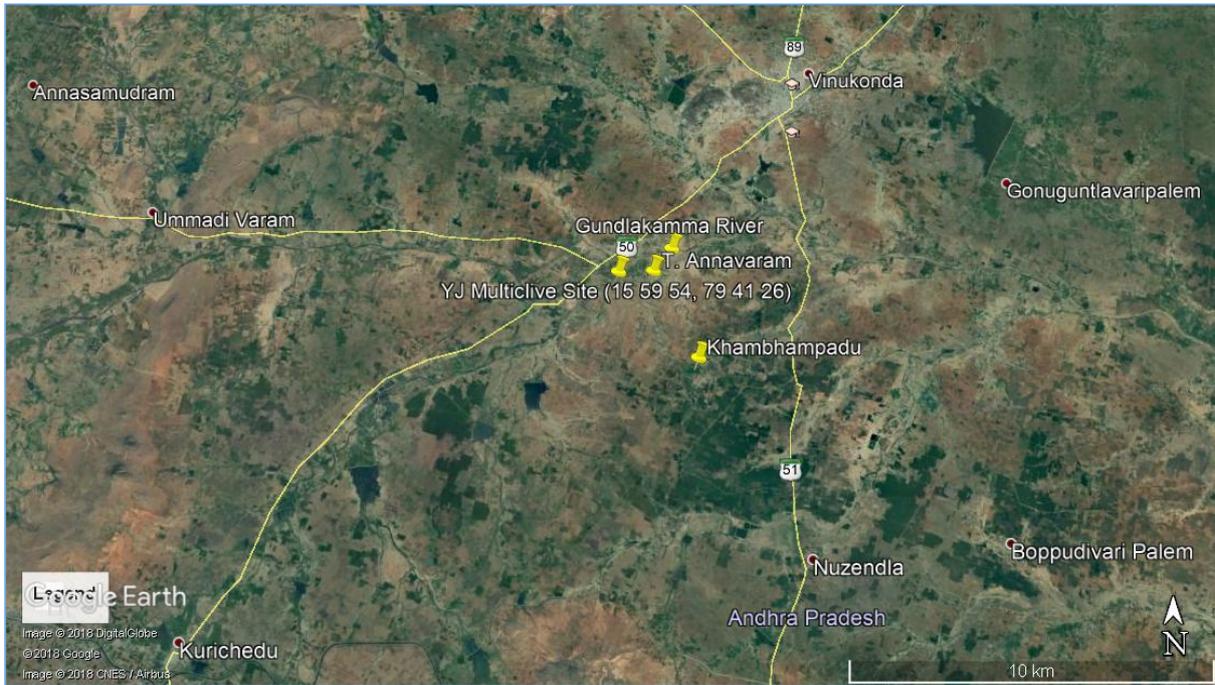
- i) **Hilly Region:** The structural hills and denudational hills form the main relief areas. The structural hills are situated about 10 km west and comprising the Nallamalai (Srisailam) range of hills with rocks of Cuddapah and Kurnool systems. The denudational hills are situated in the basement complex area associated with residual hills, inselbergs etc. These hills largely form the run-off areas with moderate to thin forest cover.
- ii) **Pediplain Region:** These are the plain land areas situated between the hilly and outcrop areas. The pediplain unit is demarcated by shallow buried / buried pediments based on the intensity of fracturing and weathering. The pediment area accelerates surface run-off with moderate to low infiltration along the joints and weathered zones.
- iii) **Fluvial land forms:** The valley fills, pediment zones, intermountain valley fills and alluvial plains constitute the main fluvial land forms. The pediment zones form along the slopes of high relief areas and ground water development is poor. The valley fill materials form

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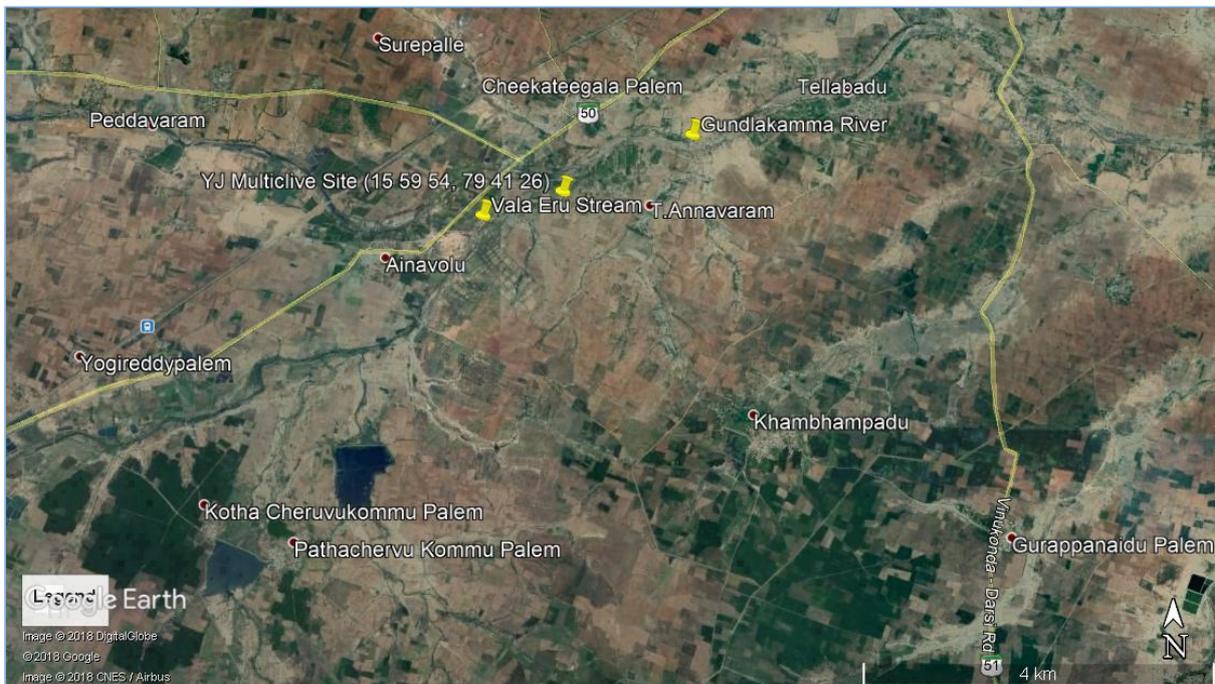
the fluvial deposits and occupy topographic lows along Gundlakamma river and other streams.

iv) The elevation of the proposed project site is about 75 m above mean sea level.

MAP 3.8 - MAP OF PROJECT AREA



MAP 3.9 - PROJECT SITE AND SURROUNDINGS



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3.9.2 Soil

The pediment soils are largely formed by the in-situ residual weathering and erosion process of granitic parental rock. The soils in the study area were classified into two groups - zonal and intra zonal. Zonal soils are developed in-situ and are of red sandy type. There is also presence of red loamy soils towards the upland and hilly areas. The intra zonal soils have more or less well-defined soil profile characteristics and are deep black soils which are rich in calcium (Lakshmi Prasanna, 2016).

In addition, the fluvial alluvial soils form predominant soils along the Gundlakamma River and its stream courses and consist of unconsolidated sand, silt and clayey sediments. These are highly porous with little binding material.

3.9.3 Climate and Rainfall

The hydro-meteorological observation of the nearby Vinukonda town was considered to assess the climate and rainfall of the study area. This area has a tropical climate. When compared with winter, the summers have much more rainfall. According to Köppen and Geiger, this climate is classified as Aw. The temperature here averages 28.6 °C. Precipitation here averages 792 mm. May is the warmest month of the year. The temperature in May averages 33.9°C. December is the coldest month, with temperatures averaging 18.1°C. The variation in the precipitation between the driest and wettest months is 163 mm. The variation in annual temperature is around 10.2 °C (**TABLE 3.22**).

TABLE 3.22 - CLIMATE DATA OF VINUKONDA, GUNTUR DISTRICT, AP

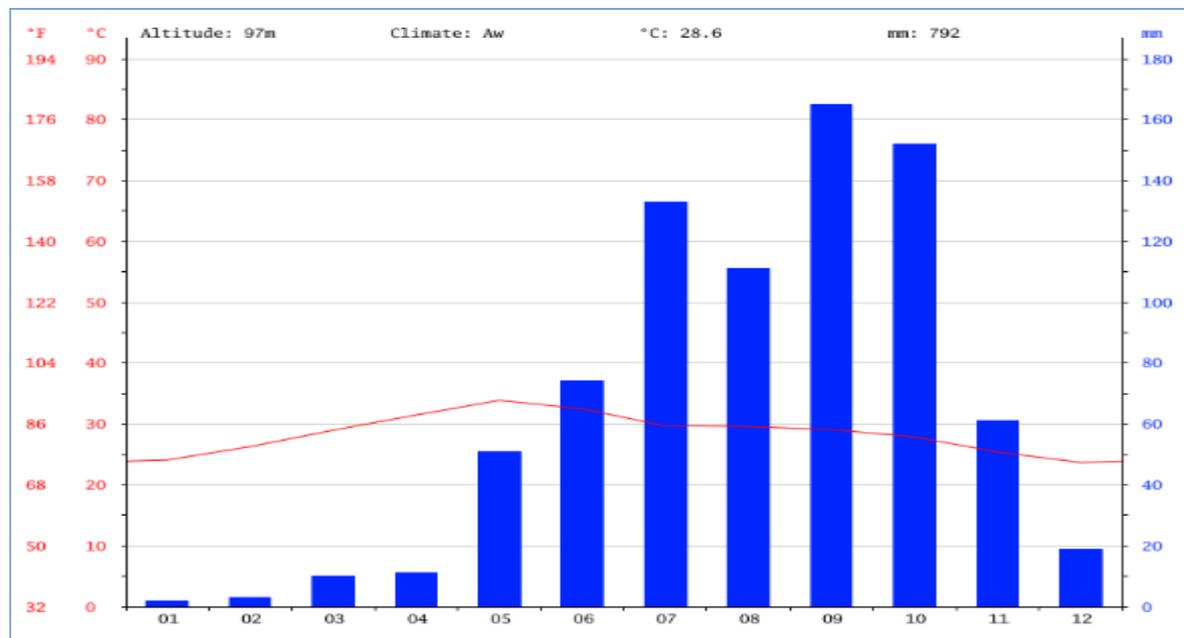
	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	24.1	26.3	29	31.5	33.9	32.5	29.7	29.8	29.1	27.9	25.4	23.7
Min. Temperature (°C)	18.3	20.2	23	25.9	28.1	27.7	25.6	25.6	25	23.7	20.5	18.1
Max. Temperature (°C)	30	32.5	35.1	37.2	39.8	37.4	33.8	33.6	33.2	32.1	30.3	29.3
Avg. Temperature (°F)	75.4	79.3	84.2	88.7	93.0	90.5	85.5	85.3	84.4	82.2	77.7	74.7
Min. Temperature (°F)	64.9	68.4	73.4	78.6	82.6	81.9	78.1	78.1	77.0	74.7	68.9	64.6
Max. Temperature (°F)	86.0	90.5	95.2	99.0	103.6	99.3	92.8	92.5	91.8	89.8	86.5	84.7
Precipitation / Rainfall (mm)	2	3	10	11	51	74	133	111	165	152	61	19

(Source: <https://en.climate-data.org/asia/india/andhra-pradesh/vinukonda-242214/>)

December is the coldest month with normal mean maximum temperature of about 29.3°C and mean minimum temperature of 18.1°C. Temperature begins to rise after February. May is the hottest month with mean daily maximum temperature of about 39.8°C and the mean daily minimum temperature of about 28.1°C.

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FIGURE 3.13 - MEAN MONTHLY RAINFALL AND TEMPERATURE OF VINUKONDA



(Source: <https://en.climate-data.org/asia/india/andhra-pradesh/vinukonda-242214/>)

The average annual rainfall of the district is 792 mm, which ranges from nil rainfall in January to 165 mm in September. The season-wise percentage distribution of rainfall is 63% in southwest monsoon, 27 % in northeast monsoon, 1 % in winter and 9 % in summer. The mean monthly rainfall distribution is shown in **FIGURE 3.13**. The least amount of rainfall occurs in January. The average in this month is 2 mm. September is the wettest month of the year, and the precipitation reaches its peak, with an average of 165 mm.

3.9.4 Drainage

The Gundlakamma River is the major river draining the area, which is more seasonal with intermittent to sub-perennial flows in the study area, and is situated about 0.3 km north of the site. The Gundlakamma is a seasonal river that flows through the east central part of the state of Andhra Pradesh. It arises in the Nallamalla hills, an offshoot of the Eastern Ghats.

The upper portion of the catchment of the Gundlakamma basin is mostly hilly with dense forests. The middle portion comprises of small groups of hillocks and the lower portion is plain. The river Gundlakamma is the largest of the small independent east flowing rivers between the Krishna and the Pennar. The Gundlakamma rises in the surrounding area of Gundlabrahmeswar, the border area between Nandyal and Atmakur talukas of Kurnool district at an elevation of about 800 m in Nallamalla hills. Numerous mountain streams join it as it descends down the thickly forested hills through a series of curves and tight bends. It follows a north-easterly direction and enters the plains near Cumbum. Gundlakamma is the largest of all the rivers that originate from the Nallamalla hills. After reaching plains, it forms two large tanks, one at Cumbum and other at Markapur in Prakasam district and flows in north-easterly direction and enters Guntur district. Then it changes the direction towards south-east and finally joins the Bay of Bengal near Ulichu village. Vala Eru is an ephemeral stream, and is the

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tributary of the Gundlakamma River located 0.3 km West of the proposed site (**MAP 3.9**). Other regional tributaries of the Gundlakamma River include Chamavagu, Rallavagu, Pogullavagu, Duvvaleru, Jampaleru, Tigaleru, Koneru and Chilakaleru streams. The length of the Gundlakamma River is about 220 km.

The general drainage pattern is dendritic to sub-dendritic. The drainage density varies from less than 0.4 km/sq.km in poorly drained fluvial alluvial areas to 0.6 km/sq.km in the Northern parts occupied by crystalline rocks. There are some small and medium sized tanks and water bodies situated in the study area with irrigation facilities, especially near to the villages of Khambampadu and Cheruvukommupalem. The area forms the upland and head reach areas of the Nagarjuna Sagar Right Canal Command System, with insufficient reaches to the farm lands.

3.9.5 Geology

The study area is underlain by different geological formations comprising oldest Archaeans to Recent fluvial alluvium (**MAP 3.10**). The Archaean basement complex comprising the granite-gneisses, schists and basic dykes of dolerites form the predominant rock types. The Nallamalla hill ranges occurring 10 km west of the Vinukonda area forming the relief areas. These are the Proterozoic sediments of Upper Cuddapah Supergroup and Kurnool Group comprising the quartzites, schists, shales and limestones. These are unconformably resting over the crystalline rocks of Archaean age.

Recent Alluvium occurs along the Gundlakamma River course and its tributaries and stream courses and ranges from few to tens of meters in thickness. The fluvial (river) alluvium forming the unconsolidated sediments comprise of rock, sand, silt and clay sediments in varying amounts with variable effective porosity and permeability.

3.9.5.1 Structural features

The study area is mainly occupied with hard rock (consolidated) formations. Prominent lineaments are trending in NE-SW, NW-SE and NNW-SSE directions. These are well expressed as lineaments in the satellite images.



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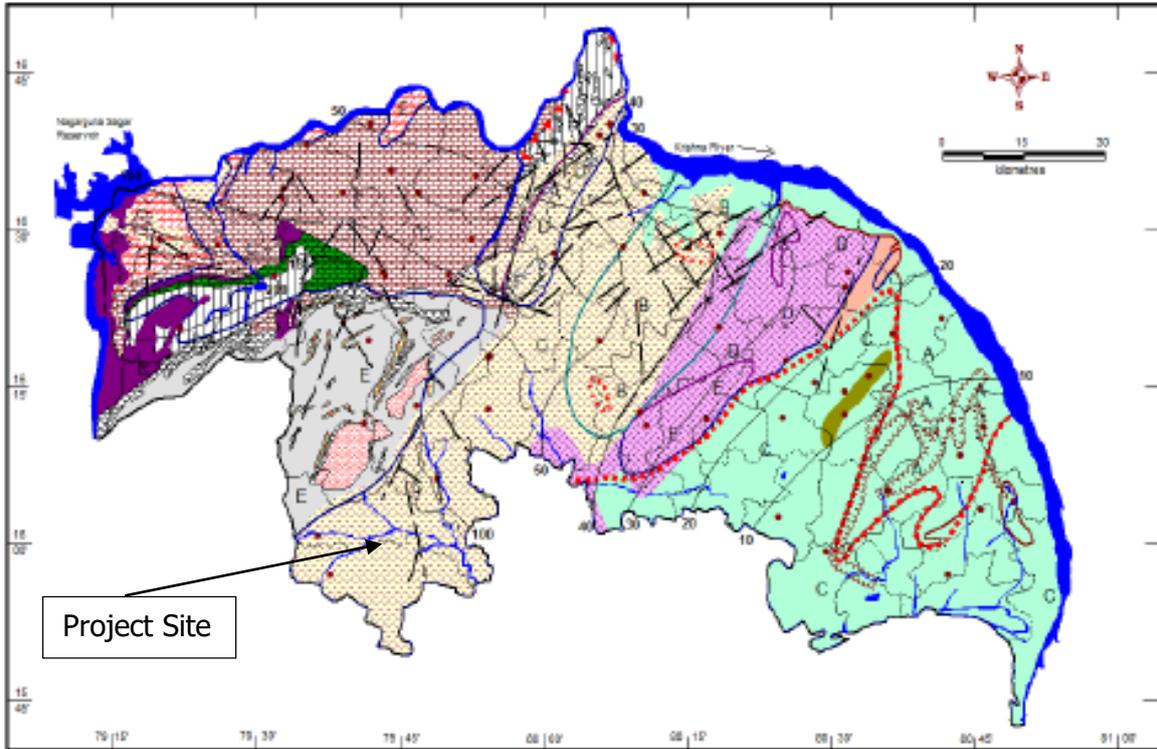
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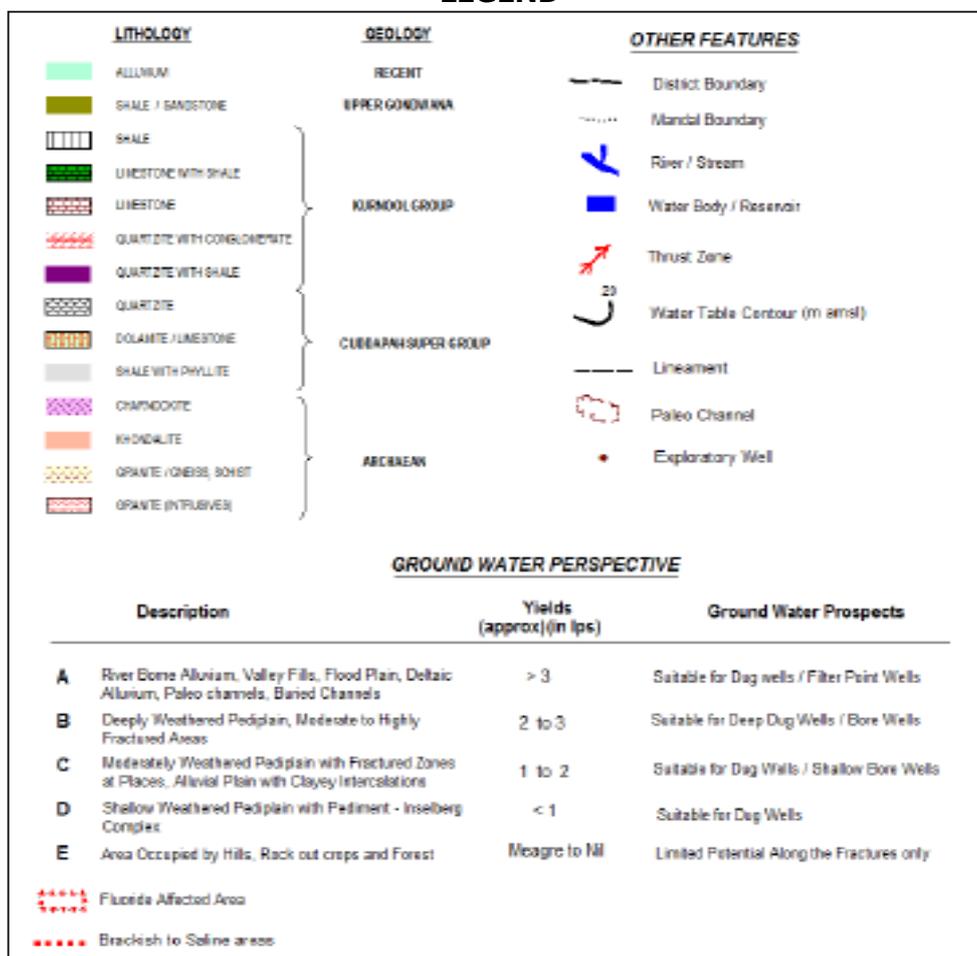
MAP 3.10 - HYDROGEOLOGICAL MAP OF GUNTUR DISTRICT



(Source : Guntur District Brochure, CGWB, 2013)

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(Source : Guntur District Brochure, CGWB, 2013)

3.9.6 Hydrogeology

Ground Water Conditions

Ground water occurrence, movement and recharge to aquifers are controlled by the degree of weathering, fracture pattern, geomorphological setup and ground water potential further depends upon the nature of geological formations, geographical setup, incidence of rainfall, recharge and other hydrogeological characters of the aquifer. Ground water occurs in phreatic condition in the weathered zone and under semi-confined to confined condition in the fractured and jointed rock formations. The hydrogeological conditions in the district are shown in **MAP 3.10**.

The study area is mainly comprised of semi-consolidated to unconsolidated formations. The chief sources of surface irrigation are through canals and tanks and are harnessed by major, medium and minor irrigation schemes. Ground water is developed by means of dug wells, bore wells, tube wells and filter point wells in the district. The depth of the bore wells in the Archaean crystallines (esp. granite gneisses) varies from 40 to >150 m, and even some were drilled down to 200 m. The depth of weathering ranges between 5.5 and 15 m bgl. The ground

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water yields generally range from < 1.0 lps to 3.0 lps (liters per second), with some instances of upto 5.0 lps. The depth of dug wells ranges between 10 to 30 m yielding 1.5 to 75 cu.m/day with the average pumping of 4-5 hrs/day. Unless those situated near to canal commands and river/stream courses, the dug wells go almost dry during the pre-monsoon times and reaching shallow levels of < 5.0 m bgl during post monsoon season. The depth to water level in the fluvial alluvium areas of Gundlakamma river system usually ranges from ground level to 4 to 12 m bgl with poor to moderate discharges.

Archaean crystalline formations comprising of granite gneisses form the predominant water bearing formations in the area. With lack of primary porosity, secondary porosity was developed through fracturing and subsequent weathering over ages and become water bearing at hydrogeologically favourable locations. In the upland and shallow buried pediment areas, ground water occurrence is restricted to the joints and fracture planes and storage capacity is low due to lack of weathered zone and meagre infiltration. Buried pediment areas generally possess thick zones of weathering and fracturing and sustain for long hours of pumping. The different pediment zones can be distinguished through the study of multispectral satellite images and thematic maps.

The depth of weathered mantle ranges from about 8 to 15 m bgl and below this zone fractured rocks are known to occur down to 40.0 m bgl. The depth to water level ranges from less than a meter (especially near to the canal command areas, and fluvial alluvium areas of Gundlakamma River and its stream courses) to 12 m bgl. The weathered zone has been tapped extensively by the dug wells and sustain four to six hours of pumping with yield 10 to 80 or upto 200 m³/day, and capable of irrigating about 0.8 to 3.0 hectares.

Central Ground Water Board has carried out ground water exploration at the locations from depth ranging 45 to 200 m bgl in hard rock areas and 25 to 430 m bgl in soft rock areas. The potential fractures were encountered between 40 and 120 m bgl. Existence of deep fractures upto 173 m bgl was also encountered. The cumulative yield of fracture zones varies from 0.12 to 15 lps. Yield of bore wells in general varies between 1 to 5 lps (CGWB, 2013).

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 seasons. The rises are due to the general build-up of water levels in response to rains and declines are due to erratic monsoon, less recharge and exploitation of groundwater resources. Well inventory of representative dug / bore wells were undertaken on 29th June 2018 within 5 km radius of the proposed BMW site, especially covering villages of Tana Annavaram, Ainavolu, Tellapadu, Chatragadapadu, Khambampadu, Yogireddypalem and Cheekategalapalem.

The depth to water level during pre-monsoon season (usually March to May/June) generally ranges between 2 and >5 m bgl. Shallow water level conditions can also be due to the presence of branch canals and distributaries of Nagarjunasagar Right Canal Command areas, and even along the Gundlakamma River and its stream courses. Moderately deep water level conditions of less than 10 m bgl occur in the areas underlain by the granite gneisses. Deep water level conditions exist even in the upland areas. The depth of water level during post monsoon season (June to November/January) is generally less than 2 m bgl and usually not

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more than 5 m bgl. The water logging conditions with water levels of less than 2 m bgl and prone to water logging conditions with water levels varying between 2-5 m bgl occur near to

PHOTOGRAPH 3.2 - DUG WELL AND DEPICTION OF ITS DEPTH, TANA ANNAVARAM VILLAGE



the canal command areas. The pre- and post-monsoon water levels in the area are shown in **MAP 3.11** and **3.12**. The water table contours are almost parallel to the topographic contours in the study area and general ground water flow direction is towards the Gundlakamma River.



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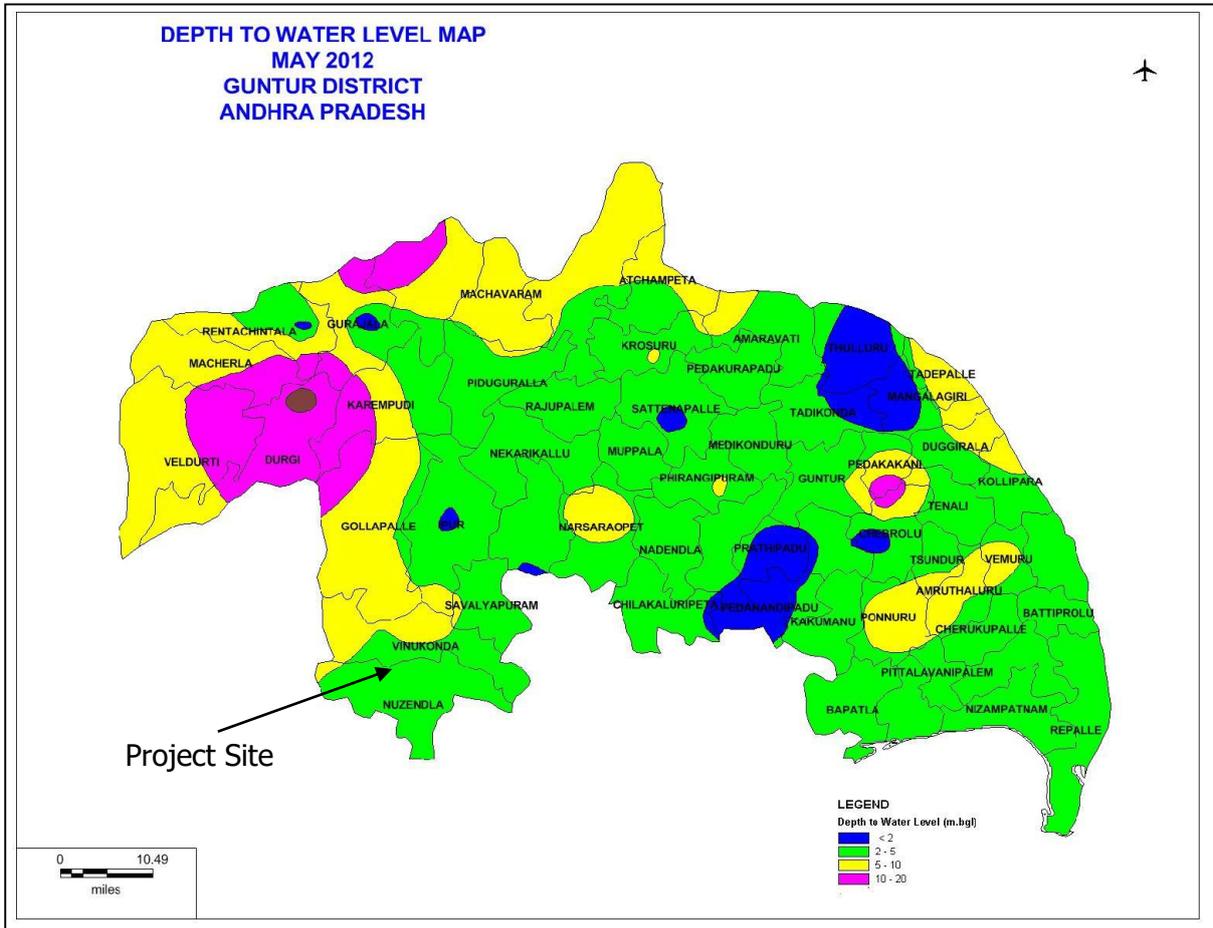
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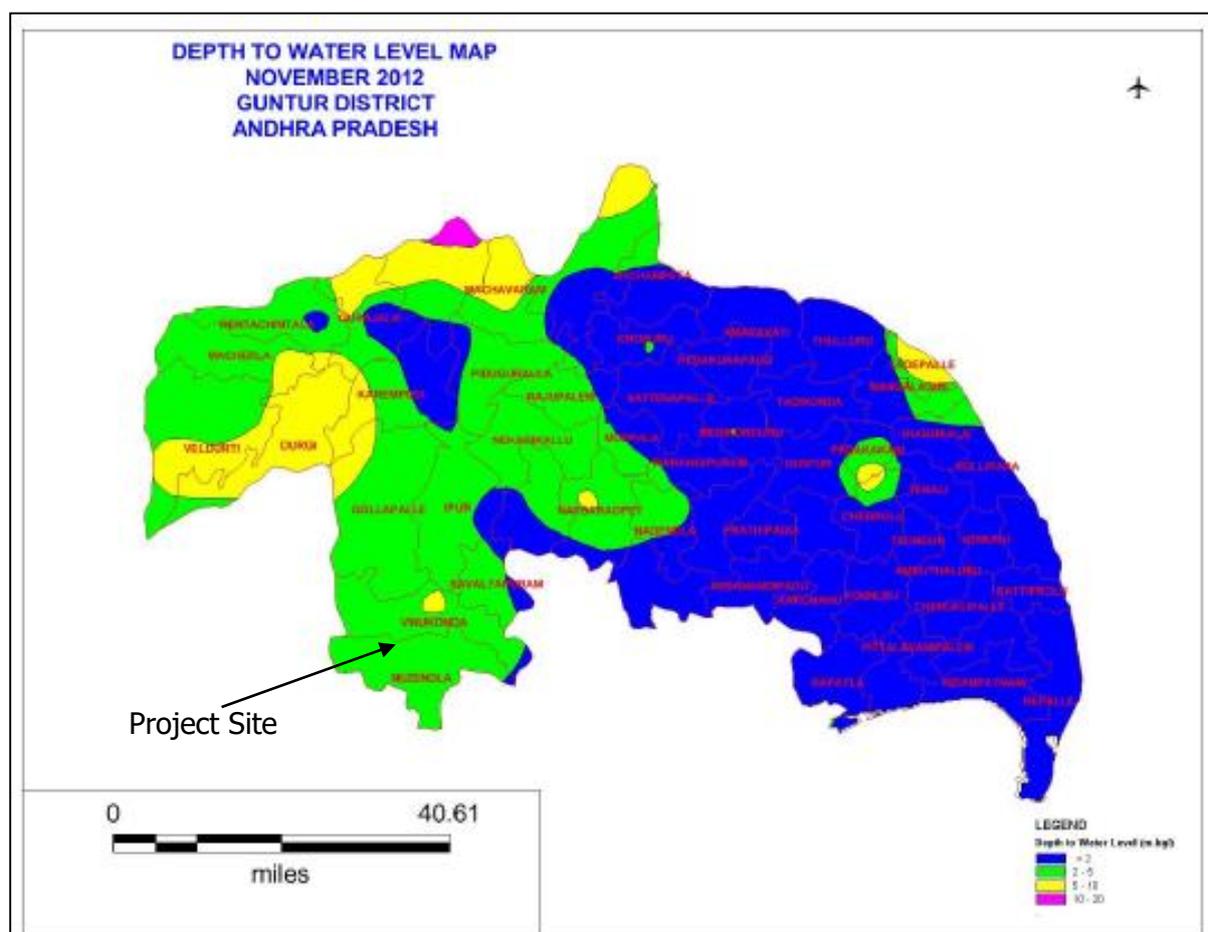
MAP 3.11 - PRE-MONSOON DEPTH TO WATER LEVEL MAP, YEAR 2012, GUNTUR DISTRICT



(Source: CGWB, 2013)

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MAP 3.12 - POST-MONSOON DEPTH TO WATER LEVEL MAP, YEAR 2012, GUNTUR DISTRICT



(Source: CGWB, 2013)

Ground water levels fluctuate considerably in response to the recharge and draft conditions of ground water aquifers. Rise in water levels from pre-monsoon to post-monsoon in the area is in the range of 2 to 5 m. Long-term trend of water levels indicate steady water level conditions with the usual seasonal fluctuations. There are no ground water depleted areas in and around the study area, with the reports of no significant fall of water table.

Ground Water Resource Estimation

In collaboration with the state departments, Central Ground Water Board (CGWB) carried out ground water resource estimation and categorization studies for the Vinukonda Mandal of the Guntur District for the year 2008-09. The details are tabulated in **TABLE 3.23** The CGWB has categorized the area as 'safe' with the stage of ground water utilization of 14%, indicating scope for further ground water development. These details are applicable to the study area also, as it forms part of the Vinukonda Mandal. The study area mainly comprises of semi-consolidated to unconsolidated formations. The chief sources of surface irrigation are through Nagarjunsagar Right Canal Command and tanks, and are harnessed by major, medium and

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minor irrigation schemes. Ground water in the area is developed by means of dug wells and bore wells.

TABLE 3.23 - DYNAMIC GROUND WATER RESOURCES OF VINUKONDA MANDAL, GUNTUR DISTRICT, A.P.

Sr. No.	Item	Ground Water Resources (ha-m)
1	Net Annual Ground Water Availability	3206
2	Existing Gross Ground Water Draft for Irrigation	383
3	Existing Gross Ground Water Draft for Domestic and Industrial Water Supply	75
4	Existing Gross Ground Water Draft for all uses	458
5	Provision for Domestic and Industrial Requirement Supply to the year 2025	346
6	Net Ground Water Availability for Future Irrigation Development	2477
7	Stage of Ground Water Development %	14%
8	Category	Safe

Note: Year of Ground Water Assessment: 2009

Water Quality

The quality of ground water is good in both shallow and deeper aquifers of crystalline hard rock formations is suitable for domestic, industrial and irrigation purposes except at few localities and in isolated places, which are contaminated due to localised pollution. There are instances of brackish water occurrences due to high electrical conductivity (EC) and total dissolved solids (TDS). Fluoride concentration in some locations of the district is more than permissible limit. Ground water pollution in Guntur district is mainly by agricultural and human activities as indicated by the nitrate concentrations in ground water. About 75% of the samples show Nitrates beyond permissible limits (> 45 mg/l) in shallow ground water, while it is about 32% in deeper ground water.

Ground Water Conservation Measures

To keep the status of the groundwater storage intact no area should be overexploited by over extraction of groundwater, as the excess usage disturbs the balance of storage, recharge, discharge aspects, resulting in the sharp decline of ground water levels and drying up of surface water bodies.

The hydrogeological environment of the study area is underlain by alluvial and consolidated aquifers with moderately good weathering and fracture system, good rainfall, runoff, infiltration and recharge potential, partly enhanced by the Nagarjunasagar Right Canal Command System. As the area of investigation is for Bio-Medical Waste (BMW) Treatment Facility, there is not much requirement for construction of artificial recharge structures and there is no need to take water conservation measures.

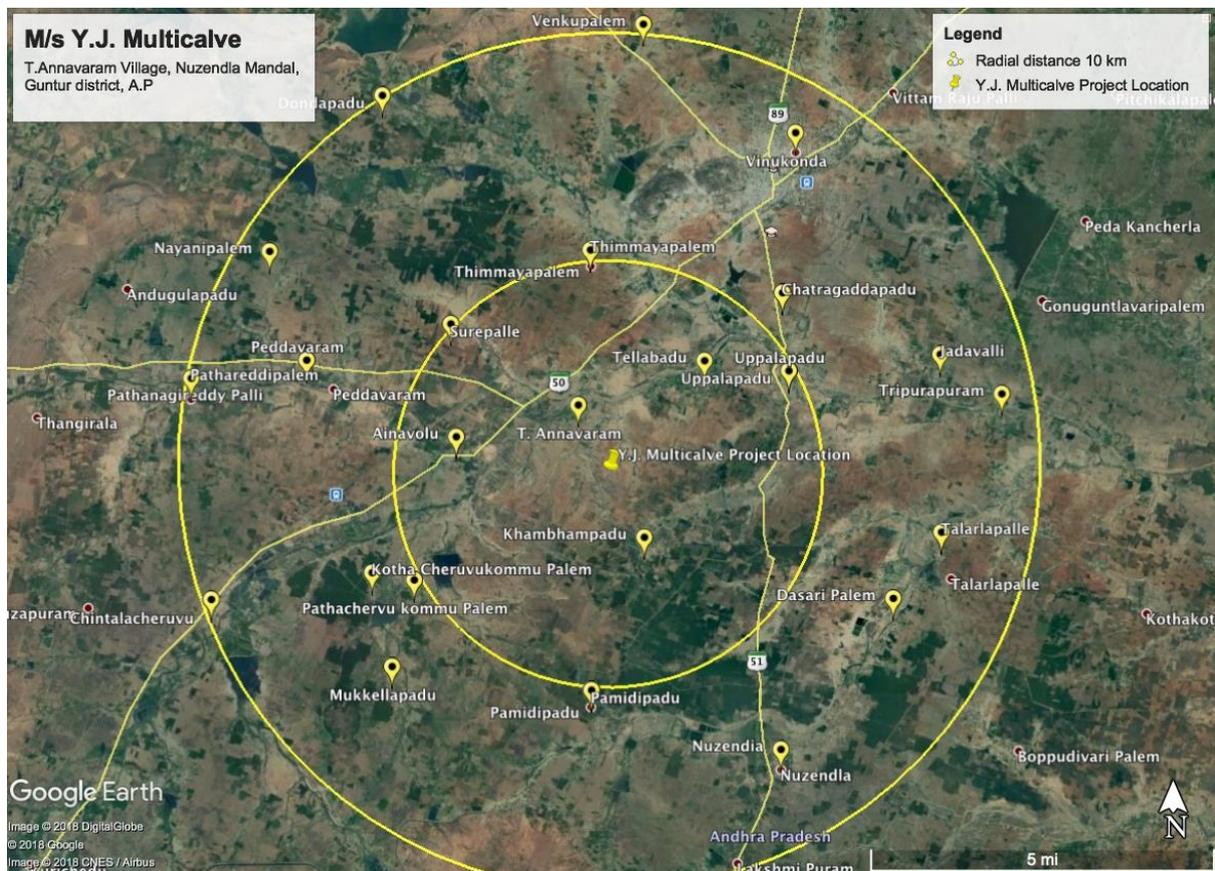
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3.10 DEMOGRAPHIC AND SOCIO-ECONOMIC ANALYSIS

3.10.1 Socio-Economic Layout

A total of 20 villages fall fully or partially in the radial distance of 10 km from the proposed project site of M/s. Y.J. Multiclave at Sy. No 7/1 and 8/1, Tana Annavaram Village, Nuzendla Mandal, Guntur District, Andhra Pradesh. Among these, 50% villages fall in Nuzendla Mandal, 25% in Vinukonda Mandal and rest 25% fall in five Mandals having one village for each Mandal (Thullur, Chebrolu, Ponnur, Rapalle, Rompicheria). Thus macro level study has been carried out in the radial distance 10 km for Nuzendla and Vinukonda Mandal of Guntur district as 75% of the villages falls in two mandals. The map showing the village location has been prepared from Census 2011 maps as indicated in **MAP 3.13**.

MAP 3.13 - LOCATION MAP (STUDY AREA 10 KM)



3.10.2 Demography

The study area in the radial distance of 10 km comprises of 100% of the area from Guntur district as indicated in **MAP 3.13** (For details of the area refer **Annexure IV**). The study area population is 0.06% of Andhra Pradesh (AP) state; 1.1% of the Guntur district. The population density of the study area is second lowest compared to native state of AP; Guntur district and

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Vinukonda Mandal. This shows there is great out migration of the population from study area for livelihood as indicated in **TABLE 3.24**.

TABLE 3.24 - COMPARATIVE DEMOGRAPHIC ANALYSIS FOR STUDY AREA – 2011

Sr. No.	Demographic Information (2011)	State	District	Taluka	Taluka	Study Area
		Andhra Pradesh	Guntur	Nuzendla	Vinukonda	(10 km)
1	Total Population	84580777	4887813	52853	112498	53659
2	Decadal Population Growth Rate (2001-2011)	10.98	9.47	1.39	12.79	-5.2
3	Density of Population (per sq.km)	308	429	160	530	247
4	Total Sex Ratio (Females per 000' males)	993	1003	1017	988	1022
4a	Rural Sex Ratio (Females per 000' males)	996	995	1017	997	1022
4b	Urban Sex Ratio (Females per 000' males)	987	1018	---	982	---
5	Proportion of Urban Population	33.4	33.81	---	55.6	---
6	Proportion of Scheduled Caste	7.0	19.59	19.8	15.1	25.5
7	Proportion Literate	67.02	67.4	47.2	61.0	47.6
8	Proportion of Female Literacy Rate	59.15	60.09	37.2	51.7	37.6
9	Work Participation Rate (Main + Marginal Workers)	46.61	48.73	57.43	45.7	55.6

NOTE: Study Area - 10 km Radial Distance from Project Site

Source: AP State Census Handbook and Guntur District Census Handbook 2011

This decadal population growth of the study area is found negative compared to native state of AP, Guntur District and other related Mandals. This suggests that overall the out migration of population from the study area. Since the study area is totally rural, the total sex ratio is more skewed to female population and is highest when compared to other areas. The proportion of total literacy rate in study area stands lowest and female literacy rate has similar status.

3.10.2.1 Description of Study Area

The study area has a total of 20 villages only in the radial distance of 10 km from the project site. The demographic profile of the study area is as under **TABLE 3.25** shows huge deviation of the value from the average value of each demographic variables and are largely concentrated among 11 villages only in the study area having radial distance of 10 km from the project sites. These villages could also be considered for social development programmes

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under Corporate Environmental Responsibilities to improve the social and economic condition of the resident population among these villages.

TABLE 3.25 - DESCRIPTION OF DEMOGRAPHIC PROFILE OF STUDY AREA – 2011

Variables	Minimum		Maximum		Average
	Village Name	Number	Village Name	Number	Number
Population	Surepalle	235	Pathareddi-palem	11190	2992
Population Density/sq km	Surepalle	36	T. Annavaram	938	247
Total Sex Ratio per 1000 males	Chatragadda	936	Uppalapadu	1698	1044
Sex Ratio 0-6 per 1000 males	Tripurapuram	798	Peddavaram	1333	988
% of SC Population	T. Annavaram	3.0	Jadavalli	69.8	27.3
% of ST Population	Venkupalem	0.4	Jadavalli	6.6	2.6
Total Literacy Rate	Chintala Cheruvu	32.0	Pathareddi-palem	61.1	46.3
Female Literacy Rate	Chintala Cheruvu	24.2	Uppalapadu	57.5	37.6
Work Participation Rate	Uppalapadu	45.1	Jadavalli	63.8	55.6
% Main Workers	T. Annavaram	24.9	Peddavaram	92.2	54.5
% Marginal Workers	Peddavaram	0.3	T. Annavaram	48.4	11.6

(Source: Guntur District Census Handbook 2011)

3.10.2.2 Work Participation Rate (Economic Status)

Nature of one's activity and extent of participation in economically productive works are the decisive factor for such a classification. Level of economic development of different regions within the District, availability of opportunities besides willingness to work especially among women, initiative and entrepreneurship evinced by men folk in general activities are the important factors that influence the distribution of population under these three categories i.e., main workers, marginal workers and non-workers.

Guntur district areas is upcoming industrial zone having varying types of industries largely related to Mining and Quarrying, Food Products and Beverages, Wood and Paper products, Chemicals, Wooden furniture etc. witness moderate industrialization due to good facilities provided by local authorities. Thus the area wise classification of work participation rate shows that, study area has greater WPR than Guntur district. The study area is comprised of rural areas from Nuzendla mandal covering major industrial zone. The percentage of main work participation rate is highest in study area after Nuzendla mandal and lowest is in Vinukonda Mandal.

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The work participation rate is maximum in the village Jadavalli (63.8%) and the minimum is in village Uppalapadu (45.1%); while the average work participation rate is 55.6% in the villages located in the radial distance of 10 km from the project site. In the sample village, it was reported that the population is largely engaged in agriculture sector (51%); followed by casual labour work (23%); and petty business (12%). It is also observed that about 13% of the population is engaged in service sector, of which 4% skilled jobs and 11% are engaged in unskilled jobs. For doing the skilled jobs, by large the population migrated to other places. The detailed villages' wise demographic and work participation status is indicated in **Annexure IV**.

3.10.2.3 Industry - Trade & Commerce

Guntur district is known for its diversified industrial development and is very fast upcoming industrial zone. This is witnessed with various manufacturing of the commodities and the total number of factories working under the Factories Act and the number of workers engaged in them according to the various categories of industries as indicated in **TABLE 3.26**.

TABLE 3.26 - FACTORIES WORKING UNDER FACTORIES ACT, INDUSTRY-WISE AND PERSONS EMPLOYED

Sl. No.	Name of the Industry	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1	2	3	4	5	6	7	8	9	10	11	12
1	Mining and Quarrying	87	117	118	116	80	NA	NA	77	107	6
	No. of Workers	583	466	835	707	510	NA	NA	440	1060	758
2	Food Products and beverages	1,906	1,912	1,881	1,773	1,724	1,674	1,674	1,534	1,506	3
	No. of Workers	16,587	15,774	15,670	15,812	15,454	15,034	15,034	15,057	16,025	30
3	Textiles	21	21	18	27	20	36	36	49	57	21
	No. of Workers	2,254	1,742	355	3,814	3,771	4,602	4,602	6,226	6,758	1,091
4	Wood and Wood Products and Cork except Furniture	159	155	185	168	157	155	155	174	139	18
	No. of Workers	645	561	870	553	513	543	543	1,002	727	1,231
5	Paper and Paper Products	34	40	39	33	20	23	23	18	14	10
	No. of Workers	576	677	928	988	619	645	645	662	913	131
6	Publishing, Printing and Reproduction of Recorded Media	14	15	17	18	20	24	24	22	23	62
	No. of Workers	184	188	304	506	394	514	514	462	607	798
7	Chemicals and Chemical Products	26	31	149	34	23	26	26	33	22	10
	No. of Workers	710	785	2,407	1,133	1,058	956	956	715	612	643
8	Rubber and Plastic Products	34	34	31	36	28	33	33	55	67	46
	No. of Workers	535	499	541	780	367	374	374	537	624	652
9	Other Non-Metallic Mineral Products	160	195	114	115	132	137	137	154	135	NA
	No. of Workers	2,933	2,696	2,473	3,846	3,149	2,875	2,875	1,963	2,446	NA
10	Basic Metals	20	21	22	23	24	26	26	35	30	11
	No. of Workers	282	227	263	269	298	312	312	461	812	167
11	Fabricated Metal Products except Machinery and Equipment	26	32	38	35	27	29	27	26	26	15
	No. of Workers	256	286	580	515	335	446	355	216	351	198
12	Machinery and Equipment NEC	12	13	13	18	13	12	16	13	11	NA
	No. of Workers	179	165	215	311	174	186	254	171	193	NA
13	Electricity, Gas, Streams Hot Water Supply	27	28	31	32	32	33	32	33	33	NA
	No. of Workers	365	332	435	366	411	474	656	450	532	NA
14	Collection, Purification and Distribution of Water	2	2	2	2	3	3	2	1	1	NA
	No. of Workers	50	55	80	94	83	98	52	20	18	NA
15	Sale, Maintenance, Repairs of Motor Vehicles and Retail	23	24	21	21	23	22	22	21	24	NA
	No. of Workers	1896	1879	1068	1014	1604	1333	1144	1401	1193	NA
	Total No. of Factories	2551	2640	2679	2451	2326	2233	2233	2245	2195	202
	Total No. of Workers	28035	26332	27024	30708	28740	28392	28316	29783	32871	5699

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(Source: Part A District Census Handbook Guntur 2011)

The district's economy with reference to the GDDP (Gross District Domestic Product), NDDP [Net District Domestic Product] and the PCI [per capita income] at current prices and at constant prices in Lakhs for the ten-year period starting from 2000-2001 to 2009-2010 is shown in **TABLE 3.27**.

TABLE 3.27 - DISTRICT ECONOMY - YEAR WISE - AT CURRENT PRICES (RS. IN LAKHS)

Sr.	Items	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
1	Gross District Domestic products (GDDP)										
	at Current Prices	905,405	980,367	937,207	1,085,968	1,195,216	1,297,770	1,462,770	1,645,200	2,225,047	2,562,168
	at Constant Prices	549,774	579,186	531,121	931,754	996,915	1,073,334	1,167,449	1,249,711	1,740,621	1,821,830
2	Net District Domestic Product (NDDP)										
	at Current Prices	826,182	906,175	860,184	1,013,299	110,150	1,191,150	1,339,945	1,505,445	2,066,529	2,349,270
	at Constant Prices	496,021	531,227	482,999	868,822	921,471	988,152	1,075,039	1,149,471	1,581,574	1,657,245
3	Per Capita Income (PCI)										
	at Current Prices	18,276	20,552	19,125	22,301	24,162	25,925	29,023	32,277	43,997	49,543
	at Constant Prices	17,411	19,022	17,035	19,121	20,165	21,509	23,285	24,645	33,672	34,949

(Source: Directorate of Economics and Statistics year books from 2001 to 2010)

One should note that the transportation road network is vital and had played significant role in the economic development, trade and social integration of the country. It facilitates smooth conveyance of both people and goods. Size of the road network, its quality and access has a bearing on various parameters of the economy like travel time, transport costs, cost of input, cost of finished products etc. Besides, road network promotes wide market of various products / services and thereby extend markets as a consequence enable exploitation of the economies of scale as witnessed in the Guntur district.

3.10.2.4 Education Status

The education status was explored in 10% of the sample villages which was discussed with Panchayat members or school teacher for adult working population only. **TABLE 3.28** shows

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mere approximate to give a rough idea of possible employment opportunity among the industries located in the study area. It is to be noted that the skill gaps in the industries for persons having skilled jobs degree are largely fulfilled by the urban areas while the persons with unskilled jobs are largely taken up from surrounding villages during construction and operation stage of the industries.

TABLE 3.28 - ROUGH ESTIMATES OF EDUCATION STATUS OF WORKING POPULATION (IN %) IN SAMPLE VILLAGES

Sample Village	Literate* Population	Illiterate* Population	Professional Course**	Post Graduate**	Graduate**	Below Graduate**
Chintala Cheruvu	1343	2548	4	5	28	63
Chatragadda padu	1116	777	3	2	36	59
T. Annavaram	173	367	1	0	18	81

* Figure taken from District Census Hand book of Guntur 2011;

** Field survey data from FGDs in 10% of villages. It also includes school going population.

3.10.2.5 Employment Opportunities

Further the Village Panchyat members, teachers and other members in Focus Group Discussion (FGD) pointed out the pattern employment among working population as indicated in **TABLE 3.29**.

TABLE 3.29 - STATUS OF PATTERN OF EMPLOYMENT OF WORKING POPULATION IN SAMPLE VILLAGES (%)

Sample Village	Cultivator/ Farmer	Agriculture Labour	Casual Labour	Petty Business	Service Sector	
					Skilled	Unskilled
Chintala Cheruvu	28	23	22	12	4	11
Chatragadda padu	32	26	22	10	2	8
T. Annavaram	27	18	26	15	5	9
Average	29	22	23	12	4	9

The above table shows that in rural area, the agriculture sector (51%) dominates the profession, while in semi urban area and the villages near urban areas are largely engaged in the service sector (13%). The casual labour (23%) fluctuate in between agriculture and industrial sector and petty business is restricted in 12% of the villagers.

The proposed project shall increase in employment; this will indirectly contribute to the development of entire area. **TABLE 3.30** shows the manpower details for construction and operation of the proposed project. It is projected that proposed project will generate 16 direct employment during operation of BMW plant and about 14 indirect employment during construction and commissioning phase. There is a potential to employ about 3 managerial

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skilled persons; 3 skilled technocrats and 10 labour class employment during regular operations phase of the factory premises. Owing to the pattern of employment existing in the area and the proposed demand of manpower for the new construction within the factory premises, it is suggested that the proponent should employ highly managerial skilled from urban areas, while mid-level technocrats from both urban as well rural areas and unskilled work force mostly from rural areas.

TABLE 3.30 - STATUS OF MANPOWER REQUIRED FOR PROPOSED PROJECT

Phase of Project	Type of Labour	No. of Individuals
During Construction	Contractual	07
During Commissioning	Contractual	07
During Operation	Managerial	03
	Skilled	03
	Unskilled	10
	Total	30

(Source: YJ Multiclave)

3.10.2.6 Quality of Life

The quality of life is best described in relation to the public amenities available to resident population. The villages/towns within the 10 km from the project site shows public amenities like presence of Govt. Primary School, Telephone/mobile, Self Help Groups and regular power supply are present in almost 100% of villages. Further, presence of Anganwadi centre and Metal road are present in 90-95% of the villages. While mode of public and private transportation is restricted among 85% of the villages, treated water piped supply is restricted in 70% of the villages and Total Sanitation Campaign is witnessed among 60% of the villages. The presence of river and canal is restricted in only 15% of the villages. The other public amenities like Govt. PHC/SC, presence of community centre, commercial bank and Agricultural Credit Society are only among 5% of the villages. Technical training centres like ITI is totally absent in the study area. The study area requires immediate mobile health services that can be linked with CSR funds while industrial training institutions must be initiated through local industries to cater the needs of the existing industries in the project area.

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CHAPTER 4 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 INTRODUCTION

Any activity will lead to a specific impact, either beneficial or harmful to the environment. Therefore, prediction of impacts is an important component in the environmental impact assessment process. Several techniques and methodologies are being used for predicting the impacts due to development activities on physico-ecological and socio-economic components of the environment.

The environmental impact identification & prediction aims to identify the degree of impacts in terms of being temporary/permanent, direct/indirect, positive/negative or short term/long term on the present environment. Such predictions are superimposed over the baseline (pre-project) status of environmental quality to develop the post-project scenario of environmental quality. The objective prediction and evaluation of impact leads to the need for a comprehensive environmental management plan for implementation during the operational phase of proposed activities for minimizing the adverse impacts on environmental quality.

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 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 project and anticipated environmental attributes likely to be affected have been described in subsequent sections of this chapter.

4.2 IDENTIFICATION OF ACTIVITIES

An impact can be defined as any change in physical, chemical and biological, cultural and/or socio-economic environment that can be attributed to activities related to alternatives under study for meeting the project needs. Overall environmental impact is divided into two categories i.e. during **Construction Phase** and **Operation Phase**. The environmental impact assessment is accomplished by identification and prediction of impacts and their assessment.

4.2.1 Construction Phase

- Site Clearing
- Transportation of Construction Materials
- Storage and Handling of Construction Materials
- Civil Construction
- Mechanical Erection
- Greenbelt Development

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4.2.2 Operational Phase

- Storage & Handling of Bio-Medical Waste
- Transportation of Bio-Medical Waste
- Operation and Maintenance
- Fugitive and Gaseous Emission
- Greenbelt 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 project during the construction & operation phase are given in **TABLE 4.1** and **TABLE 4.2** respectively.

4.3 ENVIRONMENTAL ATTRIBUTES

Potential impacts of proposed project on various environmental attributes given below are predicted as -

- **Air**
 - Quality
- **Water**
 - Quality
 - Quantity
- **Noise**
- **Land**
 - Soil Characteristics
- **Ecology**
 - Flora and Fauna
- **Occupational Health & Safety**
- **Employment generation**

4.4 IMPACT IDENTIFICATION MATRIX

Impact identification matrix has been developed to establish cause-effect relationship between activities of project and environmental attributes stated in **Sections 4.2 & 4.3** respectively. These VECs are considered base on natural resources and human world to attribute value for economic, social, environmental aesthetic and ethical reasons. The same has been presented in **TABLE 4.1 & TABLE 4.2**.

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TABLE 4.1 - IMPACT IDENTIFICATION MATRIX - CONSTRUCTION PHASE

Activity	Site Clearing	Transportation of Construction Materials	Storage and Handling of Construction Materials	Civil Construction	Mechanical Erection	Greenbelt Development
	Environmental Attributes					
(A) Air	√	√	√	√	X	√
(B) Water	X	√	X	√	X	√
(C) Land	√	√	√	√	X	√
(D) Noise	X	√	X	√	√	√
(E) Ecology	√	√	X	√	X	√
(F) Occupational Health & Safety	√	√	√	√	√	√
(G) Employment Generation	√	√	√	√	√	√

Note: (√): Possibility of Impact (X) : No Impact Will Occur

TABLE 4.2 - IMPACT IDENTIFICATION MATRIX - OPERATION PHASE

Activity	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
	Environmental Attributes						
(A) Air	√	√	√	√	√	√	√
(B) Water	X	X	√	X	√	√	√
(C) Land	√	√	X	X	√	√	√
(D) Noise	X	√	√	X	√	X	√
(E) Ecology	X	√	√	√	√	X	√
(F) Occupational Health & Safety	√	√	√	√	√	√	√
(G) Employment Generation	√	√	√	X	√	√	√

Note: (√): Possibility of Impact (X) : No Impact Will Occur

4.5 APPROACH TO EVALUATION OF IMPACT THROUGH MATRIX METHOD

For the proposed 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 as well as focus on areas for mitigation measures. The processes involved in computing Environmental Impact score are described below.

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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	Irreversible impact

4.5.2 Activity Score

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. Based on the severity criteria, matrix has been prepared assigning specific value as shown in **TABLE 4.4** and **TABLE 4.5** for construction and operation phase respectively. Also impacts and mitigation measures are explained in **TABLE 4.6** and **TABLE 4.7** for both the phases of project separately.

TABLE 4.4 - IMPACT EVALUATION MATRIX - CONSTRUCTION PHASE

Activity	Site Clearing	Transportation of Construction Materials	Storage and Handling of Construction Materials	Civil Construction	Mechanical Erection	Greenbelt Development
	Environmental Attributes					
Air						
Quality	-1	-2	-1	-2	-	+3
Water						
Quality	-	-	-	-1	-	-
Quantity	-	-1	-	-1	-	-1
Land						
Soil Characteristics	-2	-1	-1	-2	-	+2
Noise						
	-	-1	-	-2	-2	+2
Ecology						
Flora & Fauna	-1	-2	-	-2	-	+3
Health & Safety						
	-1	-2	-1	-2	-2	+2
Employment Generation						
	+2	+2	+2	+2	+2	+2
Total Activity Score	-3	-7	-1	-10	-2	+13
Net Total	-10					

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TABLE 4.5 - IMPACT EVALUATION MATRIX - OPERATIONAL PHASE

Activity	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
Environmental Attributes							
Air							
Quality	-2	-1	-2	-2	+2	-1	-1
Water							
Quality	-	-	-1	-	-	-	-
Quantity	-	-	-2	-	-2	-	-1
Land							
Soil Characteristics	-2	-1	-	-	+3	-2	-2
Noise	-	-1	-2	-	+2	-	-1
Ecology							
Flora & Fauna	-	-2	-	-1	+3	-	-1
Health & Safety	-2	-2	-2	-1	+2	-1	-1
Employment Generation	+3	+3	+3	-	+3	+3	+3
Total Activity Score	-3	-4	-6	-4	+13	-1	-4
Total	-9						
Net Score (Construction + Operational Phase)	-10 + (-9) = -19						
Environment Impact Score	-19/7 (No. of Environment Attributes) = -2.71						

TABLE 4.6 - JUSTIFICATION OF ASSIGNED VALUES - CONSTRUCTION PHASE

Sr. No.	Project Activities	Environmental Attributes	Score	Impacts
I	Site Clearing	Air Quality	-1	There will be an insignificant impact on air due to fugitive dust generation during site clearing.
		Soil Characteristics	-2	There will be short term reversible impact on soil characteristics due to site clearing activities i.e. soil erosion.
		Flora & Fauna	-1	There will be insignificant impact on flora & fauna due to dust emission during site clearing.
		Health & Safety	-1	Insignificant impact will be there during site clearing on worker's health due to dust emission and possibilities of minor accident.
		Employment	+2	There will be direct employment from nearby villages for site clearing activities.

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Sr. No.	Project Activities	Environmental Attributes	Score	Impacts
II	Transportation of Construction Materials	Air Quality	-2	Short term reversible impact on air quality is anticipated due to vehicular movement of construction materials.
		Water Quantity	-1	There will be water sprinkling activity on construction site during transportation.
		Soil Characteristics	-1	There will be insignificant impact on soil due to vehicular movement and unloading of construction materials.
		Noise	-1	There will be insignificant impact due to vehicular movement during transportation and handling of construction materials.
		Flora & Fauna	-2	There will be short term reversible impact due to exhaust emissions during vehicular movement for transportation of construction materials.
		Health & Safety	-2	There will be short term impacts on health of workers due to possibility of accidents during transportation of construction materials.
		Employment	+2	There will be employment generation on temporary basis due to transportation and material handling activities.
III	Storage & Handling of Construction Material	Air Quality	-1	During handling of construction materials, emission from cement, silt etc. will have insignificant effect on quality of air.
		Soil Characteristics	-1	There will be insignificant impact on soil due to storage and handling of construction material.
		Health & Safety	-1	There are possibilities of accident during handling of construction material.
		Employment	+2	For storage & handling of construction material, there will be generation of employment from the nearby villages on short term basis.
IV	Civil Construction	Air Quality	-2	There will be short term reversible impact due to dust emission and site development work.
		Water Quality	-1	Due to contamination of water during civil construction, there will be insignificant impact on water quality.

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Sr. No.	Project Activities	Environmental Attributes	Score	Impacts
		Water Quantity	-1	Requirement of water will be limited to construction purpose.
		Soil Characteristics	-2	Due to construction activities, there will be impact on soil quality of project site.
		Noise	-2	Due to noise generated during construction activities, there will be short term reversible impact.
		Flora & Fauna	-2	Emission during construction activities will impact flora and fauna for short term period.
		Health & Safety	-2	There will be short term impact to workers during civil construction due to possibilities of minor injuries or accidents.
		Employment	+2	There will be temporary employment due to civil construction.
V	Mechanical Erection	Noise	-2	Erection of machineries will generate noise.
		Health & Safety	-2	Possibilities of injuries and minor accidents will impact on worker's health and safety.
		Employment	+2	There will be employment generation for short period due to mechanical erection.
VI	Greenbelt Development	Air Quality	+3	Beneficial impact on air due to greenbelt development.
		Water Quantity	-1	Water consumption for additional greenbelt, the impact will be insignificant.
		Soil Characteristics	+2	Greenbelt development will have significant impact in reduction of the soil erosion.
		Noise	+2	Greenbelt development will have significant impact in reduction of the noise.
		Flora & Fauna	+3	Greenbelt will have positive impact on local flora & fauna.
		Health & Safety	+2	Due to greenbelt, there will be positive impact on health of workers.
		Employment	+2	For maintenance of greenbelt and green spaces will generate temporary employment during construction phase.

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TABLE 4.7 - JUSTIFICATION OF ASSIGNED VALUES - OPERATIONAL PHASES

Sr. No.	Project Activities	Environmental Attributes	Score	Remarks
I	Storage & Handling of Bio-Medical Waste	Air Quality	-2	Short term reversible impact has occurred due to odour generation during handling/treatment of bio medical waste,.
		Soil Characteristics	-2	There will be insignificant impact on soil due to spillage and/or dropping during handling of bio-medical waste.
		Health & Safety	-2	Minor health related impacts to workers due to odour or minor accident during bio-medical waste storage and handling.
		Employment	+3	There will be a significant impact on socio-economy due to employment generation.
II	Transportation of Bio-Medical Waste	Air Quality	-1	There will be dust emission due to transportation of trucks and vehicular movement which is insignificant impact.
		Soil Characteristics	-1	Due to vehicular movement, there will be very less insignificant impact on soil.
		Noise	-1	Vehicular movement will generate noise which will have insignificant impact.
		Flora & Fauna	-2	Due to transportation of vehicles and handling of wastes, there will be short term reversible impact on
		Health & Safety	-2	There are possibilities of minor injuries due to accidents during transportation of waste.
		Employment	+3	There will be permanent employment generation due to continuous operation of plant.
III	Operation & Maintenance	Air Quality	-2	There will be gaseous emissions from the incinerator (continual) as well as DG set (occasional).
		Water Quality	-1	In operation of plant, waste water generated will be recycle and reuse after treatment into plant itself. However the effect is insignificant.
		Water Quantity	-2	Short term reversible impact on water quantity due to water consumption.
		Noise	-2	Operation of plant will lead to generation of noise due unloading of waste, operation of incinerator and D. G. Sets. However due to enclosures,

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Sr. No.	Project Activities	Environmental Attributes	Score	Remarks
				impact will be insignificant.
		Health & Safety	-2	Injuries and minor accidents are possible during operation of plant.
		Employment	+3	Plant operation will lead to employment generation directly and indirectly.
IV	Fugitive & Gaseous Emission	Air Quality	-2	The emission of gaseous pollutants from the incinerator as well as DG set.
		Flora & Fauna	-1	Impact on local flora & fauna due to gaseous emission will be insignificant due to proposed APCs.
		Health & Safety	-1	Health related problem is possible due to gaseous emission.
V	Greenbelt Development	Air Quality	+2	Greenbelt will absorb gaseous pollutants and confine the pollution within the area. It is permanent positive impact on air quality.
		Water Quantity	-2	There will be water consumption for greenbelt development.
		Soil Characteristics	+3	Development of greenbelt and green spaces will enhance the soil characteristics permanently in positive manner.
		Noise	+2	Greenbelt will attenuate the noise levels and have permanent positive impact.
		Flora & Fauna	+3	Development of greenbelt and green spaces will have positive impact on flora and fauna.
		Health & Safety	+2	Absorption of pollutants will occur due to greenbelt which will improve human life in plant area.
		Employment	+3	For maintenance of greenbelt, there will be permanent employment.
VI	Solid / Hazardous Waste Generation	Air Quality	-1	Due to odour from hazardous waste, there will be insignificant impact on air quality.
		Soil Characteristics	-2	Soil contamination may occur in case of dropping of solid / hazardous waste. There will not be any disposal on land.

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Sr. No.	Project Activities	Environmental Attributes	Score	Remarks
		Health & Safety	-1	There may be insignificant impact on health of workers in case they come in direct contact with waste.
		Employment	+3	For handling of solid/hazardous waste generated, there will be generation of employment on long term period.
VII	Effluent Treatment Plant	Air Quality	-1	In effluent treatment, odour may be generated, which will have insignificant impact on air.
		Water Quantity	-1	Water consumption for effluent treatment plant will be used.
		Soil Characteristics	-2	Due to spill or leaks of effluent, it can have an impact on soil characteristics.
		Noise	-1	During operation of air blowers, there will be insignificant impact.
		Flora & Fauna	-1	There will be insignificant impact on local flora and fauna due to effluent fumes/odours during operation.
		Health & Safety	-1	Minor injuries to workers are possible.
		Employment	+3	There will be employment on long term basis to operate effluent treatment plant

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. Based on the Environmental Impact Score and potential of impacts due to proposed project, appreciable yet insignificant positive impact is anticipated on environment. Potential of impact on environment based on Environmental Impact Score is anticipated based on **TABLE 4.8**.

TABLE 4.8 - ENVIRONMENTAL IMPACT SCORE AND POTENTIAL OF IMPACTS

Environmental Impact Score	Potential of Impacts
$-45 < X \leq -60$	Overall Highly negative impacts
$-30 < X \leq -45$	Overall Moderately negative impacts
$-15 < X \leq -30$	Overall Slightly negative impacts
$0 < X \leq -15$	Overall Insignificantly negative impacts
$X = 0$	Overall Neutral impacts
$0 > X \geq 15$	Overall Insignificantly positive impacts
$15 > X \geq 30$	Overall Slightly positive impacts

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30 > X ≥ 45	Overall Moderately positive impacts
45 > X ≥ 60	Overall Highly positive impacts

Where X is Environment Impact Score

Interpretation: The total Environment Impact score is -2.71 which suggests that due to proposed project, overall impact on environment will be insignificantly negative. The mitigation measures of overall impacts are described below.

4.6 MITIGATION MEASURES

4.6.1 CONSTRUCTION PHASE

I. Air

- Dust suppression measures proposed will be regular water sprinkling on main haul roads in the project area. This activity will be carried out at least twice a day, if need arises frequency will be increased on windy days. In this way, around 50% reduction on the dust contribution from the exposed surface will be achieved.
- The duration of stockpiling will be as short as possible as most of the material will be used as backfill material for the open cut trenches for road development.
- Temporary tin sheets of sufficient height (3 m) will be erected around the site of dust generation or all around the project site as barrier for dust control.
- Tree plantations around the project boundary will be initiated at the early stages by plantation of 2 to 3-year-old saplings. Regular watering will be done, so that the area will be moist for most part of the day.
- To reduce the dust movement from civil construction site to the neighbourhood, the external part of the building under construction will be covered by plastic sheets.
- Vehicle speed shall be limited to 20 km/hr to reduce fugitive dust generated from unpaved areas.
- All vehicles for transportation will have valid PUC certificate.

II. Water

- Water is required for concrete preparation and curing application. Optimum use of water will be done during construction activities.
- Packaged STP shall be provided at construction site for the labourers for treatment of domestic sewage generated. Treated sewage shall be used for water sprinkling application.

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- Water required for hydraulic test of tanks will be reused for testing of other tanks and only loss in water quantity during such trial will be made up by fresh water.
- During site development necessary precautions will be taken, so that the runoff water from the site gets collected to working pit and in case of any over flow it will be diverted to nearby plantation area.

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.

IV. Land Use

- There is no existing construction at site. So there is no demolition waste generation in this project.
- Any construction waste or debris generated during construction of the project will be segregated at site and shall be stored at designated location. Steel waste will be sold to scrap dealer. Concrete / aggregate waste will be reused at site for site filling, levelling and any such application.
- Excavated soil, if any, will be reused at site for elevating level of the plot and will be also used for plantation, greenbelt development at site only.

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. 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.
- 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.

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4.6.2 OPERATION PHASE

I. Air

The major air pollutants generated from the proposed project are given below.

- Dust particulates in flue gas from chimney
- HCl in flue gas
- Nitrogen Oxide (NO_x) in flue gas

Incinerator will be provided with a stack height meeting MOEF & CC Guidelines (minimum 30 m) including APCs.

Incinerator exhaust gases will be passed through air pollution control system consisting of high pressure drop venturi scrubber and packed bed scrubber for removal of particulate matter and acidic gas pollutants. Scrubber circulation liquor will be maintained with free alkalinity of at least 5% by weight by continuous addition of caustic lye solution through auto pH control system. Air pollution control system shall also be provided with activated carbon injection system for adsorption of any rare possibility of presence of mercury vapour in incineration flue gas.

Dioxins: Incineration furnace will be operated as per CPCB guidelines for bio-medical waste incineration. Primary Combustion Chamber will be operated 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 shall be provided with minimum 2 sec 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 °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 vapour, activated carbon injection system shall be provided for adsorption of mercury vapour.

Mist: Mist eliminator shall be provided at the top of packed bed scrubber for capturing mist from flue gas.

Assessment of incremental ground level concentration of TSPM, HCl and NO_x is provided further in this section of report in **Section 4.7** using software AERMODCloud™ Version 5.2 Rev. 39 developed by M/s EnviTrans Consultancy Services. AERMODCloud™ is an integrated graphical user interface of AERMOD, ISCST3, AERMAP and AERMET.

II. Water

- 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 recycled back to process. Refer **Section 2.8.1** for description of Effluent Treatment Plant.

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- 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.

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.
- Noise generating equipment shall be installed in enclosed room so that noise is contained within room only.
- Employees shall be provided with PPEs when entering such rooms for maintenance purpose.

IV. Land

- 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 of 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 on designated floor of building and then stored in segregated storage area. 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.

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.

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- 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 check-up of all workers shall be conducted.

4.7 MODEL FOR INCREMENTAL GROUND LEVEL CONCENTRATION DUE TO PROPOSED PROJECT

For the modelling purpose, gaseous emission from the proposed project can be considered as total suspended particulate matter (TSPM) with a considerable parameter being HCl and NO_x from the stack attached to incinerator. Details of predicted emission from proposed stack are given in following **TABLE 4.9**.

TABLE 4.9 - DETAILS OF PREDICTED EMISSION FROM STACK

Sr. No.	Operating Parameters	Unit	Source of Emission
			Stack Attached to Incinerator
1	Stack height	m	30
2	Diameter	m	0.4
3	Flue gas temperature	K	351
4	Air Pollution Control Equipment	-	Venturi Scrubber and Packed Bed Scrubber
5	Flue gas velocity	m/sec	8
6	Flow Rate	Nm ³ /hr	3071.08
7	Emission Concentration		
	PM	mg/Nm ³	50*
	HCl	mg/Nm ³	50*
	NO _x	mg/Nm ³	400*
8	Emission Rate		
	TSPM	g/sec	0.042
	HCl	g/sec	0.042
	NO _x	g/sec	0.341

(* Permissible Limits)

4.7.1 MODEL ISOPLETHS AND MAXIMUM INCREMENTAL GROUND LEVEL CONCENTRATIONS

Isopleths plots for the parameters - Total Suspended Particulate Matter (TSPM), HCl and NO_x for proposed scenario are given in **FIGURE 4.1, 4.2** and **4.3** for radius of 10 km. The

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maximum incremental ground level concentration (24 Hourly) for TSPM, HCl and NO_x due to the proposed project is given in **TABLE 4.11**.

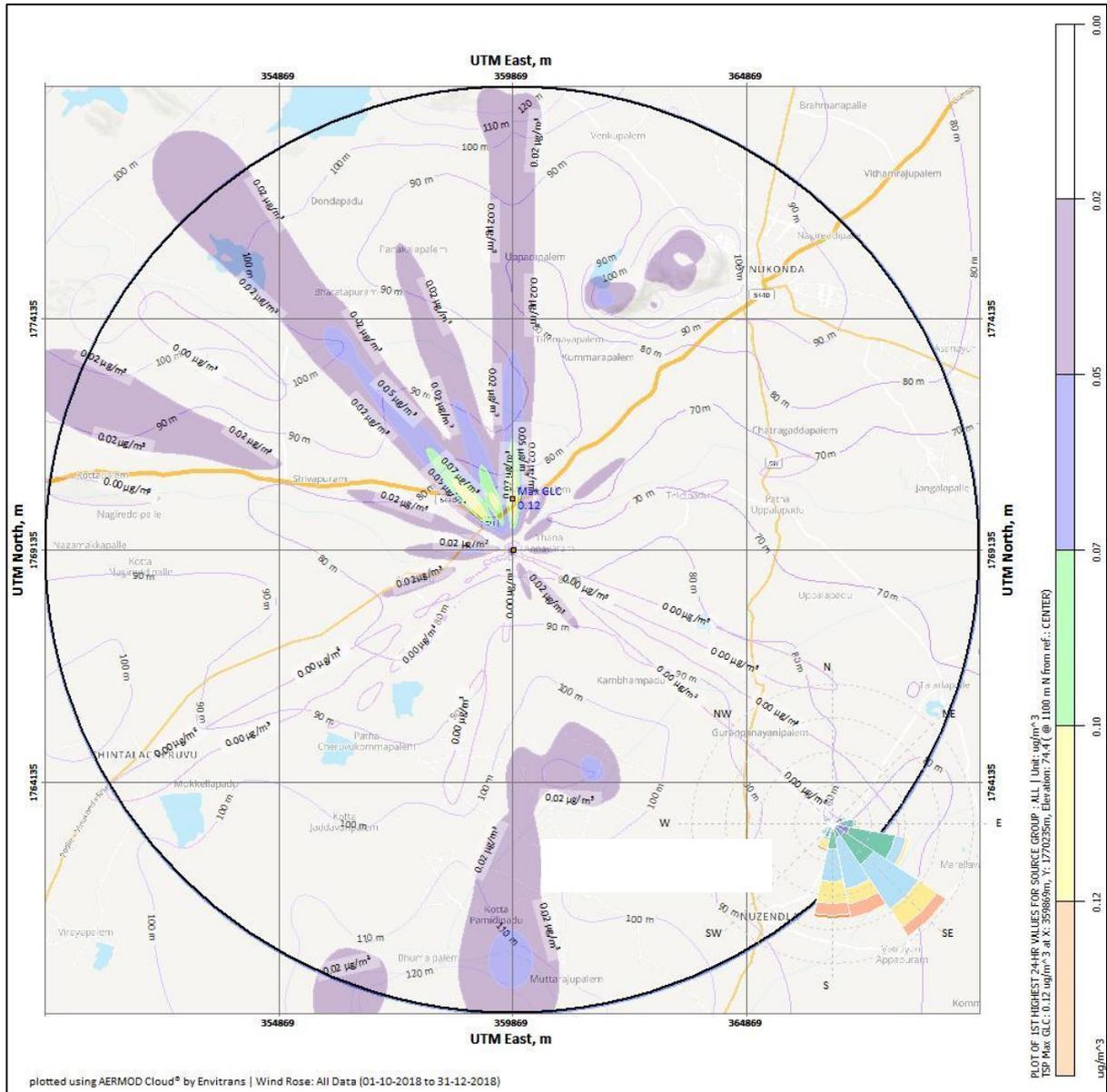


FIGURE 4.1 - ISOPLETHS PLOT FOR TSPM (10 KM RADIUS)

Interpretation: Maximum incremental Ground Level Concentration for TSPM is 0.12 µg/m³ at X: 359869 m and Y: 1770235 m at 1100 m away in North direction from Project site as shown in above **FIGURE 4.1**.



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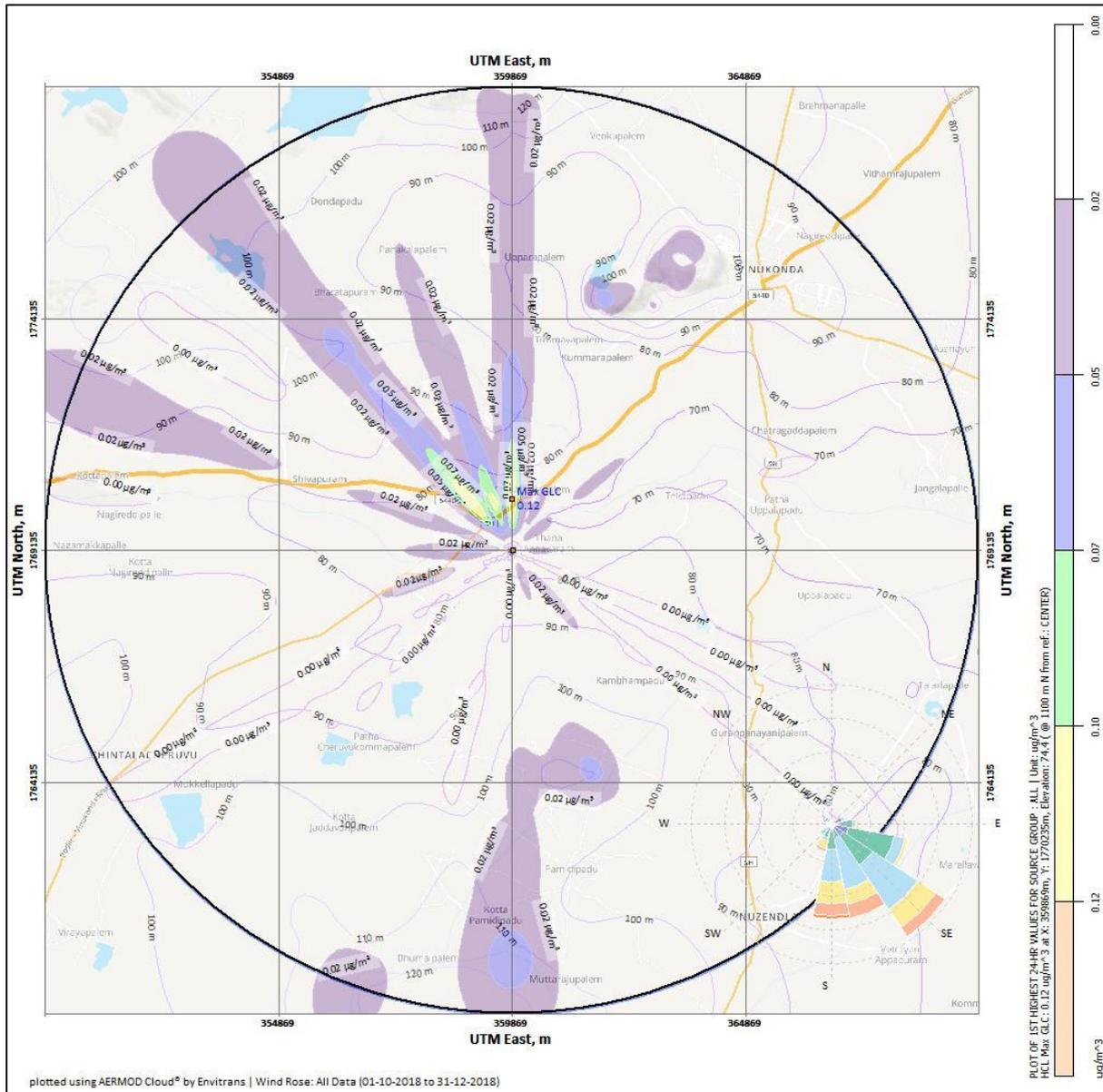


FIGURE 4.2 - ISOPLETHS PLOT FOR HCL (10 KM RADIUS)

Interpretation: Maximum incremental Ground Level Concentration for HCL is $0.12 \mu\text{g}/\text{m}^3$ at X: 359869 m and Y: 1770235 m at 1100 m away from Project site in N direction as shown in above **FIGURE 4.2.**



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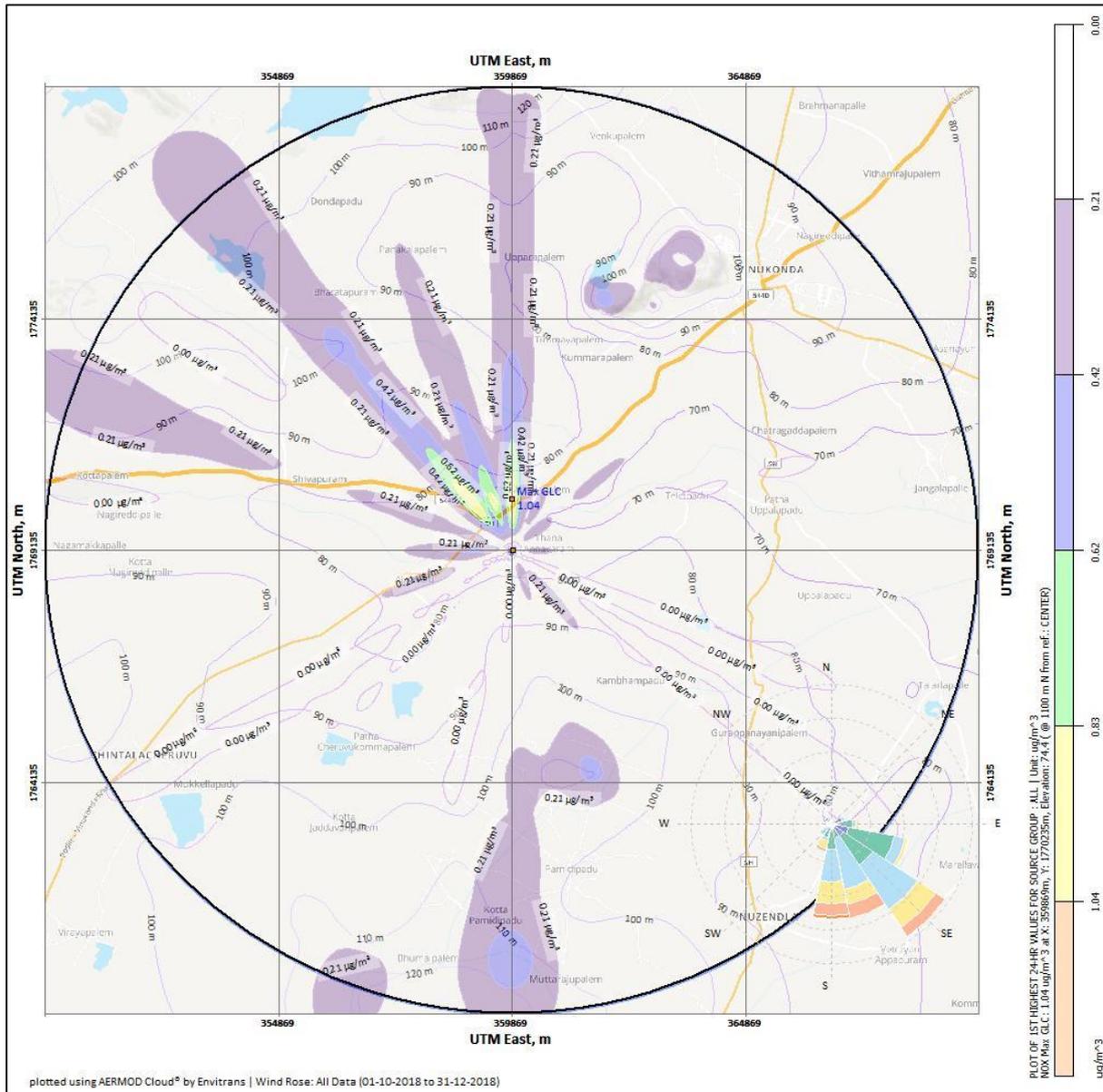


FIGURE 4.3 - ISOPLETHS PLOT FOR NO_x (10 KM RADIUS)

Interpretation: Maximum incremental Ground Level Concentration for NO_x is $1.04 \mu\text{g}/\text{m}^3$ at X: 359869 m and Y: 1770235 m at 1100 m away in North direction from Project site as shown in above **FIGURE 4.3**.

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TABLE 4.10 - MAXIMUM INCREMENTAL GROUND LEVEL CONCENTRATION

Sr. No.	Parameters	Maximum GLC ($\mu\text{g}/\text{m}^3$)	Distance and Direction
10 KM RADIUS			
1	SPM	0.12	1100 m in N
2	HCl	0.12	1100 m in N
3	NO _x	1.04	1100 m in N

4.7.2 TRANSPORTATION OF VEHICLES

It is estimated that total 18 Nos. of vehicles will be required for transportation of bio-medical waste to site as and well as solid hazardous waste to TSDF site/Authorized recycler.

- Total Bio-Medical Waste - 7 TPD
- Capacity of vehicle - 400 kg per vehicle
- Total no of vehicles per day - 17.5 say 18 vehicles per day
- Total hazardous waste material to be sent to TSDF/Authorized recycler - 3.1 TPD = 77.5 TPM
- Capacity of truck for hazardous waste - 20 T
- Total nos. of truck per month - 4 Vehicle / Month

4.7.3 INCREMENTAL EMISSION DUE TO PROPOSED TRANSPORTATION OF VEHICLES

Industry has given provision of sufficient storage area for chemicals and hazardous waste at premises. However, due to minimum required transportation of trucks and tankers from plant, there will be negligible incremental emission of different air pollutants in ambient air due to proposed activities. Basis of emission generation and its mathematical modelling is shown as under:

TABLE 4.11 – DESIGN BASIS OF VEHICULAR EMISSION

Sr. No.	Parameters	Quantity	Unit
1	No. of Vehicles per Day (Bio-Medical Waste)	18	
2	Other transportation (including staff)	10	
3	Total No. of Vehicles per Day	28	
4	Average speed of vehicles	60	Km/hr
5	Surface wind speed	4	m/sec

Note:

*No of vehicles per day are decided based on daily chemical consumption and hazardous waste disposal quantity considering storage area is provided.

*Wind speed is consider on the bases of moderate to slidly unstable meteorological conditions based on Pasquill-Stability classes (stability 'C' is noted for above case at 4 m/sec)

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4.7.4 PREDICTED EMISSION CONCENTRATION DUE TO VEHICULAR MOVEMENTS

- Incremental emission for the parameters CO, PM & HC (Carbon Monoxide, Particulate Matters and Hydro Carbons) due to proposed vehicular movements was carried using CALINEpro software Version 1.2 (Build: 31) 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.

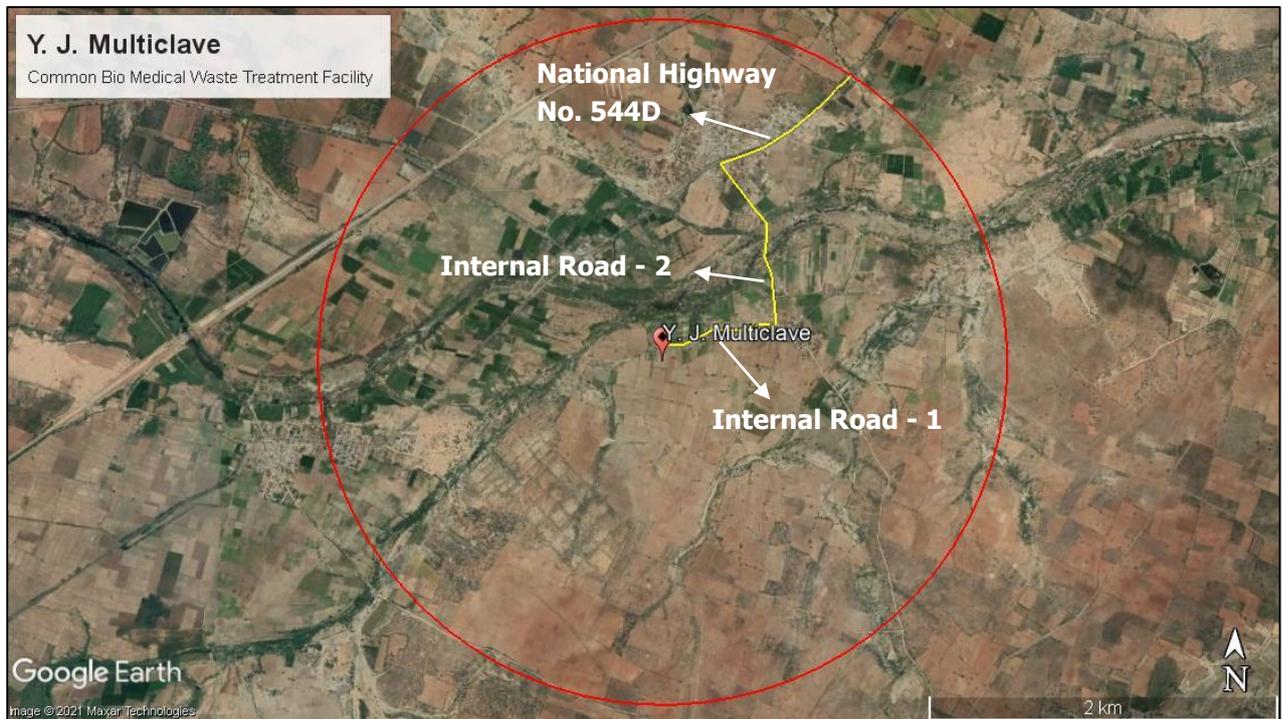


FIGURE 4.4 - ROAD NETWORK CONSIDERING 2 KM RADIUS FROM THE PROJECT SITE

TABLE 4.12 – 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)
Internal Road 1	1444	28	10	6	0.42	0.37
Internal Road 2	1823	28	10	6	0.42	0.37
National Highway No. 544D	2026	28	10	6	0.42	0.37

(Emission Factors Source: ARAI 2011)

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TABLE 4.13 - METEOREOLOGICAL DATA COSIDERED FOR PROPOSED VEHICULAR MODELLING

Wind speed (m/sec)	Wind direction	Stability class	Mixing height (m)	Temperature (°C)
2.25	135	1	100	27.64

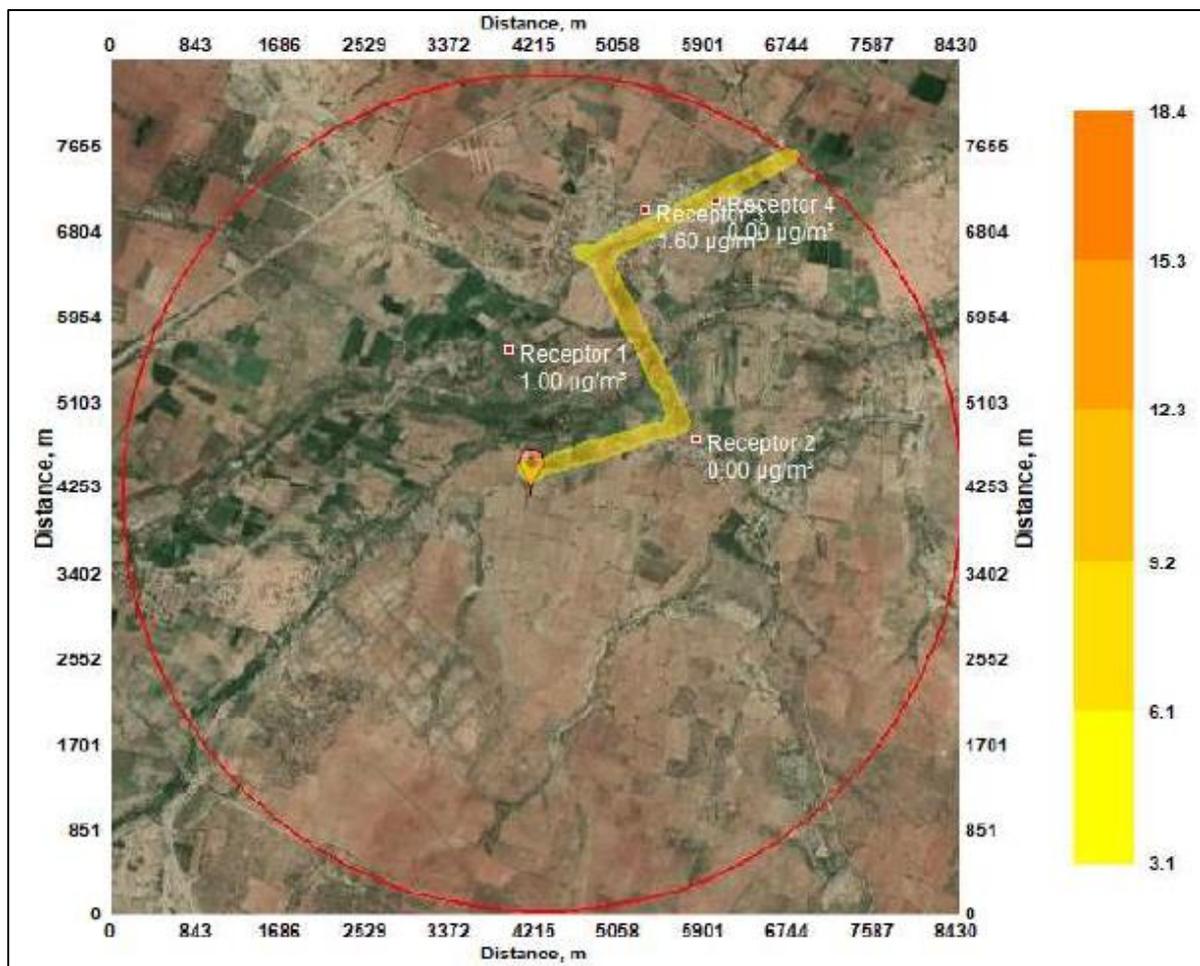


FIGURE 4.5 - TOTAL PREDICTED GROUND LEVEL CONCENTRATION OF CARBON MONOXIDE ($\mu\text{g}/\text{m}^3$)

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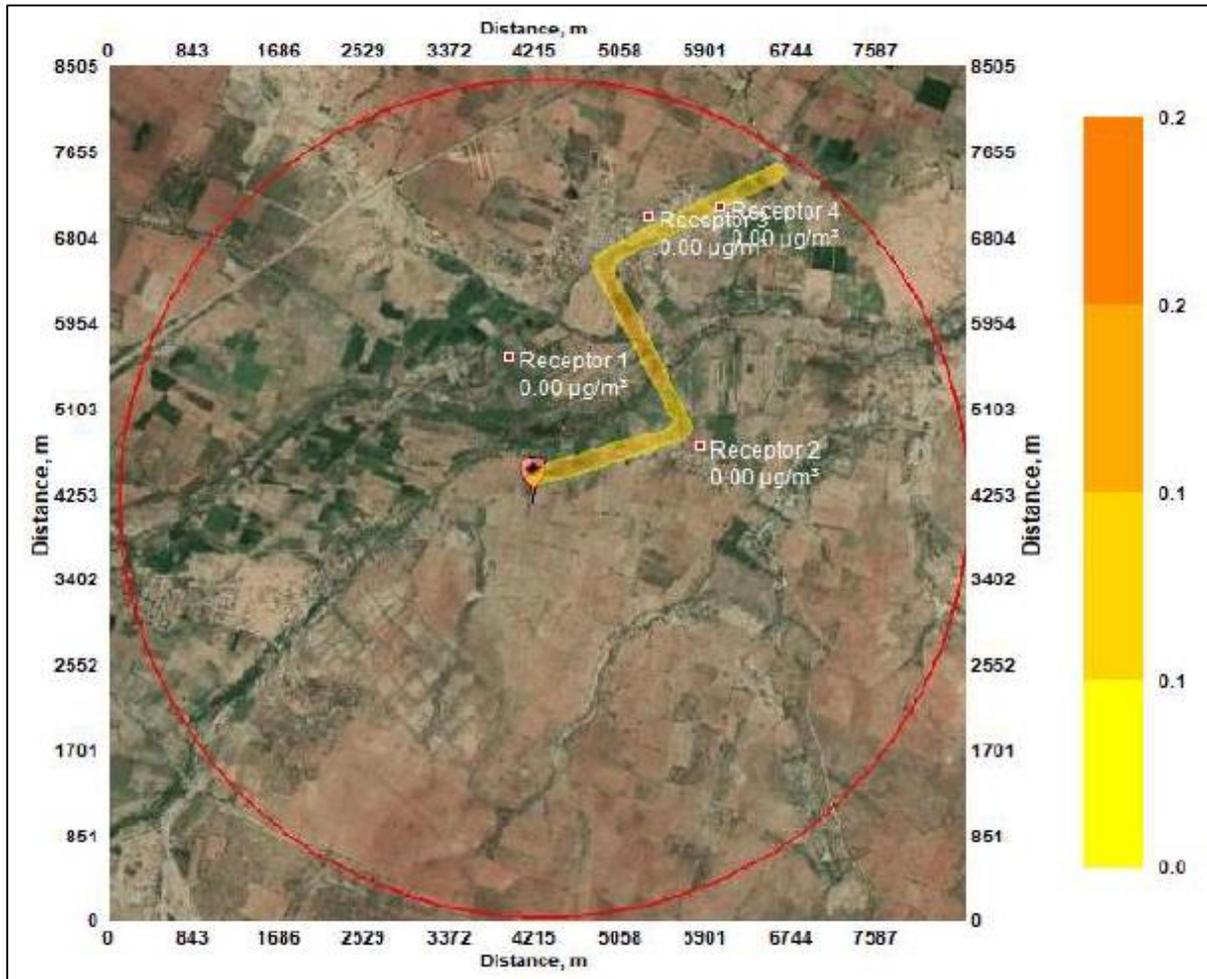


FIGURE 4.6 - TOTAL PREDICTED GROUND LEVEL CONCENTRATION OF PARTICULATE MATTERS ($\mu\text{g}/\text{m}^3$)

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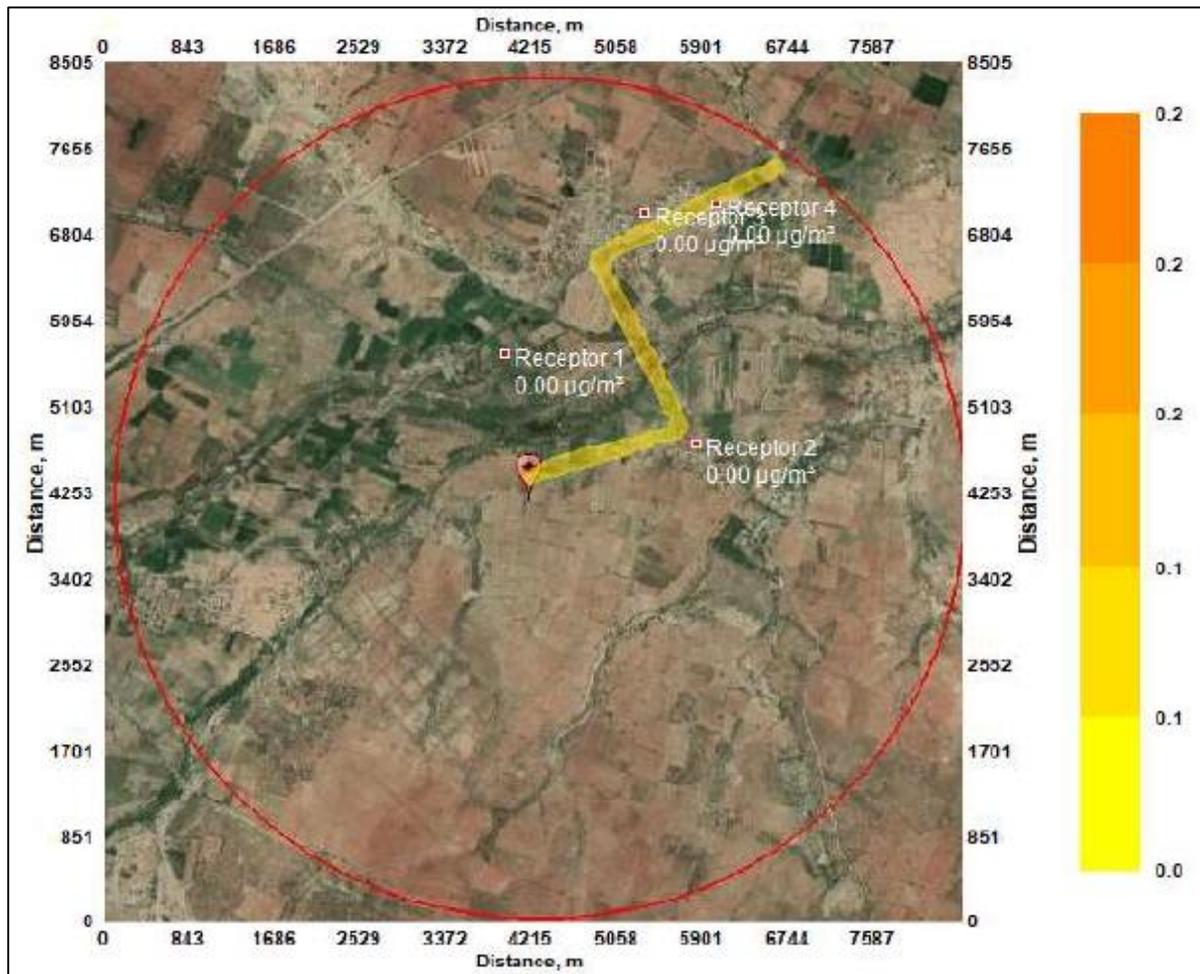


FIGURE 4.7 - TOTAL PREDICTED GROUND LEVEL CONCENTRATION OF HYDRO CARBON ($\mu\text{g}/\text{m}^3$)

- To know the value of total predicted concentration at difference places around the roads and area, total 4 nos. of receptors were selected.
- Details of the predicted concentration at receptors is given below.

TABLE 4.14 - PROPOSED TOTAL CONCENTRATION OF CARBON MONOXIDE AT RECEPTORS

Sr. No.	Receptor	Concentration	Coordinates, m
1	SSY Ashram Vinukonda	1.0	3943, 5621
2	Tana Annavaram Village	0.0	5817, 4726
3	Sri Poleyrama Thali Temple	1.6	5314, 7020
4	A.P. Model School	0.0	6027, 7103

TABLE 4.15 - PROPOSED TOTAL CONCENTRATION OF PARTICULATE MATTER AT RECEPTORS

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Sr. No.	Receptor	Concentration	Coordinates, m
1	SSY Ashram Vinukonda	0.0	3943, 5621
2	Tana Annavaram Village	0.0	5817, 4726
3	Sri Poleyrama Thali Temple	0.0	5314, 7020
4	A.P. Model School	0.0	6027, 7103

TABLE 4.16 - PROPOSED TOTAL CONCENTRATION OF HYDRO CARBON AT RECEPTORS

Sr. No.	Receptor	Concentration	Coordinates, m
1	SSY Ashram Vinukonda	0.0	3943, 5621
2	Tana Annavaram Village	0.0	5817, 4726
3	Sri Poleyrama Thali Temple	0.0	5314, 7020
4	A.P. Model School	0.0	6027, 7103

4.8 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES OF HYDROLOGY AND GEOLOGY

The impacts felt during the field surveys, 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 790 mm. Study of rainfall records indicate that more than 80 % of total annual rainfall is within four months between July and October. Most of this rainfall flows as surface runoff following the general gradient of the terrain which is North towards Gundlakamma river. Suitable peripheral garland drains are suggested around the proposed plant area so as to check and control the excess surface runoff water during monsoon season. Excess rainfall or runoff water collected into the garland drains should be discharged into Gundlakamma river and its streams in the downward reaches.
2. Geomorphology and Soils: Due to predominant presence of granitic and sandy loam and clayey soils in the area, there is possibility of ground water inflow into the proposed plant. Still adequate pumping system has to be planned to deal with the inflow of water into the proposed Bio-Medical Waste (BMW) Treatment Facility. Proper drains shall be dug along the boundary so as to keep the plant premises dry. Water logged and stagnation pools shall not be allowed in and around the premises. If it is economically feasible a dyke like underground concrete/impermeable wall of one-foot-thick and 3-6 m in depth should be constructed along the northern and western boundary of the BMW Facility so as to check the inflow of ground water.
3. Water Utilization: There are adequate ground water resources in the area, in addition to the presence of Nagarjuna Sagar Right Canal Network System, irrigation and local ponds and water bodies. The Ground Water Estimation Committee (GEC) has categorized the Vinukonda Mandal as 'safe' with the stage of ground water utilization of 14%, indicating

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large scope for further ground water development (CGWB, 2013) and to meet the drinking, irrigation and industrial needs in the area.

4. **Water Quality:** The ground water in the study area is generally potable and suitable for domestic, irrigation and industrial purposes with few exceptions such as instances of brackish water occurrences. High fluoride and nitrate contamination should be checked by installing suitable treatment facilities. Spreading of local pollution and contamination of ground water in the form of sewerage and other means should be avoided so as to keep the water environmentally safe.
5. **Green Belt:** As per the existing norms, substantial area has to be allocated for greenbelt so as to provide ecofriendly environment. Species type will be based on soil characteristics and other related aspects to mitigate pollution effects due to noise, odour, dust etc. The major advantage of greenbelt is development of buffer zone and visual barrier for surrounding locality. Greenbelt will also be helpful for reducing the soil erosion, suppress dust generation and enhance the aesthetic value of the area.

4.9 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES OF ECOLOGY & BIODIVERSITY

Some minor impacts are likely to occur due to the operations and hazards associated with the proposed project which are described below.

4.9.1 Anticipated Impacts

The activities associated with the proposed activity (common bio-medical waste management facility) will have very less impacts on terrestrial flora and fauna of the core area and buffer zone area. There are no migratory corridors, nesting and breeding sites within the core zone. There are no REET species present within the 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 effluent will be discharged on land or in any water body. Total treated wastewater will be recycled and reused in the plant. There will be no significant impacts on local ecological environment. No endangered species are reported from the study area 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 greenbelt at the project vicinity, the impact on the ecology will be minimal.

The overall impact of the project on ecological aspects is:

Magnitude: less

Extent: The extent of the impact will be on-site, as the impacts will be limited to the boundaries of the site.

Duration: The duration would be short-term as the natural vegetation of the site would be affected during the construction phase.

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Intensity or magnitude: The intensity is very less during construction and operation phases.

Reversible or Irreversible: Nil

Impacts Identified:

Major impacts on ecology shall be due to dust and noise emitted from vehicles transporting the bio-medical waste. Damage may occur to reptiles and rodents directly on main roads and dust will create damage to leaf stomata of the natural vegetation along the roads. The indirect impact will be on insect larvae and bird nesting habitats.

During the operation phase of the incinerator, unexpected emissions due to breakdown & maintenance units may also cause damage to surrounding environment. However, beneficial impacts are likely to occur on ecological status of the area due to greenbelt development activities. The details of identified impacts are described as below:

Direct Impacts:

Direct impacts on vegetation shall be restricted to proposed site area. Some common herbaceous species such as *Achyranthes aspera*, *Hyptis suaveolens*, *Tridax procumbens* are going to be removed. Major impacts on ecology shall be due to dust and noise emitted from vehicles transporting the bio-medical waste. The indirect impact will be on common egrets and other aquatic birds of the Gundlakamma stream due to vehicular activities. No significant long-term residual impacts on fauna due to project.

Indirect Impacts:

Indirect impacts on vegetation and fauna includes resource utilization during construction of project.

- Increase in road network and traffic may lead to indirect impact on faunal species such as lizards and skinks (reptiles) and few common terrestrial birds which will shift the habitat to adjoining core zone.
- Other indirect impacts in terms of adverse health effects on fauna and enrichment of toxic content in flora may occur in case of mishap in operation of transportation & disposal of bio-medical waste or final solid wastes or ash, resulting in contamination of soil & air of the mishap or disposal area. The eventual effects of this may vary depending on the toxic level of the waste being transported or disposed.

4.9.2 Mitigation Measures

- Restriction of construction activities to defined project areas, which are ecologically less sensitive.
- Regular check on vehicle condition and proper road maintenance of the direct ways.
- Awareness to drivers on animal movement and restriction of vehicle speed near the project site.

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- Proper attention on not to discharge any waste water or spill outs to nearby stream.
- Proper levelling of the site has to be done for rain water discharge.
- 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.
- After any intervention that may disturb natural sites: ecological restoration through environmental engineering (restorations, rehabilitation) shall be undertaken, including restoration of top soils and (re-) introduction of genetic species to re-establish the natural local ecology.
- 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 implemented as suggested in other relevant sections as well as mentioned in EMP.
- Safety measures & action plan for prevention of spreading of toxic materials being transported shall be provided in transport vehicles to ensure safety & protection of ecological factors during major accident.
- Safety measures & action plan for control & prevention of hazards associated with the materials & operation of proposed project shall be provided to ensure safety & protection of ecological factors during major accident.
- Compensatory planting or restocking of indigenous species.
- Creation & maintenance of dense greenbelt in and around the project premises.
- No disposal of effluent and solid & bio-medical waste on land and in water bodies.

Positive impacts on Ecological aspects:

Due to 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 in turn attract bird species of the region.

4.10 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES OF SOCIO ECONOMIC

Impacts on socio-economic environment due to proposed project are envisaged due to probable pollution, hazards and direct & indirect employment only. The details of environmental impacts of the proposed project are described below.

4.10.1 Anticipated Impacts

Construction Phase

The impacts of the construction phase will be restricted within the construction site & duration. Hence issues of impacts on socio-economic activities like farming & fishery is not anticipated.

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Overall socio-economic effect of construction phase will be positive due to direct and indirect employment opportunity for the local livings. Local people from nearby villages of the surroundings from the site will be employed for construction work to the maximum extent possible.

Besides these, there will not be any other source of considerable impacts on socio-economic is envisaged. Considering these it has been revealed that no major specific mitigation measures for safeguard of socio-economic layout is required except criteria for preferences to local people in employment & contract works.

Operation Phase

As an understanding, impacts on socio-economic environment may occur mainly due to pollution of environment, competing use of water resources, hazardous material handling & storage, hazards associated with proposed project, noise generation, traffic & load on other public amenities. Further it has also been marked that the issue of traffic & load on public amenities will not arise as the site is well connected with highway networks wherein the project is to be developed.

Further, the site is considerably away from the locality. To control probable pollution necessary mitigation measures has been proposed by the proponent, which ensures that there will be no impacts on socio-economic layout out due to the residual impacts after mitigations.

In furtherance to these, impacts on the socio-economic environment may occur due to hazards associated with the hazardous chemicals and operations of the proposed project mainly due to improper storage and handling facilities of waste and catastrophic accidents. To prevent & minimize the chances of such impacts of hazardous chemical & operation, the designs of storage area & tanks shall plan as per the regulatory provisions applicable for particular material. Adequate fire-fighting measures will also be provided in the entire plant to prevent impacts of fire hazards. Risk assessment study has been carried out for the proposed project to eliminate any major impact on social environment due to the hazards associated with the proposed project. It is suggested that company shall implement all necessary risk/hazard control & prevention measures as recommended & mentioned in risk assessment report.

At last but not least, direct employment of skilled and unskilled person as well as technical and managerial person for operation of the plant will result in slight beneficial impacts on socio-economic environment as preference to local people will be given to meet the HR requirements of the project. Besides, the indirect employment mainly through the transport, travels, maintenance & other contracts for the proposed project will also have beneficial impacts on socio-economic environment. Thus, with the adoption of policy of local employment, a marginal long term positive impact is foreseen on the economic environment. It is also noteworthy that the CSR activities planned by the proponent will also have significant beneficial impacts on socioeconomic layout of the project area. Thus after reviewing all above details it is envisaged that the proposed project would not have any considerable adverse impacts on the socio-economic environment.

4.10.2 Mitigation Measures

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Construction Phase

- Use of state & national highway for transportation
- Preference to local people & contractors in employment & contracts for the construction works of the proposed project
- Purchase of resources required for proposed construction works from local area
- Noise generating operation shall be avoided in night time

Operation Phase

All mitigation measures shall be implemented for control of air pollution, water pollution, land pollution and noise pollution.

- Use of state & national highway for transportation as well as usage of recycled water.
- Employment for proposed project with priority to the local people to ensure at least 70-80% employment from local areas.
- Prevention & control of hazards associated with proposed project by implementation of safe work procedures, risk/hazard precaution/control/prevention measures and provision of PPEs for all employees etc. as suggested in RA report.
- Regular social activities as part of its CSR programme to enhance the social condition mainly for education & health improvement in the project area.

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CHAPTER 5

ANALYSIS OF ALTERNATIVES

5.1 SITE ALTERNATIVES

M/s. Y.J. Multiclave proposes to establish Common Bio-Medical Waste Treatment Facility (CBMWTF) with a capacity of 7 TPD at Sy. No. 7/1 & 8/1, Tana Annavaram Village, Nuzendla Mandal, Guntur district, Andhra Pradesh. In addition to this site, two other sites were identified. **TABLE 5.1** provides site selection criteria.

TABLE 5.1 - SITE SELECTION CRITERIA

Sr. No.	Criteria	Site 1 Tana Annavaram Village, Nuzendla Mandal, Guntur district	Site 2 Yenugulapalem Village, Vinukonda Mandal, Guntur District	Site 3 Donakonda Village, Donakonda Mandal, Prakasam District
1	Distance from Human Habitation (km)	0.6 km (Tana Annavaram village)	0.2 km (Yenugulapalem village)	1.3 km (Medapadu village)
2	Distance from water body (km)	0.27 km (Gundlakamma river)	4.2 km (Raghavamma Cheruvu river)	60 m (Pond)
3	Distance from Highway (km)	1.66 km (State Highways 42 & 50)	3.6 km (State Highway 40)	1.4 km (State Highway 40)
4	Distance from other CBMWTF (km)	125 km (Safe Environ, Guntur)	88 km (Ongole Medical Waste Treatment Facility, Prakasam), 90 km (Safe Environ, Guntur)	80 km (Ongole Medical Waste Treatment Facility, Prakasam) 130 km (Safe Environ, Guntur)

(All distances are approx. aerial distances)

There is a surface water body (Pond) is at aerial distance of 60 m nearer to the Site 3 in Donakonda Village. So, it was not suitable for the proposed CBMW facility. Site 2 was also observed in Yenugulapalem Village but the village is very nearer to the site at distance of 200 m. Based on above analysis it was preferred that Site 1 was more suitable for project than Site 2 and Site 3.

The existing CBMWTF facility, Safe Environ located at Chinakakani (V), Mangalagiri (M), Guntur District covers about 700 Health Care Facilities (HCFs) with 13683 beds. There are about 4061 numbers of beds uncovered by the existing CBMWTF. Hence it is proposed to establish another Common Bio-Medical Treatment Facility in Guntur district. In-principle

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permission was obtained from APPCB vide letter no. 1/APPCB/HO/UH-IV/BMW/In-Principle/2018- dated 23.05.2018. Copy of this letter is enclosed in **Annexure III**.

5.2 ANALYSIS OF ALTERNATIVE TECHNOLOGIES

For handling, segregation, transportation, storage and settling up of bio-medical waste treatment facility, CPCB guidelines shall be followed. Accordingly, all components of the projects shall be installed as per CPCB guidelines. Well established and proven technology for the facility will be selected and installed.

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 also rejected.

For thermal destruction comparison of two technologies were considered - Incineration and Plasma Gasification.

- 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 H₂. 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 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 incineration technology.
- Biomedical waste incinerators installed and operated as per CPCB guidelines for incinerator meets all emission norms, destruction efficiency and ash quality as per requirement of guidelines. So, incineration technology is technically equally competent to plasma gasification technology from statutory requirement point of view.
- 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 be established over incineration system. Thus on this ground, plasma gasification technology is rejected and incineration technology is selected.

Thus at proposed CBMWTF, following technologies are selected

- Autoclave followed by shredding for plastic waste
- Autoclave for Glass and Human metal implant parts
- Autoclave and Shredding for sharps
- Incineration

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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 project, a comprehensive Environmental Monitoring Program is required to be developed, to satisfy the various statutory requirements for discharges and emissions and also to identify the trend of various environmental parameters.

Environmental monitoring program covers

- Ambient air quality
- Water quantity and quality
- Effluent quality
- Noise
- Soil characteristics
- Ecology, etc.

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 analysed is usually not adequate and satisfactory to predict all variations induced by natural or human activities 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

Details of Environmental Monitoring Program is provided as under in **TABLE 6.1**.

TABLE 6.1 - MONITORING POINTS/LOCATIONS & COMPONENTS

Sr. No.	Environmental Components	Monitoring Points/Location
1.	Ground Water	Groundwater from all bore wells within premises (5 Locations)

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Sr. No.	Environmental Components	Monitoring Points/Location
		In case of accidental spillage / leak, groundwater samples from the area likely to be affected
2.	Waste water	Raw waste water at ETP inlet and Treated waste water at ETP discharge
3.	Ambient Air	Ambient air quality at project site and at villages within 10 km radius of project site. Ambient air quality at minimum 1 location in downwind direction preferably at between 500 meter & 1 km distance from plant boundary.
4.	Emission	Incinerator stack and DG set stack
5.	Noise	At all sources i.e. 1 m from DG Set, Shredder, ID Fan, FD Fan and ETP Air Blower. At different areas of plant (treatment area, storage area, transportation area, administrative area, security area, utility house, ETP etc.) within premises
6.	Greenbelt/Vegetation Cover	Greenbelt area along boundary & in garden
7.	Soil	At two locations within premises i.e. from storage & greenbelt area. In case of accidental spillage / leak, soil of the affected area from various spots & depth
8.	Hazardous Waste	ETP sludge and incinerator ash

6.2.1 Environmental Monitoring Parameters & Frequency

TABLE 6.2 - ENVIRONMENTAL MONITORING PARAMETERS & FREQUENCY

Sr. No.	Item / Attribute	Parameters	Frequency & Responsible Party
1.	Ambient Air Quality	Particulate Matter [PM _{2.5}] & [PM ₁₀], Sulphur Dioxide [SO ₂], HCl, Nitrogen Dioxide [NO _x] and Carbon Monoxide [CO]	Once in 3 months at project site and at villages within 10 km radius (5 stations) by external lab
2.	Emission from Stack (Incineration)	PM, HCl, NO _x , Hydrogen Fluoride, Total Organic Carbon	Once in 3 months by external lab
		Dioxin & Furan	Once in a year by external lab
3.	Emission from Stack (Incineration)	CO, O ₂ (Or as added in future by CPCB)	On line monitoring (CEMS) connected to CPCB / SPCB server

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Sr. No.	Item / Attribute	Parameters	Frequency & Responsible Party
4.	Work Place Monitoring	PM _{2.5} , PM ₁₀ , SO ₂ , NO _x , Noise, Temperature, Humidity	Once in 3 months by external lab. Or in-house by EHS Exe./Sr. Chemist
5.	Ground Water	As per IS 10500	Twice in a year (except during monsoon)
5.	Waste Water	pH, EC, Turbidity, TDS, Calcium, Magnesium, Total Hardness, Total Alkalinity, DO, COD, BOD Chlorides, Sulphates, Phosphate, Ammonia, Nitrite, Oil & Grease, Bio assay test (Heavy Metals if required)	Monthly by external lab
		pH, COD, TDS, BOD, Flow	Daily by internal lab (Or online as per future guideline of CPCB)
		Flow at inlet and outlet	Online monitoring on continuous basis provided with recorder
6.	Noise	Equivalent Noise Level - dB (A) (atleast 1 hr. continuous)	Once in 3 months by external lab
7.	Soil	pH, EC, Moisture, Organic matter, N, P, K, SO ₄ ⁻² , Cl ⁻ , Ca ⁺² , Mg ⁺² & Na ⁺	Once in a year
8.	Hazardous Waste	General Parameters	Once in a year by external lab
9.	Greenbelt	Number of plantation (Units), Number of Survived Plants/Trees, Number of Poor Plants/Trees	Throughout year at regular intervals: in-house by EHS Executive & other EMC members
10.	Employee Medical / Health Check-up	As per statutory provision & requirement	Yearly through approved medical officer & doctor as per OHS plan

6.2.2 Reporting Schedule and Documentation

Records of the monitoring program shall be kept on regular basis for all aspects of the monitoring. Separate records for water, waste water, solid waste, air, emission & soil shall be prepared and preserved regularly.

Immediately upon the completion of monitoring as per the planned schedule, report shall be done and necessary documents shall be forwarded to the concerned person. Methodology of monitoring (sampling & analysis) shall be prepared as separate documents as SOP (Standard Operating Procedure), wherever required.

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Environmental statements &/or performance report/compliance report/audit report as per conditions of EC and CC&A shall be prepared and submitted to the concerned authority as per the guidelines provided by the authorities within the stipulated time frame. CC&A and other statutory permission/consents must be obtained & renewed timely as per legal provision & guidelines.

Similarly, all necessary reports & forms shall be prepared and submitted to the concerned authority as per the statutory requirement of Environmental Acts/Rules, Factory Act & MSIHC Rules. Reporting of accident & other requirements shall be made in prescribed format well within stipulated time frame as per statutory requirements & guidelines.

6.2.3 Budgetary Provisions

The budget shall include provisions for:

- Environmental Monitoring Program through third party

Detail break up of budget for environmental monitoring plan is provided as under

TABLE 6.3 - BUDGETARY BREAKUP OF ENVIRONMENTAL MONITORING PLAN

Sr. No.	Activity	Quantity per year	Budget per Quantity (Rs)	Total Budget (Rs)
1	Ambient Air Monitoring	24	5000	120000
2	Stack Gas Monitoring	4	5000	20000
3	Waste Water Analysis	24	4000	96000
4	Haz. Waste Sample	1	4500	4500
5	Soil Sample	1	5000	5000
6	Ground Water Sample	2	12500	25000
7	Dioxin and Furan	1	70000	70000
8	Health Monitoring	30	500	15000
			Total	3,55,500

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CHAPTER 7

ADDITIONAL STUDIES

7.1 RISK ASSESSMENT

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 / Off-Site Emergency Plan)
- Occupational Health Programme

7.1.1 Introduction

M/s. Y.J. Multiclave, for its upcoming new unit in Tana Annavaram Village, Nuzendla Mandal, Guntur District, Andhra Pradesh shall handle Bio-medical wastes from various places in Guntur district. This Common Bio-medical Waste Management Facility will serve as Medical Waste Management, for Hazardous Wastes from Autoclaving, Incineration, Shredding, ETP sludge and Used batteries.

Having an integrated facility would minimize the risk involved in waste transportation and waste movement and monitoring of such facilities would be better and feasible. Waste may contain infectious agents, toxic or hazardous chemicals or pharmaceuticals wastes and waste sharps. Any waste, by virtue of any of its physical, chemical, reactive, toxic, flammable, explosive or corrosive characteristics is likely to cause danger to health or environment, whether alone or when in contact with other wastes or substances. Thus, the main focus of this project would be to identify the environmental impacts due to the activities to be carried out at Y.J. Multiclave rather than conducting consequence modelling & then proposing the preventive & mitigating measures for the same.

7.1.1.1 Objective of Risk Assessment

Risk analysis follows an extensive hazard analysis. It involves the identification and assessment of risks the neighbouring populations are exposed to as a result of hazards present. This requires a thorough knowledge of failure probability, credible accident scenario, vulnerability of population etc. Much of this information is difficult to get or generate. Consequently, the risk analysis is often confined to maximum credible accident studies.

Risk assessment is carried out for the following objectives:

1. To identify hazard and risk resulting from the hazards
2. To study and foresee the effects of such risks on the workers, public, property and environment and to find out necessary control measures to prevent or minimize risk.
3. 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

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- Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016
- Bio-Medical Waste Management Rules, 2016
- Manufacture, Storage and Import of Hazardous Chemical (Amendment) Rules, 2000
- Public Liability Insurance Act & Rules, 1991
- Chemical Accident (Emergency, planning, preparedness and response) Rules, 1996

4. To get the necessary information for Emergency planning and evacuation.

Layout of Y.J. Multiclave showing details of Diesel Storage Area, Incinerator Area, Hazardous Waste Storage Room, etc. **FIGURE 7.1.**

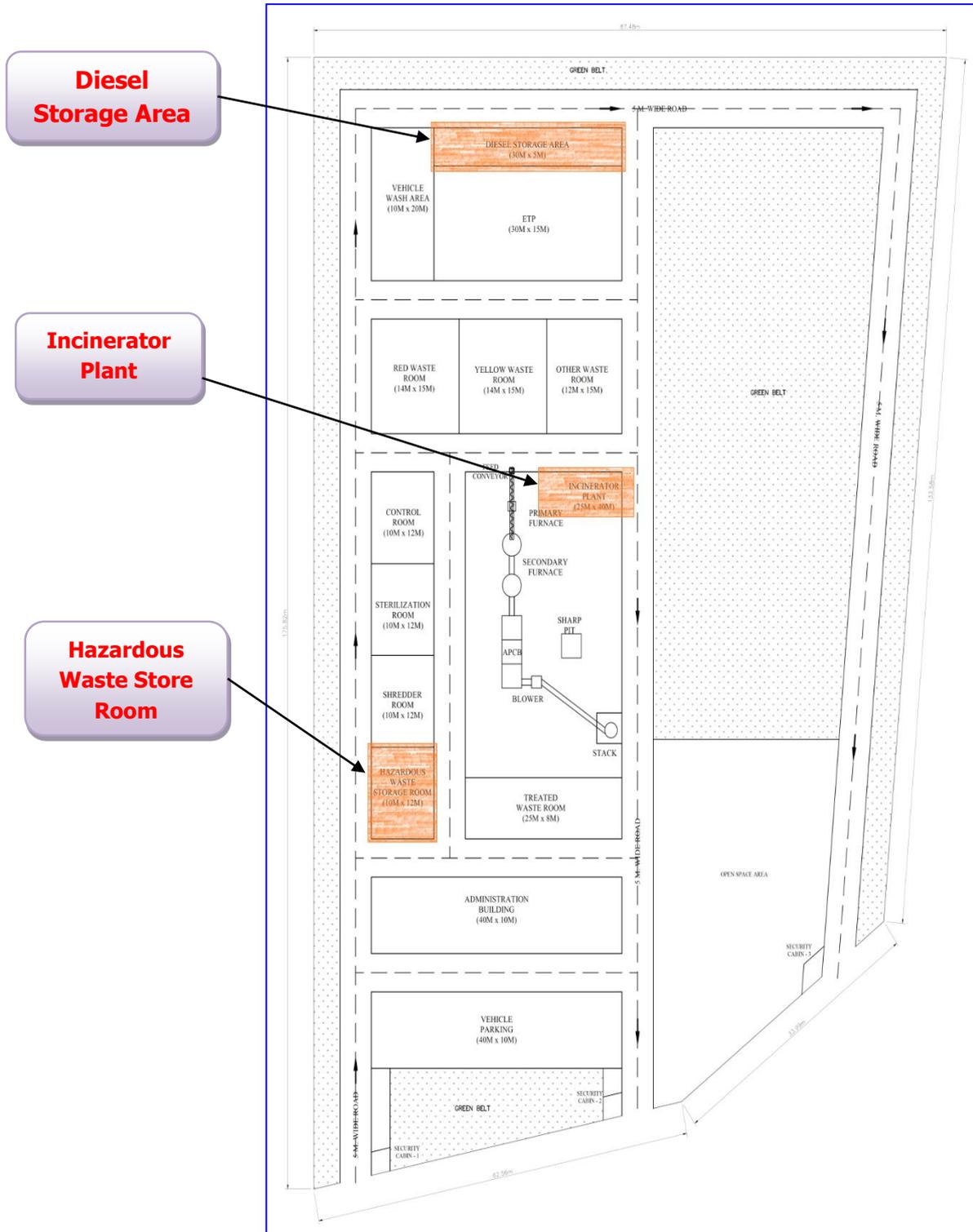
Zone 1 has been marked for Hazardous Waste Storage Room & Incinerator Plant & also at a distance of 8 m from the periphery of Hazardous Waste Storage Room & Incinerator Plant; a place wherein hazardous waste (consisting of a mixture of flammable, toxic, corrosive, bio-medical, etc. hazards) shall be continuously (stored/handled/processed) present.

TABLE 7.1 - LIST OF INVENTORY

Sr. No.	Name of Hazardous Substance	Maximum Quantity Storage/ Day	Mode of Storage	Storage Condition	Type of Hazards Possible	Control Measures
1	Bio-Medical Waste	7 Tons/day	Yellow coloured non-chlorinated plastic bags. Red coloured non-chlorinated plastic bags. Puncture proof, Leak proof, tamper proof containers. Cardboard Boxes with Blue coloured marking	Ambient	Fire Infection	<ul style="list-style-type: none"> • Fire Extinguisher (CO₂, DCP) • Personnel Protective Equipment (PPE) • Sand Buckets • Emergency Provision for Fire
2	Diesel	4 Liter/Hr	Drums	Ambient	Fire	<ul style="list-style-type: none"> • Fire Extinguisher (Foam) • Sand Buckets

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FIGURE 7.1 - PLANT LAYOUT FOR Y.J. MULTICLAVE



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7.1.2 Hazard Identification & Risk Assessment

Hazardous Identification

Identification of hazards at the proposed site indicates the characteristics of hazardous wastes that pose potential for an emergency situation. All the components of proposed Bio-medical Waste management shall be thoroughly examined to assess their potential for initiating or propagating an unplanned event / sequence of events, which can be termed as an accident or emergency.

At the proposed Y.J. Muliclave site, 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:

- Wastes produced by hospitals
- Veterinary facilities
- Medical research facilities

These wastes include both infectious ("red bag") medical wastes as well as non-infectious, general housekeeping wastes. The emission factors presented here represent emissions when both types of these wastes are combusted rather than just infectious wastes.

Hospitals, veterinary facilities, and medical research facilities dispose 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.

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.

Risk Assessment

Risk Assessment is a structured approach to identifying and understanding the risks associated with Storage and Handling of Hazardous / 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 mitigation measures / safety precautions to minimize or mitigate risks to meet appropriate acceptability criteria. The planning for emergency evacuation shall be borne in mind whilst interpreting the results.

As already mentioned above, it's the characteristics of hazardous wastes that pose potential for an emergency situation. After examining all the potentials for an emergency situation, Hazardous Waste Storage Area & Incinerator Area have been identified with potential for major hazards.

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Qualitative Risk Assessment

At M/s. Y.J. Multiclave, Andhra Pradesh looking to the nature & types of activities, nature & types of wastes to be handled, Consequence Modelling is not applicable to this waste facility and hence we have analysed the risk associated with them Qualitatively.

Many a times, 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 & related equipment, working in storage areas, working in incinerator area, transportation, loading & 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.

In Qualitative Risk Assessment, risk has been analysed using methodology called HIRA- Hazards Identification & Risk Assessment. In HIRA, major manual activities (as mentioned above) carried out by plant personnel as well as contract labours have been considered.

Qualitative Risk Assessment has been carried out for the following areas:

1. Working at DG Set Area
2. Other operational activities carried out at site
 - Hazardous Solid Waste transportation from generation site to CBMWTF site of Y.J.
 - Weighing and Sampling of Waste
 - Incineration
 - Autoclave
 - Shredding

The Risk Matrix presented below has been referred in evaluating this assessment.

TABLE 7.2 - RISK MATRIX FOR QUALITATIVE RISK ASSESSMENT

LIKEHOOD / PROBABILITY		SEVERITY				
		Catastrophic (Death/System Loss)	Major/ Critical (Serious Injury/Illness)	Moderate (Less Serious Injury/Illness)	Minor/Marginal (Minor Injury/Illness)	Insignificant/ Negligible (No Injury/Illness)
		5	4	3	2	1
Almost Certain	5	H	H	H	M	M
Likely	4	H	H	M	M	L
Possible	3	H	M	M	M	L
Unlikely	2	M	M	M	L	L
Impossible	1	M	M	L	L	L

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TABLE 7.3 - RISK RANGE AND ITS ACCEPTABILITY CRITERIA

Risk Range	Risk Acceptability Criteria	Remarks
H	Unacceptable / High	Management's Decision / Action Plan required. Potential off-site impact.
M	Medium	Generally Minor Impact. Acceptable with Management's Review. Specific monitoring or SOP to be followed.
L	Low	Acceptable without Review. Manage through Routine Procedure.

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7.1.2.1 D.G Set Area

TABLE 7.4 - RISKS AND RECOMMENDATIONS FOR D. G. SET AREA

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.	Working near DG room	<ul style="list-style-type: none"> Apparently High noise 	<ul style="list-style-type: none"> Noise induced hearing impairment or Hearing loss 	4	2	H	<ul style="list-style-type: none"> PPE's like ear plugs, ear muffs etc., shall be used. Acoustic enclosures shall be provided for DG room OR, Generator shall be used in open air, away from work area, where high noise shall not disturb the other facilities. 	2	3	M	<ul style="list-style-type: none"> Only trained personnel to be allowed to work in this area. Audiometry test & other relevant testings to be carried out for the personnel in-charge of this area.
2.	Maintenance Work (Electrical)	<ul style="list-style-type: none"> Electrocution 	<ul style="list-style-type: none"> Death, Burns, serious injury 	4	2	H	<ul style="list-style-type: none"> No cables will be unplugged while unit is under operation. 	2	3	M	<ul style="list-style-type: none"> Work permit procedure to be given due importance. electrical work permit to be followed before

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							<ul style="list-style-type: none"> • Shut down shall be taken before carrying out any maintenance work. • Flameproof fittings shall be used. • Access to unit shall be restricted to authorized persons only. • Strict Vigilance shall be carried out during work. 				<ul style="list-style-type: none"> • carrying out electrical work. • Standard Operating Procedure to be prepared & followed.
3.	Maintenance Work (Mechanical work like cleaning, repairing greasing, etc.)	<ul style="list-style-type: none"> • Slips, Trips and Falls while carrying out mechanical work. • Rotating parts. 	<ul style="list-style-type: none"> • Severe body injury. 	4	3	M	<ul style="list-style-type: none"> • Access to maintenance parts will be made after performing complete safe checks only. • PPEs shall be used & operators shall wear suitable safety footwear at all times. • Proper guards shall be provided to rotating parts. 	1	2	L	

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4.	In diesel Storage - Leakage, spillage of Hot Oil / Hot Fumes/Diesel.	<ul style="list-style-type: none"> • Spillage, • Leakage, • Fire. 	<ul style="list-style-type: none"> • Risk of severe bodily injury, • Possible fatal, • Building/equipment damage. 	4	2	H	<ul style="list-style-type: none"> • Spillage shall be cleaned with the help of suitable adsorbent & spill containment kit shall be made available. • Leakage & spillage sources shall be identified & will be rectified immediately. • Fuel shall be stored in sealed containers, away from source of ignition and from generator also. • Storage area & related accessories shall be inspected on regular basis for leakage/spillage/damage conditions, if any. • Storage shall be labeled as "NO Smoking Area", "Dangerous 	2	3	M	<ul style="list-style-type: none"> • Fire fighting facilities to be inspected on regular basis.
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						<ul style="list-style-type: none"> zone", Restricted Area", etc. • Sources of ignition, combustibles, shall not be allowed inside the site. • Fire-fighting facilities as mentioned under the section no.: 7.4 shall be available all the times. • Only qualified and highly trained personnel shall be allowed to work in this area. 				
	<ul style="list-style-type: none"> • Hot parts of generator. • Inhalation of exhaust fumes. 	<ul style="list-style-type: none"> • Severe burns, injury, asphyxiation 	3	3	M	<ul style="list-style-type: none"> • Proper insulation shall be provided to hot parts. • Exhaust shall be pointed away from public places. • PPEs like heat-resistant clothing, face mask, goggles, 	2	2	L	

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							gloves etc. shall be used.				
		<ul style="list-style-type: none"> • Dermatitis from diesel. 		3	3	M	<ul style="list-style-type: none"> • PPE's like safety shoes, helmets, face mask, hand gloves, ear plugs, etc. shall be used. • Spillages shall be treated/absorbed with suitable adsorbent immediately. 	2	2	L	

7.1.2.2 Other Operational Activities

TABLE 7.5 - RISKS AND RECOMMENDATIONS FOR OTHER OPERATIONAL ACTIVITIES

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.	Hazardous / Solid Waste transportation from generation site	<ul style="list-style-type: none"> • Wastes spillage • Leakage from 	<ul style="list-style-type: none"> • Exposure to toxic, irritant, fumes. • Health problem. 	4	3	M	<ul style="list-style-type: none"> • Vehicle used for carrying waste shall be maintained properly, such that no leakage can happen on the way. 	2	2	L	<ul style="list-style-type: none"> • Hazard Identification symbol / information and emergency telephone number to be displayed as per

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	to CBMWTF site of Y.J. Multiclave	damaged container • Fire	<ul style="list-style-type: none"> • Chronic & acute illness. • Burn or may be fatal. 				<ul style="list-style-type: none"> • Vehicle shall be checked & inspected frequently, for its smooth functioning. • Before starting the vehicle from generation site, client shall educate the driver about the nature of waste & its preventive measures. • Waste shall be covered properly so as to avoid its contact with ignition source. • Care shall be taken that the heat generation from the vehicle should not become the source of ignition. • Drivers shall be trained for the consequences of hazardous wastes, its preventive & mitigation measures. • Training shall be given on safe driving, hazards of chemicals, emergency handling, use of SCBA sets. • Drivers shall be educated for not to travel & not to stop the vehicle in populated areas, only designated & isolated routes shall be preferred for the same. • Unloading activity shall be carried out in well ventilated area under proper supervision. 			HAZCHEM CODE on the vehicle. <ul style="list-style-type: none"> • Drivers to be instructed to carry necessary license, TREM cards, etc. • Prior to taking up effective treatment, it is necessary to ensure proper & safe collection, segregation and storage of adequate quantity of waste in most scientific manner through safe transportation system and storage facility.
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							<ul style="list-style-type: none"> • Required safety measures like necessary first aid, fire extinguishers, PPEs, etc. shall be kept available within the vehicle. • Once it is received at CBMWTF sampling shall be done to identify the severity of waste. • The truck shall be weighed, sample shall be collected for testing & verification of parameters. After verification, the truck shall be directed to the unloading area. • All the trucks being used for transportation of raw material and final product shall be checked for "Pollution under Control" certificate prior to their entry to the plant premises. • All trucks will be transported after covering from the top. 				
2.	Weighing and Sampling of Waste	<ul style="list-style-type: none"> • Hazardous properties of wastes 	<ul style="list-style-type: none"> • Direct exposure to wastes, • Toxication, • Irritation 	3	3	M	<ul style="list-style-type: none"> • Appropriate PPEs like full body suit, face mask, gloves, helmet, shoes etc. shall be used • Shall be performed under continuous vigilance. 	2	2	L	<ul style="list-style-type: none"> • Standard Operating Procedure to be prepared & followed strictly.
3.	Incineration activity	<ul style="list-style-type: none"> • Toxic pollutants like Ash, 	<ul style="list-style-type: none"> • Exposure to toxic fumes & pollutants, • Health effects, 	3	2	M	<ul style="list-style-type: none"> • Sampling & Testing shall be done for the emitted gases. 	1	2	L	<ul style="list-style-type: none"> • Periodic Inspection of flanges/ferrule joints & other related

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		<ul style="list-style-type: none"> Emissions of heavy metals, dioxins, etc. 	<ul style="list-style-type: none"> Inhalation 				<ul style="list-style-type: none"> Gases/Ash or other pollutants shall be treated before disposing off. Flare system shall be installed. Chimney shall be made tall so as to emit the gases at a greater height. PPEs shall be used at all the time. Only trained & qualified personnel shall carry out this activity. Personnel vigilance shall be carried out on regular basis. Efforts shall be made to produce / recover as much energy as possible from wastes. 				accessories to be carried out.
		<ul style="list-style-type: none"> Exposure to hot surfaces (while working) 	<ul style="list-style-type: none"> Burns Severe injury 	3	2	M	<ul style="list-style-type: none"> Proper insulation shall be provided to hot parts. Maintenance shall be carried out under strict vigilance. Necessary work (Hot Work, etc.) permits shall be followed, whenever required. 	2	2	L	
4.	Autoclaving Activity	<ul style="list-style-type: none"> Falling hazards Exposure to hot surfaces (while working) 	<ul style="list-style-type: none"> Body injury Burns Severe injury 	3	2	M	<ul style="list-style-type: none"> Proper insulation shall be provided to hot parts. The door / lid shall be opened only when autoclave contents reduce to a safe level. 	2	2	L	<ul style="list-style-type: none"> Interlocking arrangement, incorporating temperature-sensing devices to be installed

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5.	Shredding Activity	<ul style="list-style-type: none"> • Apparently high noise. • Shear blades 	<ul style="list-style-type: none"> • Noise induced hearing impairment or • Hearing loss • Cut injury 	3	2	M	<ul style="list-style-type: none"> • Auto Reverse System • Interlocks to avoid aerosolizing • Low noise, non-ballistic • Auto shut-off 	2	2	L	
6.	Cleaning of Sludge	<ul style="list-style-type: none"> • Release of Chemical 	<ul style="list-style-type: none"> • Skin / eye irritation 	2	3	M	<ul style="list-style-type: none"> • PPEs will be used 	1	3	L	<ul style="list-style-type: none"> • SOPs to be prepared and followed • Checklist to be followed
7.	Working / Cleaning Over Compartment	<ul style="list-style-type: none"> • Falling, slippery 	<ul style="list-style-type: none"> • Falling drowning • Fatality accident 	2	3	M	<ul style="list-style-type: none"> • Only trained operators will be allowed to work in this area • Safety shower will be made available nearby 	2	4	L	<ul style="list-style-type: none"> • Authorized person should be available at work place

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7.1.3 Other Safety Precautions / Recommendations

Proposed Safety/Control Measures to Reduce the Risk of Fire, Explosion and Toxic Release:

Following safety precautions shall be followed / practiced during storage, transportation, unloading and handling of wastes, in order to ensure safety and avoid the human health impacts.

1. Storage Area (Storage Shed)

- Infectious, ignitable, reactive and non-compatible wastes shall be stored separately and shall never be stored 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 and 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.
- "Fire break" of at least 4 m between two blocks of stacked drums shall be provided in the storage shed. One block of drum shall not exceed 300 MT of waste.
- Doors and approaches of the storage area shall be of suitable sizes for entry of fork lift 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 on roads or within the storage yards as well as accidental flow due to firefighting.
- Special care shall be taken for storing medical wastes. It should be kept totally isolated from other wastes.
- All care shall be taken so that infectious material shall not leak and spread the infection.

Hazardous 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.

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- Vapour recovery systems shall be used to prevent the release of toxic organics into air.
- Monitoring data shall be analysed and reviewed at regular intervals and compared with the operating standards, so that necessary corrective actions can be taken, if any.
- Ground and surface water use shall be monitored carefully.
- Practices such as process optimization, production scheduling, materials tracking and inventory control, special material handling and storage procedures, preventive maintenance programs and waste stream segregation shall be adopted.

Storage Drums / Containers (if required to use)

- The container shall be made or lined with suitable material, which will not react with or in other words compatible with the hazardous 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 labelled properly indicating mainly type, quantity, characteristics, source and date of storing etc.

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.
- In case of spills/leaks, dry adsorbents/cotton shall be used for cleaning instead of water.
- Proper slope with collection pits shall be provided in the storage area so as to collect the spills/leakages.
- Storage areas shall be provided with adequate number of spill kits at suitable locations. The spill kits shall be provided with compatible adsorbent material in adequate quantity.

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 & post closure environmental monitoring.
- Super fund for any unforeseen event.

3. Safe Practices: Do's & Don'ts

Following Do's & Don'ts shall be practiced for the upcoming unit.

Do's:

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- Inspection of Storage Area, all Fire Fighting Facilities / Check Alarms operations.
- Ensuring that operators/workers etc. follows the SOPs, safety procedures & 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 liquid hazardous wastes.
- Storage sites will have adequate & 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 and Off-site Emergency Plans shall be reviewed and updated, as per the requirement.
- Immediately on receipt of the hazardous waste, it shall be analysed and depending upon its characteristics, storage & disposal shall be finalized.
- Mock drill for on-site 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 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.

4. Hazard Analysis & 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 & externally once in two years by a reputed expert agency. Conditions stipulated by SPCBs while granting authorization under Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016 to the CBMWTF site operation will be complied.

Display of Necessary Information at CBMWTF Site of Y.J. Multiclave

Necessary information containing the following elements shall be displayed at the site.

- Waste type (infectious, ignitable, toxic, reactive, etc.)
- Approximate quantity of each type of waste
- Generation location of waste

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5. Measures for Fugitive Emission Control

- Regular monitoring of site area shall be conducted and records shall be maintained.
- Extractor hood routed through emission control system shall be used to absorb toxic fumes from furnace & finally discarded to atmosphere after the treatment (dust collector from chimney, may be used).
- Mask shall be made compulsory to be worn by concerned personnel, wherever required.
- Entire operational area shall be well ventilated. High speed industrial fans shall be placed to continuously supply fresh air to operational people and drift fumes to open/ safe area, wherever required.
- Safe Operating Procedures and EMERGENCY RESPONSE PROCEDURES shall be followed strictly.

7.1.4 Fire Control Plan

M/s. Y.J. Multiclave has considered fire prevention measures at the project planning stage for its upcoming new facility 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 CBMWTF site of Y.J. Multiclave.

- Fire load calculation shall be carried out and accordingly firefighting facilities comprising of main pump, stand by pump, jockey pump, diesel driven pump, hydrant network, hose box, hose reels, manual call points, fire & smoke detectors, fire alarms, fire buckets, etc. will be provided as per the GFR and TAC guidelines.
- Also, flame detectors, smoke / temperature actuated heat detectors with alarms, automatic sprinkler system, 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 & Sirens shall be placed at the conspicuous locations. Hand bell shall be used in case of power failure.

7.1.5 Disaster Management Plan (On-Site / Off-Site Emergency Plan)

M/s. Y.J. Multiclave shall prepare the Disaster Management Plan (On-Site / Off-Site Emergency Plan) which shall be followed from the project construction & erection phase to tackle any emergency situation for proposed facility.

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.

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The details of the same are discussed in the following sections.

7.1.5.1 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.
- The incident at proposed CBMWTF is confined to a small area and does not pose an immediate threat to life or property. Spillage of liquid or solid hazardous wastes, small fire in flammable hazardous wastes, etc. can come under this category.

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.
- An incident at the proposed CBMWTF involving a greater hazard or larger area which poses a potential threat to life or property. Fire in flammable hazardous wastes, filling of water in disposal pit due to heavy rain, etc. can come under this category.

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 the site.
- An incident at proposed CBMWTF 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.

7.1.5.2 Objectives of Emergency Management System

- To identify and assess types of emergencies due to different types of hazards.
- To work out plan with all provisions to handle emergencies and safeguard employees and people in the vicinity of the factory.
- To provide for emergency preparedness and periodical rehearsal of the plan.
- To plan mode of proper communication and actions to be followed in the event of emergency.
- To keep all necessary information with respect to hazard / accident control and emergency contacts in one document for easy and speedy reference.

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- To inform employees, general public and the authorities about the hazards / risk if any and the role to be played by them in the event of emergency.
- Minimization of the risks to lives and safety of proposed CBMWTF operators on-site and of the neighbouring community.
- To control and contain the accident.
- Containing and minimizing environmental damage to surroundings and to site property and equipment, this could occur from emergency or accidental situations beyond the normal operations of the facility.
- To effect rescue and treatment of casualties.
- To inform and help relatives of casualties.
- To secure rehabilitation of affected area and restore normalcy.
- To provide information to media and government agencies.
- To preserve record, equipment etc. for investigating cause of emergency.
- To be ready for "mutual aid" if need arises to help neighbouring units.
- Maintaining effective trained personnel capable of performing the established emergency response procedures when it is required.

7.1.5.3 Structure of Emergency Management System

M/s. Y.J. Multiclave shall develop an Emergency Management Team. The management structure shall include the following personnel:

- Crises Co-ordinator
- Chief Emergency Co-ordinator (CEC)
- Site Incident Controller
- Fire and Safety Function Co-ordinator
- Media Function Co-ordinator
- Communication Function Co-ordinator
- Medical Function Co-ordinator

The other elements of Emergency Plan shall be:

- Assembly points
- Emergency control centre
- Fire control arrangements
- Medical arrangements
- Other arrangements

7.1.5.4 Crises Co-ordinator

The Head of Y.J. Multiclave will work as Crisis Co-ordinator:

- He will assess the situation and instruct the Chief Emergency Co-ordinator to sound the siren.
- This will inform the employees that an emergency situation has risen and that the proposed CBMWTF should be shut down and evacuated.
- All the personnel/part of the proposed facility need to be evacuated and employees other than given responsibility assemble at the assembly points.

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- He will approve release of information to press, TV and government agencies, as required.

7.1.5.5 Chief Emergency Co-ordinator (CEC)

The General Manager of Y.J. Multiclave will work as Chief Emergency Co-ordinator.

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 proposed site other than those affected.
- To assess the magnitude of the situation and decide if personnel need to be evacuated to identified safe places.
- To continuously review in consultation with the other co-ordinators.
- To liaise with senior officials of police, fire brigade and Factories Inspectorate and pass on information about possible effects to the surrounding areas outside the factory premises.
- To liaise with various co-ordinators to ensure casualties are receiving adequate attention and traffic movement within the proposed facility site 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.

7.1.5.6 Site Incident Controller

The in-charge 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 co-ordinate the activities of other key persons reporting at the incident site, under his overall command.

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- To direct all operations within the affected areas giving due priorities for safety of personnel and to minimize damage to environment, proposed facility and property.
- To provide advice and information to Fire & 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.

7.1.5.7 Fire and Safety Function Coordinator

The Manager - Fire & 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 & Safety):

- Site Incident Controller directs the firefighting and emergency operation. His duties include...
- Keep constant touch with the CEC / in-charge - EHS.
- Direct the crew members to the scene of emergency and arrange replenishment of manpower / equipment / extinguishing media etc.

B) Role of EHS Representative:

- On being notified about the location of fire / gas leakage, he immediately proceeds to the help.

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- Decides his line of action in consultation with Site Incident Controller and takes appropriate measures to handle the emergency.
- Assessing the severity of the incident, immediately report to Emergency Controller about the gravity of the situation.
- He assesses the extra requirement required if any, from the neighbouring industry.

C) Fire Crew Members

- 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.
- The personal available at the scene of incident to be made optimize.

D) Emergency Squad Members

- On hearing Emergency Siren, they immediately report to Site Main Controller, safety in-charge or Incident Controller.
- They shall combat the emergency situation as per the direction of Site Main Controller, safety in-charge or Incident Controller.
- They help for safe evacuation.

7.1.5.8 Media Function (if required) Co-ordinator

The Human Resource Manager will work as Media Function Co-ordinator. He will under the direction of the CEC and 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 & 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 proposed facility's 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.

7.1.5.9 Communication Function Co-ordinator

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.

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7.1.5.10 Medical Function Co-ordinator

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 Centre.
- To liaise with the local medical authorities and hospitals, if the casualties are more and the situation demands treatment at more/other medical centres.
- To liaise with the transport co-ordinator for transporting the victims to various hospitals.
- 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 outside, 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 Co-ordinator 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 Co-ordinator for release of news to the press.

7.1.5.11 Transport Function Co-ordinator

The Waste Transportation Manger will work as Transport Function Co-ordinator. He shall perform the following duties:

- Arrange for transport of victims to hospital/dispensaries.
- Mobilize all available vehicles available at the proposed facility for emergency use, along-with the drivers.
- Arrange for the duty rotation of the drivers to meet with the emergency situation.
- To direct refuelling 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:

7.1.5.12 Assembly Point

In affected & vulnerable areas, all non-essential workers (who are not assigned any emergency duty) will be evacuated from the area & 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

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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 & made available with workers.

7.1.5.13 Emergency Control Centre

The Emergency Control Centre is the place or room from where the operations to handle the emergency are directed and co-ordinated. 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.

The ECC centre shall be equipped with the following facilities.

- Internal and external telephone including STD facility
- Telephone directory / telephone nos. of mutual aid centres
- Company layout showing all the locations
- First Aid
- Muster roll of Workers
- Identity card register
- Copy of ON-SITE / OFF-SITE PLAN
- Stationaries like note book, pen, pencils etc.
- Sand Buckets & Hydrant Network
- Adequate numbers of PPE's

7.1.5.14 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 & 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.

7.1.5.15 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 & fire tenders.

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- They will be guided to the place of 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.

7.1.5.16 Other Arrangements

Other arrangements include external transport, heavy vehicles, lift / cranes, generator sets to supply emergency power, environment monitoring equipment, special instruments / equipments, 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 will inform 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 Don't:

- Get panicky or spread rumours.
- 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

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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.

STANDARD OPERATING PROCEDURE (SHALL BE FOLLOWED DURING EMERGENCY)

- As soon as emergency alarm is heard, all essential workers shall report to SIC or 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.

7.1.6 Communication System

Communication System is a Crucial Factor while handling emergency. Company should have quick & effective Communication System through which, any situation, which can lead to emergency, can be informed or known to...

- I. All persons working inside the plant.
- II. Key Personnel outside during normal working hours & during off-duty hours.

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- III. Outside emergency services, Statutory and Local Authorities and
- IV. Neighbouring facilities and public living in vicinity.

Each and every section, Plant & Department of the facility will be connected by internal telephones with CEC, Supervisor or SIC. External phone at office and residence and mobile shall also be made available with Key Personnel and top executive of the facility. The Communication System shall begin with raising the alarm declaring the emergency, telephone messages and procedure to communicate the emergency to other persons & general public.

7.1.6.1 Raising the Alarm

As soon as incident takes place inside the facility 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.

7.1.6.2 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 times or its consequence may be serious. Therefore, major emergency must not be decided on whims or immature judgment or without proper thought. Hence the nominated persons (may be CEC) who can declare the emergency shall be selected on the basis of their knowledge & experience. These persons shall be technically qualified and experienced. The decision about major emergency shall be taken as early as possible and without wasting time so that control action can be started immediately.

7.1.6.3 Telephone Messages

A telephone operator who is precise, sharp, attentive and quick in receiving and noting the message and subsequently effective in further communication shall be appointed. A form to record emergency telephone calls shall be available with telephone operator or person available in Emergency Control Centre, who shall record such calls during emergency. Telephonic messages shall be given out by the telephone operator to Site Main Controller and key personnel as per the instructions of the Incident Controller. Telephonic messages shall also be given to authorities and external agencies to describe the type of emergency. All details of emergency shall be collected / delivered according to the format available with the telephone operator.

7.1.6.4 Communication of Emergency & Statutory Information

Communication of Emergency

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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 & 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 neighbouring factory & 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 shall be prepared by the unit. This information shall be 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 shall be given to outside emergency services and authorities, if required.

C) To Neighbouring Firms and the General Public

Statutory information in the form of booklet shall be given to neighbouring units and the general public of the villages in the vicinity of the unit, if required.

7.1.7 Occupational Health & Safety Programme

M/s. Y.J. Multiclave has proposed the Occupational Health Surveillance Programme which shall be followed right from the project construction & erection phase.

The details of the same are described in the following sections.

7.1.7.1 Occupational Health

Occupational health needs attention both during construction & erection and operation & maintenance phases. However, the problem varies both in magnitude and variety in the above phases.

7.1.7.2 Hospital Facilities / Factory Medical Officer & OHC

Company shall make formal agreements with nearby hospitals having facilities to attend fire and toxic effect cases, emergency cases, attending the affected persons in the emergency arising out of accidents, if any, etc.

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A qualified doctor will be appointed as FMO on retainership basis. Apart from him, required medical facilities applicable as per State Factories Rules and Factories Act shall also be made available.

All types of first aid related accessories, medicines & antidotes as prescribed by FMO, etc. shall be made available at conspicuous locations.

7.1.7.3 Ambulance Van & First Aid Box

An Emergency Vehicle shall be made available round the clock to be used as an Ambulance during emergency.

First Aid Boxes will be made available at the different locations in the plant. Training shall be given to employees for First Aid.

7.1.7.4 Plan for Periodical Medical Check-up

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:

- Before employment, to ascertain physical fitness of the person;
- During employment, every six months (blood & physical examination) as per State Factories Rules, to ascertain physical fitness of the person to do the particular job

7.1.7.5 Details of Occupational Health Impacts & Safety Hazards

- Exposure to Toxic Wastes.
- Exposure to Corrosive, Medical, Flammable Wastes.
- Exposure to Incinerated Ash.
- Fire at flammable hazardous waste at site, DG set, etc.

For the details of: Occupational health impacts on employees/workers arising out of the above hazards and mitigation measures proposed to avoid the human health hazards, please refer Qualitative Risk Assessment in **Section 7.1.2.**

7.1.7.6 Monitoring of the Occupational Injury and Its Impact on Workers

The action plan will be prepared to monitor the occupational injury to workers:

- Each workplace will be evaluated for the existing work conditions.
- Unsafe acts & unsafe practices will be identified.
- Unsafe equipments, 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 & on the job work.

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Impact of the above mentioned unsafe conditions on workers will be studied and remedial measures for the same will be adopted.

7.1.7.7 Provision of Industrial Hygienist & Health Evaluation of Workers

- It is proposed that management will devise a plan to check and evaluate the exposure specific health status evaluation of workers.
- 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.
- While in work also, all the workers will be periodically examined for the health with specific reference to the hazards which they are likely to be exposed to during work. Again, the parameters and frequency of such examination will be decided in consultation with Factory Medical Officer and Industrial Hygienists. Plan of monthly and yearly report of the health status of workers with special reference to Occupational Health and Safety, will be maintained.

7.1.7.8 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

In order to fully develop the capabilities of the employees in identification of hazardous processes and improving safety and health, safety circle shall also be constituted. The circle would consist of about three to four employees. The circle normally shall meet for about an hour every week.

Safety Training

Safety trainings (on Safe Material Handling, First Aid & all Safety Aspects) shall be provided by the Safety Officers with the assistance of faculty members called from other Professional Safety Institutions and Universities. In addition to regular employees, limited contractor labours shall be provided safety trainings. To create safety awareness, safety films will be shown to workers and leaflets shall be distributed.

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7.2 PUBLIC CONSULTATION

7.2.1 Introduction

The Ministry of Environment, Forest and Climate Change, (MoEFCC) Government of India issued Environmental Impact Assessment notification S.O. 1533 dated August, 2015 mandating prior environmental clearance for Common Bio-Medical Waste Treatment Facilities (CBMWTF) prescribes environmental clearance under category 'B'. The proposed facility will be located at Sy. No. 7/1 & 8/1, Tana Annavaram Village, Nuzendla Mandal, Guntur District, Andhra Pradesh. Project proponent has already obtained terms of reference from the Andhra Pradesh State Environmental Impact Assessment Authority (SEIAA) vide letter no. SEIAA/AP/GNT/IND/05/2016/84- dated 10.10.2018., which mandated public consultation. Accordingly, the draft Environmental Impact Assessment was submitted to Regional Officer, Andhra Pradesh Pollution Control Board, Guntur District for conducting public hearing. The public hearing for the proposed CBMWTF was conducted on 19/09/2019 at 11.00 AM at the Project Site, Thana Annavaram, Nuzendla Mandal, Guntur District, Andhra Pradesh.

The public consultation was chaired by Sri A. S. Dinesh Kumar, Joint Collector & District Magistrate, Guntur District and Sri V.R. Maheswara Rao, Environmental Engineer (FAC), Rept. Of A.P Pollution Control Board, Regional Office, Guntur District, Andhra Pradesh.

7.2.2 Advertisement

Press notification regarding the date, time and venue of the Environmental public hearing for the proposed bio medical waste treatment facility was issued in Indian Express (English) & Andhra Jyoti (Telugu) newspapers on 17/08/2019.

Minutes of Meeting

The minutes of the public hearing is enclosed along with the attendance sheet. Concerns expressed by speakers during public hearing and responses of the proponent are presented in **Table 7.6**.

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TABLE 7.6 – CONCERNS RAISED IN PUBLIC HEARING AND RESPONSES

Sr. No.	Represented By	Subject of the Representation	Proponent's Response
1.	Sri Srinivasa Rao	While welcoming the proposed project, he informed that the proposed facility shall not cause any Air and Water Pollution problems to the surrounding agricultural fields and to the nearby village.	Sri. Srinivasa Reddy, Coordinator representing M/s. Enpro Enviro Tech and Engineers Pvt Ltd., on behalf of M/s. Y.J. Multiclave, replied to the objections/ suggestions raised by the public during Public Hearing. The details are as follows:
2.	Sri Nageswara Rao	He raised concerned on potential for pollution generation from melting of plastic waste from the above activity and requested to implement requisite measures to prevent any impacts of air and water pollution problems to surrounding environment. He welcomed the project and request to address the above concerns.	As per the Bio Medical Waste Management Rules, 2016, Bio Medical Waste shall be treated within 48 hours and they will comply the norms without causing Air and Water pollution to the nearby Agricultural fields and human habitation.
3.	Sri K. Nageswara Rao	He welcomed the proposed project and requested the project proponent not to cause any Air and Water Pollution problems to the surrounding agricultural fields and to the nearby village.	The proposed project is a Bio Medical Waste treatment facility and abide by all the Rules stipulated. The proposed project will not burn plastic. The plastic waste will be sterilized and treated plastic waste will be disposed to authorized plastic recyclers.
4.	Smt K. Eswaramma	She requested the project proponent to implement necessary measures and not to cause any Air and Water Pollution problems to the surrounding environment.	The proposed project will provide incinerator with primary chamber and secondary chamber for incineration of Bio Medical Waste. Primary chamber will maintain at a temperature of more than 850°C and secondary chamber is maintained at a temperature of more than
5.	Sri N. Anjaiah	He welcomed the proposed project and informed that the line of activity of the proposed project is collection of Bio Medical Waste (BMW) generated in the Guntur District and proposed to treat the BMW as per the Rules, without causing any pollution problems to the surrounding agricultural fields and to the nearby village. He expressed that the project proponent is ability to run the facility without causing any water and air pollution problems to the nearby surroundings. He opined that the proposed project proponent is utilizing the lands of the village,	

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Sr. No.	Represented By	Subject of the Representation	Proponent's Response
		hence employment shall be given to local people only. He recommended to grant Environmental Clearance to the proposed project.	1050°C. The incineration ash will be disposed to M/s. Ramky Pharma, TSDf for scientific disposal.
6.	Sri B.V. Reddy	He welcomed the proposed project and informed that the line of activity of the proposed project is collection of Bio Medical Waste (BMW) generated in the Guntur District and to provide treatment to the BMW as prescribed. Further informed that the villagers are welcoming the project, since the project proponent has implemented several social activities in the village. He requested the project proponent to operate the facility without causing any water and air pollution problems to the nearby surroundings. He informed that the project proponent shall develop minimum 33% of greenbelt. He requested to recommend Environmental Clearance to the proposed project.	<p>The proposed project will provide Effluent Treatment Plant to treat the waste water generated from the treatment of Bio Medical Waste. The treated waste water will be recycled.</p> <p>The project proponent will provide alternative arrangement for moment of Bio Medical Waste carrying vehicles without entering into the village roads.</p> <p>The incineration ash will be disposed to M/s. Ramky Pharma city through closed vehicles which are provided with GPS tracking system.</p>
7.	Sri. Y. Chennakesava Reddy	He welcomed the proposed project. He requested the project proponent to maintain same ambience even after establishment and operation of the facility without causing any water and air pollution problems to the surrounding environment. He requested to establish Effluent Treatment Plant (ETP) to treat the waste water generated and shall utilize the treated waste water. He requested the project proponent to explain disposal mode of incinerator ash. He further requested to develop thick greenbelt around the facility and also requested to give employment to the local people, to organize Medical camps periodically in the surrounding villages. Finally, requested the project proponent to utilize latest	<p>The proposed project will provide Online Continuous Emission Monitoring System in compliance with the Central Pollution Control Board norms.</p> <p>The proposed project will give employment to the local people and shall comply CSR norms.</p>

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		technology to treat the Bio Medical Waste as per the norms and informed to recommend to MoEF&CC for grant of Environmental Clearance to the proposed project.	
8.	Sri T. Hussain Naidu	He welcomed the proposed project. He requested the project proponent to cover the Bio Medical Waste with tarpaulin sheets. He requested the project proponent to inform the nature of chemicals proposed to utilize to treat the Bio Medical Waste. He informed that the proponent shall dispose solid waste generated to M/s. Ramky Pharma City for scientific disposal. He requested the project proponent to develop thick greenbelt with local neem species, which will give oxygen and filter air pollution.	
9.	Sri S. Venkateswarlu	He welcomed the proposed project. He requested the project proponent to provide RO Plant for supply of drinking water to the nearby villages since drinking water is not sufficiently available, and to provide medical health camps to the nearby villages periodically.	
10.	Sri. Sudarshan, Cheyutha	He welcomed the project and requested the proponent to give employment opportunities to the local youth.	

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CHAPTER 8

PROJECT BENEFITS

8.1 INTRODUCTION

In the process of treating patients, hospitals generate considerable quantities of "Bio-Medical Wastes" which may cause harm to the environment, if disposed in an improper manner. These wastes need professional attention for effective management as the infectious nature of the waste can cause irreparable damage to the human health and the environment. It has become imperative to monitor and control the management and handling of these wastes.

Improper segregation of waste results in mixing of hospital wastes with general waste making the whole waste stream hazardous. Inappropriate segregation ultimately results in an incorrect method of waste disposal. Various communicable diseases, which spread through water, sweat, blood, body fluids and contaminated organs, are important to be prevented. The bio- medical waste spread in and around the hospitals attracts flies, insects, rodents, cats and dogs that are responsible for the spread of communicable diseases like plague and rabies. Rag pickers in the hospital, sorting out the garbage are at a risk of getting tetanus and HIV infections. The recycling of disposable syringes, needles and other articles like glass bottles without proper sterilization are responsible for hepatitis, HIV and other viral diseases. Hospitals and Health Care Facilities were trained by this facility to properly segregate different kinds of bio-medical waste. Due to the facility, hazardous bio-medical waste shall be properly treated.

8.2 IMPROVEMENT IN INFRASTRUCTURES

8.2.1 Improvements in Physical Infrastructure

The proposed project is expected to yield a positive impact on the socio-economic environment. It shall help sustain the development of this area including further development of physical infrastructural facilities. The beneficial impact of proposed project on the civic amenities will be substantial after the commencement of project activities. 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.

8.2.2 Improvements in Social Infrastructure

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 off in scientific manner instead of dumping along with solid waste.

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8.3 EMPLOYMENT POTENTIAL

The project will create opportunities for employment. Skilled and unskilled manpower will be required for plant operation and maintenance. Semiskilled and unskilled manpower will be required for collection and transportation of waste from generator to facility. Proposed manpower for project is tabulated as under

TABLE 8.1 - DESCRIPTION OF EMPLOYMENT

Sr. No.	Description	Numbers
1	Plant In charge	1
2	Plant Operator	2
3	Junior Operators / Helpers	5
4	Drivers	3
5	Attendants	3
6	Accounts and Administration	2
7	Security	3

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. There will be temporary employment generation during plant construction and installation work.

First preference will be given to local people for all kinds of required employment in the project and especially for unskilled employment the company will take local people.

8.4 ENTERPRISE SOCIAL RESPONSIBILITY

Unit is aware of the obligations towards the society and to fulfill the social obligations, unit will employ semi-skilled and skilled labour from the nearby villages for the proposed project as far as possible. Unit will also try to generate maximum indirect employment in the nearby villages by appointing local contractors during construction phase as well as during operation phase as well as for transport sector.

The management proposes to spend 2 % of the capital cost towards social development activities in the surrounding villages. The objective is to obtain a social license from the stake holders who are likely to be affected due to the proposed CBMWTF.

Tax Income

The proposed capital expenditure of Rs. 2.32 crores include GST on various equipment and services. The provision of employment also directly contributes to additional income tax and also indirectly contributes to additional GST due to various transactions. The operation of the CBMWTF also results in additional GST from revenue, additional income tax on profits and from employees' salaries. This way, the proposed project will not only treat and dispose the bio-medical waste but also result in benefit to the country in the form of taxes, duties etc.

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TABLE 8.2 - PROPOSED SOCIAL ACTIVITIES (RUPEES)

Sr. No.	Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year
1.	Technical Training Centers (I.T.I) / Govt. School Funds	10,000	25,000	35,000	40,000	50,000
2.	Health Care Centers / Medical Camps	10,000	25,000	35,000	40,000	50,000
3.	Untreated Water Supply Pipelines / Swachh Bharat Mission	10,000	20,000	30,000	40,000	50,000
Total		30,000	70,000	1,00,000	1,20,000	1,50,000

1. Education

The literacy rate in some nearby area is found to be low, which indicates basic level of education is required in that area. Hence, the unit has proposed to take following actions for educational necessities:

- Scholarships/fellowships to deserving students to encourage education in nearby villages like Tana Annavaram, Chintala Cheruvu, Chatragaddaparu.
- Promote Technical & professional education by giving financial assistance in school.
- Financial support and assistance for the development and maintenance of industrial training institute.

2. Health

Proposed unit is proposing to help the community through following measures for health benefits:

- Organize free medical check-up camp for local residents in villages like Tana Annavaram and Chintala Cheruvu. Providing support for the development and maintenance of the health Facilities.

3. Swachh Bharat Mission

Proposed project has planned following activity for Swachh Bharat Mission.

- Arranging collection of plastic waste from dedicated village and disposal same to nearby Solid waste site or plastic recycler.
- Providing Dustbins to nearby Villages and Schools.
- Arrangements of awareness program on cleanliness, Hygiene and Sanitation among nearby villages and school.

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CHAPTER - 9

ENVIRONMENTAL COST BENEFITS

This chapter is not applicable as it is not asked by committee in TOR points.

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CHAPTER 10

ENVIRONMENTAL MANAGEMENT PLAN

10.1 INTRODUCTION

Preparation of Environmental Management Plan is required for formulation, implementation and monitoring of environmental protection measures during and after commissioning of projects.

10.2 OBJECTIVE & SCOPE

Long-term objectives of the EMP for all the environmental attributes are as under:

- To comply with all the regulations / applicable laws stipulated by Central & State Pollution Control Boards.
- To create good working conditions for employees.
- To rationalize and streamline environmental activities to add value in efficiency and effectiveness.
- To encourage and achieve highest performance and response from individual employees and contractors.
- Perspective budgeting and allocation of funds for environment management expenditure.
- To contribute significantly for sustainable development.
- To encourage support and conduct developmental works for the purpose of achieving environmental standards and to improve methods of environment management.
- Continuous development and search for innovative technologies for a cleaner and better environment.

10.3 ADMINISTRATIVE ASPECT FOR EMP

10.3.1 Operational Philosophy

Philosophy behind designing the Environment Management Plan for a particular project is that all the activities being undertaken at the plant should be in complete compliance with all applicable laws, regulations, standards and guidelines. In order to achieve this, the management of Y.J. Multiclave will establish a resource base for the management of health, safety, environment and social issues during operation phase of the project. Technically qualified and experienced staff will be in-charge of this activity. The HSE objectives will consist of no accidents in plant, no harm to people of surrounding area and no damage to the environment. Plant management will be responsible to the community regarding environmental protection and promoting all practicable control measures to ensure implementation of project operation phase in an efficient and environmentally responsible manner. Success of the Environment Management Plan is due to following aspects:

- 1) Management support;
- 2) Efficiency of Environment Management Cell;

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3) Acceptability of resulting environmental quality.

10.3.2 Management Support - Corporate Environment Policy

To implement and facilitate the Environment Management System for any project, one of the most important aspects is management support. Since, the project is yet to commence, it does not have any Environment Policy. However, an Environmental Policy covering following aspects shall be laid down prior to commencement of proposed project:

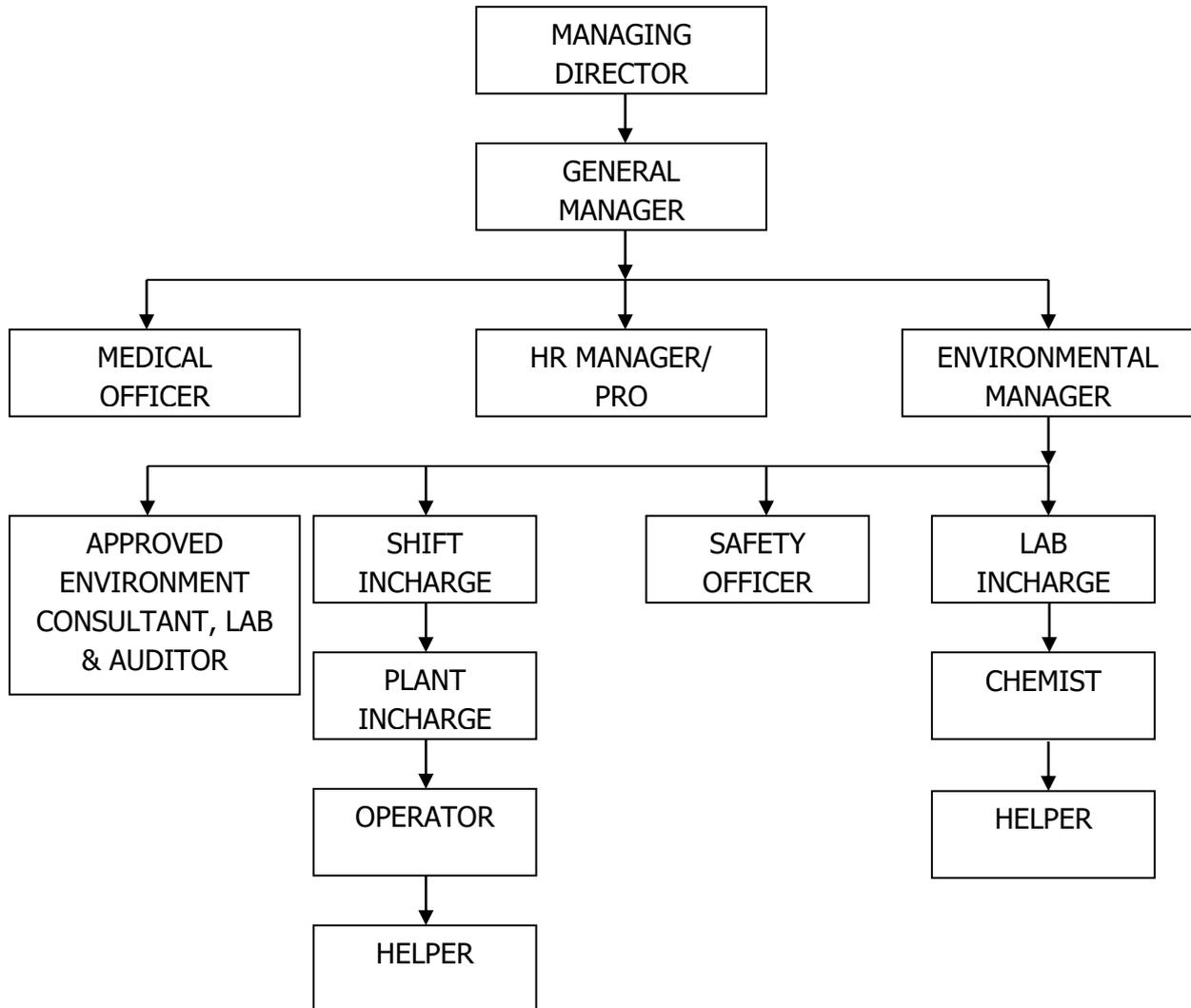
- Prevention of pollution through conservation of resources, careful handling and disposal of hazardous wastes in an eco-friendly manner and re-use / recycle of materials wherever possible.
- Providing continual training to employees and associates for upgradation of awareness and skills for better implementation of EHS management system.
- Adherence to all legal requirements concerning environment and occupational health and safety.
- Monthly training programme will be arranged through medical associations in different areas by the facility operator.

10.3.3 Environmental Management Cell

The company shall formulate the 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, Environmental Management Cell has to be formed for efficient & easy operation of environment management system & operations thereof. The illustrative presentation of the suggestive EMC is presented below in **FIGURE 10.1**.

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FIGURE 10.1 - THE ILLUSTRATIVE PRESENTATION OF EMC



The major duties and responsibilities of Environment Management Cell shall be as given below:

- To implement the Environment Management Plan
- To assure regulatory compliance with all relevant rules and regulations
- To ensure regular operation and maintenance of plant
- To minimize environmental impacts of operations by strict adherence to the EMP
- To initiate the environmental monitoring plan as per approved schedule
- Review and interpretation of monitoring as per approved schedule and take corrective measures, in case monitoring results are above the permissible limits
- Supervise the functioning of all concerned employees and contractors to ensure that the EMP, procedures & SOPs for prevention of impacts on ecological features of the local area are implemented properly
- Maintain documents of good environmental practices and applicable environmental laws as ready reference

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- Co-ordination with regulatory agencies, external consultants & monitoring laboratories
- Maintain log of public complaints and preventive and corrective actions to be taken.
- 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.

Allocation of Resources, Responsibility and Authority will result in successful implementation of EMP during construction and operational phase.

10.4 EMP FOR CONSTRUCTION PHASE

The construction phase impacts would be mainly due to civil works such as site preparation, levelling, foundation works, excavation and earth removing, transportation of construction materials and machineries, installation of machineries etc. These activities will involve movement of a substantial quantity of soil and debris. Proper restrooms and sanitary blocks shall be provided for the construction workers. The construction phase impacts are temporary and localized phenomena except for the permanent change in local landscape. However, it is essential to consider the probable impacts of construction phase and suggest efficient procedural and structural measures to address the adverse impacts on environment. These are usually short-term impacts as compared to those during operational phase.

10.4.1 Air Environment

For the proposed project site levelling and grading will be carried out if required, wherever possible to maintain the natural elevations they will not be disturbed, only levelling activity will be carried out for providing roads, sewage network, storm water system and places required for construction of sheds and administrative buildings. According to the engineering assessment, most of the excavated muds generated during construction activities will be reused within the project site for levelling during road formation etc. The excess if any, will be given to local contractors for disposal in low lying areas, road construction use etc.

During construction period most of the dust will be generated from the movement of construction vehicles on unpaved roads. Unloading and removal of soil material shall also act as a potential source for dust nuisance. The control measures proposed to be taken up are given below.

- Water sprinkling on main haul roads in the project area shall be done. This activity shall be carried out at least twice a day, in this way around 50% reduction on the dust contribution from the exposed surface will be achieved.
- Temporary tin sheets of sufficient height (3 m) shall be erected around the site of dust generation or all around the project site as barrier for dust control.
- Tree plantations along the project boundary will be initiated at the early stages by plantation of 2 to 3 years old saplings using drip irrigation or by regular watering so that the area will be moist for most part of the day.

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- All vehicles carrying solid/hazardous waste shall be instructed to cover with tarpaulin / plastic sheet, unloading and loading activity shall be stopped during windy period.
- To reduce the dust movement from civil construction site to the neighbourhood, the external part of the construction activity shall be covered by plastic sheets.

10.4.2 Water Environment

During site development, necessary precautions will be taken, so that the runoff water from the site gets collected to working pit and if any overflow occurs, it will be diverted to nearby greenbelt / plantation area. During construction activity, all the equipment's 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.

The domestic waste water generated from temporary toilets used by the work force will be diverted to septic tank followed by soak pit. Therefore, impact on water quality due to proposed unit would be insignificant.

10.4.3 Land Environment

Following steps are proposed to take care of impact of construction activity on project land area:

- On the completion of civil works, all debris etc. will be completely removed from site to avoid any incompatibility with future use.
- Other materials like paint, diesel etc. will be properly stored and handled to prevent any spillage on land.
- All the wastes will be stored at a designated site within the premises to prevent scattered discharge on land.
- Wastes like used oil, lubricants etc. generated from the site will be segregated and disposed to authorized recyclers.
- Other wastes like soiled cotton, paper etc. will be disposed to municipal dump/landfill.

10.4.4 Biological Environment

The company has allotted 4491.9 m² (33.63%) of total plant area for greenbelt development. The company will start developing greenbelt during construction activity which shall reduce impact due to proposed construction activity on ecology.

- Restriction of construction activities to defined project areas, which are ecologically less sensitive.
- Restrictions on location of labour camps and offices for project staff near the project area to avoid human induced secondary additional impacts on the flora and fauna species.
- Cutting, uprooting, coppicing of trees or small trees present in and around the project site for cooking, burning or heating purposes by the labourers will be prohibited and suitable alternatives for this purpose will be found.

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- Along the major construction work, peripheral greenbelt shall be developed, so that it will grow to become a full-fledged green cover by the time the construction is over.

10.4.5 Noise Environment

Noise generating equipment will be used during day time for brief period of its requirement. Proper enclosures will be used for reduction in noise levels, wherever possible the noise generating equipment will be kept away from the human habitation. Temporary tin sheets of sufficient height (3 m) will be erected around the noise generating activity or all around the project site as barrier for minimizing the noise travel to surrounding areas. Therefore, impact on noise environment due to proposed project would be insignificant.

All vehicles entering into the project will be informed to maintain speed limits and not blow horns unless it is required. Personal protective equipment like earmuffs, helmets covering ears would be provided to the workers working near noise generating equipment and would see that workers use the protective gadgets regularly. All machineries to be used for construction purpose will be of highest standard of reputed make. Feasibility of putting up acoustic enclosure / temporary barrier around areas with high noise levels will also be explored during construction activities. Possibility of raising greenbelt along with construction activity will also be explored so as to serve as a noise barrier.

10.5 EMP for Operation Phase

Operation phase of any industry being longer in duration and because of its potential to create continuous impacts is quite important from the impact point of view. Comprehensive and effective EMP has to be prepared and implemented to safe-guard environmental concerns during operation phase of any unit.

10.5.1 Air Environment

- Incinerator shall be designed as per CPCB guideline for incineration system for Common Bio-Medical Waste Treatment Facility. APCs consisting of Venturi scrubber, Packed bed scrubber and stack with 30 m height shall be provided.
- Preventive maintenance of APCs will be carried out in order to ensure its effectiveness.
- LDO fired D.G. sets shall be run only in emergency power requirement / power supply failure from electricity department.
- Possible fugitive emissions from the waste feed system of incineration system shall be contained by maintaining negative pressure in incinerator system.
- Stack gas monitoring and ambient air monitoring shall be conducted as per environment monitoring plan described in Chapter 6.
- On line monitoring system (CEMS) shall be operated, calibrated and maintained regularly as per CPCB guideline.

Odour Control

Following odour control measures will be taken in plant.

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- Regular collection of Bio-Medical waste from generators will be ensured through proper planning of routes and trips to covered area.
- It shall be ensured that the total time taken from collection of bio-medical waste to its treatment shall not exceed 48 hours.
- Transportation vehicle shall be as per CPCB guideline and shall be closed container type and locked while transportation to ensure that local community is not exposed to odours and contamination.
- Transportation vehicle shall be provided with GPS based tracking system to ensure that there is no mishandling of waste after collection.
- No waste shall be kept open and manually segregated.
- Good housekeeping practice shall be followed.
- Odour diluter such as Ecosorb (organic and biodegradable chemical) shall be used around storage area of bio-medical waste during regular interval.
- Greenbelt development will help in preventing odour spreading outside the premises of facility.

10.5.2 Water Environment

- Record of the water usage shall be kept on regular basis. Water consumption shall not exceed the consented / granted quantity.
- Floor of storage areas shall be made of concrete to prevent impacts of spilled/leaked materials/liquid/fuel/leachate on groundwater.
- Waste water generated from the facility shall be treated in Effluent Treatment Plant as described in Chapter 2 of this report. Treated waste water shall be recycled and reused in facility.
- Dedicated and responsible skilled manpower team shall be deployed to look after efficient operation of Effluent Treatment Plant.
- Printed logbooks, records shall be maintained for Effluent Treatment Plant operation.
- Internal monitoring of Effluent Treatment Plant and external monitoring of treated and untreated waste water shall be conducted as per Environment Monitoring Plan provided in Chapter 6.
- Regular ground water monitoring shall be conducted as provided in Environment Monitoring Plan in Chapter 6

In-house laboratory facility shall be provided for regular plant monitoring and to check aeration efficiency. List of major instruments to be provided in laboratory are given below.

TABLE 10.1 - LIST OF MAJOR LABORATORY INSTRUMENTS

Sr. No.	Name of Equipment	Quantity
1	pH meter	1 Nos.
2	COD Digester	1 Nos.
3	BOD Incubator	1 Nos.
4	Oven	1 Nos.
5	Single Pan Analytical Balance	1 Nos.
6	Digital Balance	1 Nos.
7	Hot Plates	2 Nos.
9	Refrigerator	1 Nos.

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Sr. No.	Name of Equipment	Quantity
10	Magnetic Stirrer	1 Nos.
12	Vacuum Pump	1 Nos.
13	Water Bath	1 Nos.
14	DO Meter	2 Nos.
15	Required glassware, chemicals and reagents	1 Nos.

10.5.3 Land Environment

- Dedicated storage areas for different types of bio-medical waste shall be provided.
- All hazardous solid waste (Incinerator Ash and ETP Sludge) shall be stored in dedicated hazardous waste storage area and shall be disposed off to TSDF site. Record shall be maintained for generation, storage and disposal of hazardous waste.
- Record shall be maintained for all recyclable waste being sent to authorized recycler.
- Copies of such records shall be regularly submitted to State Pollution Control Board in prescribed format as per Hazardous Waste Rule.
- Greenbelt development & management plan as designed shall be implemented and monitored to ensure greenbelt and cover in 4491.9 m² (33.63%) area of the site.

10.5.4 Biological Environment

A) Construction Phase

- Restriction of construction activities to defined project area, which are ecologically less sensitive.
- Restriction on location of labour camp and office for project staff near the project area to avoid human induced secondary additional impacts on the flora and fauna species.
- Cutting, uprooting, coppicing of trees or small trees present in and around the project site for cooking, burning or heating purposes by the labourers will be prohibited and suitable alternatives for this purpose will be found.
- Along the major construction work, the peripheral greenbelt should be developed so that it will grow to become a full-fledged green cover by the time the construction is over.

B) Operation Phase

Enhancement of current ecology at the proposed project site will entail the following measures:

- Plantation & Landscaping
- Park & Avenue Plantation
- Greenbelt Development

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Plantation & Landscaping

- Selection of the plant species will be based on their adaptability to the existing geographical conditions and the vegetation composition of the forest type of the region.
- During the development of the greenbelt within the project area, it has to be emphasized that those native plant species should be planted which are having good ornamental values and fast growing with excellent canopy cover.

During entire project life, following mitigation measures shall be implemented & followed:

- Regular monitoring for emission and ambient air quality, noise and water and wastewater quality and soil quality as per monitoring plan.
- Proper and efficient implementation of mitigation measure & EMP suggested for air, water, soil and noise environment and waste management.
- Proper and efficient implementation of non-structural preventive / precautionary / control measures as well as procedures suggested for prevention / control of major hazards in the proposed unit.
- As suggested in below Greenbelt Development Plan, development & maintenance of adequate dense greenbelt as per CPCB guideline within premises & along periphery throughout project life.
- Disaster management and emergency action plan shall be prepared carefully and implemented to eliminate / minimize the chances of impact on ecological features of local area.
- Before commissioning of plant, properly formulated procedures (including necessary/ required SOPs) and action plan for various operations of concern to eliminate the chances of impacts on ecological features of the local area shall be prepared & implemented by Environment Manager.
- The supervision shall be done by Environment Manager on daily basis throughout the life of the project starting from the commissioning of the unit.

Greenbelt Development

It is proposed to provide greenbelt in an area of 4491.9 m² (33.63 %) of Total Plot Area, covering the boundary of the site as part of Environment Management Plan. Native species are identified for plantation and the guidelines issued by CPCB for development of greenbelt are to be followed. The direction, distance between the plants, maintaining the survival rate etc. are keen for greenbelt. The number of species and their size (individual numbers) depends on the budget and available space.

Greenbelt is recommended as one of the major components of Environmental Management Plan. Proper attention and management is required to maintain the survival rate of the planted species. A large variety of plant species are suggested under the greenbelt plan and around 3 lakhs financial budget for first five years is proposed to develop the green cover. Following guidelines have been suggested & shall be followed by the company for greenbelt development & maintenance.

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Guidelines for Greenbelt Development

- Design and development of greenbelt should be in adherence to industry-specific requirements and prevalent climatic conditions.
- Company shall ensure healthy and dense greenbelt throughout the project life.
- Company shall follow CPCB guidelines for development & maintenance of greenbelt.
- Company shall ensure regular irrigation & fertilization of greenbelt as required timely.
- Company shall ensure re-plantation in greenbelt, depending upon the survival rate of planted vegetation to maintain greenbelt.
- Indigenous species with fast growth are only selected or form the base of selection as greenbelt can come in view as fast as possible.
- Company shall plant local species of trees & shrub for greenbelt development.
- The trees shall be planted in three tiers pattern so as to ensure that the entire area gets covered and ensure effective pollution abatement. For this, management shall ensure that plantation of trees shall include mixture of lower, higher and middle canopy structure, which shall be mixed appropriately / proportionately / uniformly.
- The plantation shall also include fruit bearing trees / species which shall be uniformly distributed which shall act as dwelling place for variety of birds and other fauna and form a breeding ground for them. The tree products should have acceptable characteristics to suit local customs and traditions flowering herbs & shrubs species.

As per the present project activities, it is recommended to raise the following plant species. These species can be also available near the forest department nurseries. Small herbs, grass varieties, climbers and other ornamental and flowering plants can also be raised as per the availability, near the paths and in corridors of the buildings. Certain plants are also recommended to rise in the buffer zone as per the budget availability.

TABLE 10.2 - LIST OF TREES RECOMMENDED FOR PROPOSED PROJECT SITE

Sr. No.	Botanical Name	Common Name	Preferred Site of Planting	No.
1	<i>Azadirachta indica</i> A.Juss.	Vepa	A1	5
2	<i>Pongamia pinnata</i> (L.) Pierre	Adivi ganuga	A1	10
3	<i>Tectona grandis</i> L.f.	Teak	A1	10
4	<i>Terminalia catappa</i> L.	Badam	A1	10
5	<i>Tecoma stans</i> (L.) Juss. ex Kunth	Pasupu ganneru	A2	10
7	<i>Bauhinia purpurea</i> L.	Bodhanta	A2	15
8	<i>Plumeria alba</i> L.	Tella devaganneru	A2	10
9	<i>Nerium odoratum</i> Lam.	Erra ganneru	A3	10
10	<i>Ixora coccinea</i> L.	Ramabanam	A3	20

Preferred site of planting codes:

- A1: Tall trees towards boundary wall
A2: Medium sized trees next row to A1 species
A3: Small trees next row to A2 species

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TABLE 10.3 - LIST OF ORNAMENTAL HERBS & SHRUBS WITHIN GREENBELT AREA (OPTIONAL)
(Recommended for aesthetic value):

Sr. No.	Botanical Name	Common Name	Habit	Preferred Site of Planting
1	<i>Acalypha hispida</i>		Shrub	Next row to Hedges
2	<i>Plumaria pudica</i>		Tree	Garden Centre
3	<i>Tabernaemontana divaricata</i>	Nandivardhanam	Shrub	Garden Centre
4	<i>Caesalpinia pulcherrima</i>	Ratnagandhi	Shrub	Next row to Hedges
5	<i>Allamanda schottii compacta</i>		Hedge	Towards paths
6	<i>Begonia semperflorens</i>		Hedge	Towards paths
7	<i>Caladium hortulanum</i>	Fancy Leaved Caladium	Hedge	Towards paths
8	<i>Euphorbia geroldii</i>	Kiss Me Quick	Herb	Near Corridor
9	<i>Catharanthus rosea</i>	Vinca Ordinary	Herb	Near Paths
10	<i>Crinum asiaticum</i>	Blood Lily	Herb	Near Corridor
11	<i>Crossandra undulaefolia lutea</i>	Crossandra Yellow	Herb	Near Corridor
12	<i>Eranthemum purpureum</i>	Kodia Purple Leaves	Hedge	Towards paths
13	<i>Gerbera jamesonii</i>	Transvaal Daisy	Herb	Near Corridor
14	<i>Lantana camara erecta</i>	Lantana Red	Shrub	Next row to Hedges
15	<i>Kalanchoe tubiflora</i>	Chandelier Plant	Herb	Near Corridor
16	<i>Buddleja davidii</i>	Butterfly Bush	Shrub	Next row to Hedges
17	<i>Asystasia gangetica</i>	Creeping Foxglove	Hedge	Near Paths
18	<i>Bauhinia scarlet</i>		Climbing Shrub	Entrance to Garden
19	<i>Ixora coccinea</i>	Jungle Flame	Shrub	Next row to Hedges
20	<i>Pennisetum clandestinum</i>	Lawn Grass	Grass	Rest of all

TABLE 10.4 - PROPOSED FINANCIAL BUDGET FOR GREENBELT DEVELOPMENT (RS IN LAKHS)

Sr. No.	Component	1 st year	2 nd year	3 rd year	4 th year	5 th year	Total
1	Plant seeds / saplings	0.5	-	-	-	-	0.5
2	Gardeners / labour cost	0.5	0.5	0.5	0.3	0.2	2.0
3	Fertilizers and miscellaneous cost	0.5	-	-	-	-	0.5
Grand Total		1.5	0.5	0.5	0.3	0.2	3.0

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

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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

- 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

10.5.5 Noise

- To restrict noise level due to vehicle carrying waste, all vehicle (drivers) entering into the project will be informed to maintain speed limits, and not blow horns unless it is required. Necessary speed controlling bumps will be placed near weighbridge and entrance of the site.
- In house monitoring of noise level near noise generating machineries will be carried out to ensure that noise abatement measures are effectively implemented.
- Preventive maintenance schedule of such machineries are ensured and dedicated responsibility shall be given to in-charge of maintenance team.
- Regular noise monitoring shall be carried out as described in Environment Monitoring Plan described in Chapter 6.

10.5.6 Occupational Health and Safety

- Pre-medical examination and periodical examination will be carried out once in six months and record will be maintained in Form No-32 & 33 as per GFR. PFT, LFT, Cardiac as well as Haematological & 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-ups programs shall be followed.
- Proponent shall make efforts to implement the ISO 9001:2000, ISO 14000 & OHSAS 18001 system.
- Provision of conveyance facilities like safe drinking water & dining rooms etc. and good sanitation including proper waste disposal.
- Isolation of drinking water & refreshment area including canteen etc. from the area of hazardous materials storage & 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.

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- 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 & necessary health manual & procedures for all activities shall be developed and implemented. Such manual & 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 & implementation of emergency action plan including on-site & 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 & procedures shall be prepared, implemented & 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 & site.
- Strict prohibition of edibles & potables in the area of hazardous materials storage & handling.
- Strict prohibition of match box, lighters, clothes having potential of static charges as well as smoking in plant & 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 & 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 & / or statutory norms.
- Medical & first-aid facilities within premises & 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 & arrangement wherever possible to avoid manual handling & so as to avoid issues of MSD. Wherever, automatic system is not possible, adequate manual handling facilities like trolley & 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 & height of display screens & 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 & safe work conditions. Regular inspection for the safety procedures and use of PPEs & safety equipment/material shall be done by management/safety officer.
- Workplace monitoring shall be carried out on regular basis. Necessary records & documents for such monitoring shall be maintained by the proponent on regular basis.

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- Necessary training programs & audit shall be done on regular basis to prevent impacts of the operational activities on human health as well as to improve workplace condition & safe work system.
- Monthly training program will be arranged through medical associations in different area by the facility operator.

TABLE 10.5 - FREQUENCY OF HEALTH MONITORING

Occupation	Type of Evaluation	Frequency
Process area	Physical examination, complete blood picture, complete urine examination, ECG, random blood sugar, abdomen ultra sound scan, treadmill test, spirometry test	Once a year for regular employees. Half yearly for contract employees
Noise prone areas	Audiometry	Annually

10.5.7 Hazardous & Non-Hazardous Solid Waste

- Separate designated storage area shall be allocated for storage of all different type 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:



HANDLE WITH CARE

CYTOTOXIC HAZARD SYMBOL



HANDLE WITH CARE

- Transportation of hazardous wastes to TSDF site shall be governed as per Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.
- 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.

10.6 IMPLEMENTATION OF EMP

The EMP as described in the foregoing sections will be implemented by the EHS management cell. The cell will have qualified in-charge and trained members. The role & responsibility of each member of the cell shall be clearly defined.

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10.6.1 Budgetary Allocation for Environment Protection

Capital investment towards the environmental protection, control & mitigation measures will be about **Rs. 80 Lakhs** for the proposed new project.

The unit will keep provision for adequate funds aside to meet with regular expenses for the environmental control measures. Recurring cost for environmental management for the proposed project is given in **TABLE 10.6**.

TABLE 10.6 - ENVIRONMENTAL MANAGEMENT COST ESTIMATE

Sr. No.	Description	Capital Cost		Recurring Cost	
		Rs. in Lakhs	Basis of Cost Estimation	Rs. in Lakhs per annum	Basis of Cost Estimation
1	Air Pollution Control	40	Installation of Air Pollution Control System	10	Power consumption and maintenance of APMC
2	Water Pollution Control	30	Construction and Installation of ETP	8	Cost of chemicals, power consumption, maintenance cost of ETP
3	Noise Pollution	2	Acoustic enclosure for DG Set	0.5	Maintenance cost
4	Environmental Monitoring	4	In-house lab with monitoring and testing facilities	3.5	Third party cost for environmental monitoring and statutory compliance and chartered services.
5	Occupational Health	1	Occupational Health Facilities / First Aid Centre	0.15	Hiring of panel doctors, medical examiners and expenses
6	Hazardous / Solid Waste Management	3	Membership of TSDF/CHWIF	1.85	Transportation and disposal cost
	Total	80		24	

10.7 PREVENTION, MAINTENANCE AND OPERATION OF ENVIRONMENT CONTROL SYSTEM

The pollution control equipment, effluent treatment system 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

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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 tabulated below.

TABLE - 10.7 - MONITORING OF OPERATING CONDITIONS OF CBMWTF

Sr. No.	Name of Facility	Type of Test	Frequency	Procedure	Method
1	Incinerator	Combustion efficiency	Once in 3 month	Combustion efficiency calculated using formula prescribed in Schedule II of BMW Rules, 2016 - Standards for Incinerator $\text{C.E.} = \frac{\% \text{CO}_2}{\% \text{CO}_2 + \% \text{CO}} \times 100$	Schedule II of BMW Rules, 2016 - Standards for Incinerator
2	Autoclave	a. Validation test	Once in 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 3 month	Biological indicator strips or vials (Geobacillus stearothermophilus spores with at least 1×10^6 spores)	
3	Heat Sterilization	a. Validation test	Once in 3 month	Biological indicator (Geobacillus stearothermophilus or Bacillus Atropheaus spores using vials with at least 6 log ₁₀ spores per ml.)	Schedule II of BMW Rules, 2016 - Standards for Heat Sterilization.
		b. Routine Test		A chemical indicator strip or tape	

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10.7.1 Good Housekeeping

Good housekeeping means changing existing practices or introducing new ways of operating and maintaining equipment. Proper 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.
- Proper working instructions will be given to all the workers in factory.
- Roads/walkway within the plant will be maintained neat and clean.

10.7.2 Duties of the Operator of Common Bio-medical Waste Treatment and Disposal Facility

- Operator shall follow 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.
- 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 an occupier to any off-site bio-medical waste treatment facility only in the vehicles having label as provided in Annexure IX.
- In case for any reason if it becomes necessary to store waste beyond such a period, the occupier shall be trained to take appropriate measures to ensure that the waste does not adversely affect human health and the environment. Occupier should inform prescribed authority along with the reasons for doing so.
- Operator shall instruct and train occupier for pre-treatment of microbiological waste and all other clinical laboratory waste 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.
- 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 30th June of every year. Information regarding all other accidents and remedial steps taken shall be provided in the annual report in accordance with rule 13 by the occupier

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- 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 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.

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CHAPTER 11

SUMMARY AND CONCLUSION

11.1 INTRODUCTION

1. M/s. Y.J. Multiclave proposes to establish a Common Bio-Medical Waste Treatment Facility at Sy. No. 7/1 & 8/1, Tana Annavaram Village, Nuzendla Mandal, Guntur District, Andhra Pradesh.
2. Facility proposes to establish a Common Bio Medical Waste Treatment Facility (CBMWTF) with a capacity of 7 TPD in area of 3.3 acres.
3. Treatment shall include incineration, autoclave and shredding.
4. The bio-medical waste treatment facility is categorized under the Item 7 (da), category 'B'.
5. In order to assess the potential environmental impacts arising due to proposed 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 project and suggest the environmental safeguards and mitigation measures.

11.2 PROJECT DESCRIPTION

1. M/s. Y.J. Multiclave facility proposes to establish common bio-medical waste treatment facility with capacity of 7 TPD. Details of these facilities are given in **TABLE 11.1**.

TABLE 11.1 - LIST OF TREATMENT FACILITY

Sr. No.	Treatment	Capacity
1	Incinerator	330 kg/hr
2	Autoclave	250 kg/hr (750 lts)
3	Shredding	2 x 150 kg/hr

2. Total cost of the proposed project is estimated around INR 2.32 crores.
3. The total area of proposed project land is 3.3 acres (13354.6 m²).
4. The required water shall be drawn from bore wells within the premises in addition to reuse of treated waste water. Total water requirement for proposed project will be 28 KLD consisting of 15 KLD of fresh water and 13 KLD of recycled water.

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- Power requirement for the proposed project will be 75 KVA shall be sourced from APTRANSCO and 65 KVA D.G. Set will be used as power back-up operated during emergency time only.
- LDO will be used for Incinerator and Furnace Oil will be used as fuel for D.G. Set.
- Project will generate direct and indirect employment. Project during construction and operation phase will need total 30 (skilled, semi-skilled and unskilled) on contractual and permanent basis. Workers will be sourced from the local area as far as possible.
- Details of pollution potential/sources is given below.

TABLE 11.2 - DETAILS OF POLLUTION POTENTIAL / IDENTIFIED SOURCES OF IMPACTS

Sr. No.	Pollution Potential / Identified Sources	Proposed Total
1	Water	Total - 28 KLD Industrial - 26 KLD (13 fresh + 13 recycled) Domestic - 2 KLD
2	Air Emission	Stack-I: Incinerator (Ht. - 30 m, Dia - 400 mm) Stack-II: D.G. Set (Ht. - 20 m)
3	Solid Hazardous Waste	Incinerator Ash: 90 kg/day (Send to TSDF) ETP Sludge: 15 kg/day (Send to TSDF) Spent Activated Carbon: 1000 Kg/day (Send to TSDF) Glass and Plastic Waste After Autoclave and Shredding: 3 T/day (Send to authorized recyclers) Sharps after Autoclave and Shredding: 5 kg/day (Send to iron foundry / to TSDF) Waste Oil: 15 Litres/Month (Send to authorized recyclers) Used Batteries: 4 nos/year (Send to authorized recyclers)

11.3 BASELINE ENVIRONMENTAL STATUS

- Environmental scenario has been described for the specific environmental components as delineated in TOR for study area of plant.
- Ambient air quality data for the proposed project has been generated during the study period starting from 1st October 2018 to 31st December 2018 at six locations within study area of 10 km.
- The average concentration of all pollutants at all ambient air locations were found well within the limits and were varying in the following range:
PM₁₀: 41 to 52 µg/m³
PM_{2.5}: 14 to 16 µg/m³
SO₂: 9 to 12 µg/m³
NO_x: 9 to 14 µg/m³

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VOC: Below Detectable Limit
HCl: Below Detectable Limit

4. Based on meteorological data, wind rose has been prepared for the post monsoon season. As per meteorological data, it shows that average wind speed in this season was 2.25 m/sec. It can be observed that in this season, wind blows mostly from South-East to North-West.
5. The surface water samples have been collected at 2 locations of Gundlakamma river. The ground water samples have been collected from 1 Tube well and 7 hand pumps at various locations in study area. It is observed that the surface water source needs water treatment plant consisting of clarification, sand filtration, carbon treatment and disinfection, before it is used as domestic purposes because DO and BOD levels are at permissible limit. Based on ground water sample analysis results, it is observed that at more than 50% of the stations, results of some parameters such as TDS, Magnesium, Alkalinity, Chloride, Hardness are above desirable limit of drinking water standards (IS 10500:2012) but below permissible limit of same. Iron and Nitrate levels were slightly higher than desirable limit in 2 stations. Therefore, it is advisable that, ground water can be used as drinking water after treatment through RO plant.
6. Soil samples have been collected from 8 locations to ascertain its physical and chemical characteristics within study area. Physical parameters suggested that type of soil within study area is mostly sandy loam. Chemical parameters are presented in Table 3.12 of chapter 3. Soils are mildly acidic to mildly alkaline with very low cation exchange capacity and low to medium Nitrogen and Potassium levels.
7. The noise levels have been measured at project site and 7 other locations falling within study area and they were found within permissible limit as per CPCB.
8. The land use / land cover mapping has been carried out for 10 km radius area with project site at centre. The area is mostly covered with agricultural land and open scrub around 42% and 6 % respectively of the total area which is taken up for cultivation but is temporarily allowed to rest, un-cropped for one or more season, but not less than one year. Thus, total cultivable land is 42%. Stony waste land covers 4%, roads cover 9%, settlement (built-up area) located around the edges of agricultural land covers 9% and forest area covers 3% of the total study area. The railway lines cover 5%, rockynob covers 3%, boulders cover 4% and plantation covers 2% of the total study area. The proposed project is on open scrub and does not have any significant impact on the surrounding villages and habitation. The water bodies cover 13% of the total area. Some of the water bodies are Gundlakamma river, Vala Eru and Venkatamma Cheruvu.
9. The base line study for evaluation of the flora and fauna bio diversity of the terrestrial environment of the study area was carried out within 10 km radius of the proposed plant.
10. The assessment of flora and fauna of the study area was done as per the MoEFCC guidelines. Statistical analysis was conducted near the 2 reserve forests present in the

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study area. A reconnaissance survey has been made randomly to observe the ecologically sensitive habitats during monsoon season 2018.

The proposed project site is a private land with no vegetation. Few weed species are present here. The entire area is with terrestrial vegetation is without any forest or agriculture land and it was devoid of any ecologically sensitive biological resources. No REET species present in the core zone. No migratory corridors or breeding grounds for faunal species present here. The common butterflies, dragonflies, lizards, birds and smaller mammals are observed.

Buffer zone is mostly with human habitations and agricultural fields. *Azadirachta indica*, *Ficus hispida*, *Borassus flabellifer*, *Prosopis juliflora*, *Pongamia pinnata*, *Dalbergia sisoo*, *Phoenix sylvestris*, *Albizia lebbeck*, *Acacia nilotica* are dominant here. Eucalyptus is widely spread over buffer zone. Some scattered bushes of *Euphorbia tirucalli*, *Balanites roxburghii*, *Opuntia dillenii*, *Prosopis juliflora*, *Datura metel* and *Zizyphus numularia* are also predominant here. *Pergularia daemia* and *Ipomoea nil* are climbers commonly present here.

11. The Socio Economic Impact Assessment has been done based on (secondary data collected from Census 2001-2011) covering around 20 villages in and around the project site. Among these, 50% villages fall in Nuzendla Mandal, 25% in Vinukonda Mandal and rest 25% fall in five Mandals having one village for each Mandal (Thullur, Chebrolu, Ponnur, Rapalle, Rompicheria). Thus macro level study has been carried out in the radial distance 10 km for Nuzendla and Vinukonda Mandal of Guntur district as 75% of the villages falls in two mandals. The villages/towns within the 10 km from the project site shows public amenities like presence of Govt. Primary School, Telephone/mobile, Self Help Groups and regular power supply are present in almost 100% of villages. Further, presence of Anganwadi centre and Metal road are present in 90-95% of the villages. While mode of public and private transportation is restricted among 85% of the villages, treated water piped supply is restricted in 70% of the villages and Total Sanitation Campaign is witnessed among 60% of the villages. The presence of river and canal is restricted in only 15% of the villages. The other public amenities like Govt. PHC/SC, presence of community centre, commercial bank and Agricultural Credit Society are only among 5% of the villages. Technical training centres like ITI is totally absent in the study area

11.4 IMPACT ASSESSMENT

1. Impact identification matrix has been developed by establishing cause-effect relationship between activities of project and environmental attributes and based on that, the adverse impact due to proposed project will be insignificant.
2. The waste water from the CBMWTF shall be collected in effluent collection tank and subjected to dosing for coagulation followed by primary settling tank. Waste water from primary settling tank shall be subjected to biological treatment. Biologically treated waste water shall be passed through pressure sand filter and activated carbon filter and the filtered water shall be recycled and reused as scrubbing media in incinerator

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scrubber. Thus there shall be no discharge of treated waste water on land / in surface water and facility will recycle entire treated waste water back to process. Sludge from effluent treatment plant will be sent to TSDF site.

3. Incinerator flue gas will be treated in Air Pollution Control System consisting of High Pressure Drop Venturi Scrubber and Packed Bed Scrubber for removal of Particulate Matter (PM) and acidic gases consisting of HCl. Clean flue gas will be vented to atmosphere through 30 m high stack. Modelling of pollutant emission (PM, HCl, NO_x) 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.
4. Incinerator Ash and ETP Sludge are hazardous solid wastes to be generated from plant. They will be stored in packed form in dedicated hazardous waste storage area and then disposed to TSDF site. Disinfected and shredded plastic and glass waste will be sent to authorized recyclers. Disinfected and shredded sharps shall be sent to iron foundries or to TSDF site for disposal. Spent activated carbon shall be sent to TSDF site. Used oil and used batteries will be sent to authorized recyclers. Thus, there will be disposal on land and hence no impact on soil.
5. The proponent will develop greenbelt of 33.63 % of land area of plant.
6. There are no notified ecological sensitive locations, migratory paths, sanctuaries etc. within the study area.
7. 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.
8. The socio-cultural and economic structure within the study area is also not likely to be affected by the proposed project. The manpower requirement for the proposed plant is expected to generate some permanent jobs and secondary jobs for the operation phase.
9. Risk assessment study has been conducted for the proposed project and the suggestions made in the report shall be implemented strictly to prevent any chances of environmental contamination and employee health & 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 monitoring of air, water, soil and land pollution to ensure that mitigation measures are effective and implemented to prevent / minimize anticipated impacts.

11.6 ENVIRONMENT MANAGEMENT CELL

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1. Qualified and experienced personnel in the field of environment pollution control shall be recruited as a plant in-charge for overall responsibility for plant operation and for looking after Environment, Health and Safety aspects of the plant. Plant in-charge will be directly reporting to management.
2. 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 report to plant in-charge. Lab in-charge will be responsible for implementation of Environmental Monitoring Plan.
3. Plant operators will report to plant in-charge and will be responsible for operation and maintenance of the facility in each shift of operation.
4. 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 is planned, considering stand by storage facility, availability of manpower, availability of maintenance tools, safety equipment and other required facilities.
5. Preventive maintenance schedule for plant machineries will be prepared and strictly followed on regular basis for effective and efficient operation of plant.
6. Training will be imparted to plant operating staff as well as waste transporters on regular basis.
7. All personnel working at plant will be provided with personnel protective equipment's (PPEs).
8. Adequate number of fire extinguishers will be provided in the plant as described in risk assessment study.

11.7 PROJECT BENEFITES

1. Project will provide direct and indirect employment to local people.
2. Project proponent has committed for economic and social development through CSR activities equivalent to 2 % of project cost in local area.
3. The proposed project facility will improve bio-medical waste disposal status in the district and will lead to better hygienic condition in area.

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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 & Engineers Pvt. Ltd. (ENPRO)
(B)	Address	306, Royal Park, Adajan Road, Surat-395009 Gujarat, INDIA
	Telephone	91-261-3295244
	Fax	91-261-2786129
	E-mail address	enpro.eia@enpro.co.in , rushabh@enpro.co.in
(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 (MoEF& CC).
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.
(E)	Accreditation & Recognition	

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1.		QCI-NABET Accredited EIA Consultant, (Certificate No. NABET/EIA/1922/SA 0125 Valid till 12 th January, 2022)
2.	 Certificate No. TC- 5885 (in lieu of T-1961)	NABL Accredited Environment Testing Laboratory, (Certificate No. TC- 5885 (In lieu of T-1961) Valid till 31 st May, 2022)
3.	 ISO 9001: 2015	Certificate No. QACS-A-EE-09.18.041 Valid till 29 th November, 2021
4.	 ISO 14001: 2015	Certificate No. QACS-EMS-EE-5953 Valid till 29 th November, 2021
5.	 ISO 45001: 2018	Certificate No. QACS-OH-EE-02955 Valid till 29 th November, 2021
6.	 Ministry of Environment, Forest & Climate Change	S.O.388(E), Sr. No. 147 Valid till 8 th February, 2022

(F) Analytical capability

The existing laboratory facilities are capable of estimation of following pollutants.

(1). For water and waste water

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

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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). Colour
21). Conductivity	22). Turbidity
23). Volatile & Fixed 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 Emissions

1. Suspended Particulate Matter
2. Sulphur Dioxide
3. Oxides of Nitrogen
4. Other process gases like HCl, Cl ₂ , NH ₃ etc.

(3). For Ambient Air

1. Sulphur Dioxide
2. Oxides of Nitrogen
3. PM _{2.5} , PM ₁₀
4. Other gases like HCl, Cl ₂ 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	24
2.	Dr. Dhaval Naik	Ph. D with Water Pollution	Sr. Scientist	Since 2001	18
3.	Ms. Nirupam Patnaik	B. E Civil (Elective – Env.Engg.)	Environment engineer	Since 2001	20

Annexure I
BMW Rules Compliance

**BIO MEDICAL WASTE (MANAGEMENT AND HANDLING) RULES, 2016 AND
ITS COMPLIANCE**

(Covered Related to Facility Operator)

Section	Clause / Rules	Condition	Compliance
Duties of the operator of a common bio-medical waste treatment and disposal facility	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.	The facility is proposed in line with CPCB guideline for establishment of CBMWTF.
	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. Same has been incorporated in section 2.6.2 of EIA report.
	c	Establish bar coding and global positioning system for handling of bio- medical waste within one year.	GPS tracking system shall be installed in vehicle. Barcoding system for waste is incorporated in project as per CPCB guideline. Same has been covered under section 2.6.2 in 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;	This condition is incorporated in proposed EMP under section 10.7.2 in EIA report.
	e	Provide training for all its workers involved in handling of bio-medical waste at the time of induction and at least once a year thereafter.	Training to be provided to all workers is covered in EMP under section 10.5.6 in EIA report.

	f	Assist the occupier in training conducted by them for bio-medical waste management;	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 in EIA report.
	g	Undertake appropriate medical examination at the time of induction and at least once in a year and immunise 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;	Appropriate medical examination will be done during operation phase. However same has been mentioned in section 10.5.6 and in section 7.1.7.4 in 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;	Adequate PPEs will be provided to workers and same is referred in section 10.5.6 and in chapter 7.
	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;	This information is mentioned in section 7.1.6 of EIA report.
	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;	Log book will be maintained and same is incorporated in section 10.5 of EIA report.
	k	Allow occupier, who are giving waste for treatment to the operator, to see whether the treatment is carried out as per the rules;	This information is covered in EMP under section 10.7.2 in EIA report
	l	Shall display details of authorization, treatment, annual report etc. on its web-site.	This information is provided under section 10.7.2 in EIA report.
	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	Information is provided under Section 2.9 in EIA report.

		authorization or registration from the respective State Pollution Control Board or Pollution Control Committee;	
	n	supply non-chlorinated plastic coloured bags to the occupier on chargeable basis, if required;	This information is provided in Section 2.9 of EIA report.
	o	common bio-medical waste treatment facility shall ensure collection of biomedical waste on holidays also;	This information is provided in Section 2.9 of EIA report.
	p	maintain all record for operation of incineration, hydro or autoclaving for a period of five years.	This information is provided in Section 2.9 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.	Not Applicable
7. Treatment and disposal	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.	Adequate treatment units are provided to achieve this required.
	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: Provided that the lab and highly infectious bio-medical waste generated shall be pre-treated by equipment like autoclave or microwave.	Facility will provide training to occupier.
	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 kilometer.	Not Applicable
	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 authorisation given by the prescribed	Not Applicable.

		authority.	
	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.	Treatment technology as per Schedule I is included in facility.
	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.	Not applicable
	7	Every operator of common bio-medical waste treatment facility shall set up requisite biomedical waste treatment equipments like incinerator, autoclave or microwave, shredder and effluent treatment plant as a part of treatment, prior to commencement of its operation.	These units are incorporated in facility.
	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.	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.	All recyclables after autoclaving and shredding will be sent to authorized recyclers only as mentioned in EIA report
	10	The Occupier or Operator of a common	This information is

		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.	covered in section 10.5.7 of EIA report.
	11	The handling and disposal of all the mercury waste and lead waste shall be in accordance with the respective rules and regulations.	For these waste dedicated storage area is provided at facility.
8. Segregation, packaging, transportation and storage	1	No untreated bio-medical waste shall be mixed with other wastes.	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.	A separate color coded bags are 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.	This provision is incorporated in section 10.5.7 in 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.	GPS tracking system shall be installed in vehicle. Barcoding system for waste is incorporated in project as per CPCB guideline. Same is incorporated in section 2.6.2 in 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 with necessary information as specified in part 'B' of the Schedule IV.	This provision is mentioned in EMP under section 10.7.2 of EIA report.
	6	The vehicles used for transportation of bio-medical waste shall comply with the	This provision is covered in EMP under section

		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.	10.5 of EIA report.
	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>This provision is mentioned in section 10.5.1 of EIA report.</p> <p>Occupier shall be instructed and trained accordingly.</p> <p>Provision is mentioned in section 10.7.2 in EIA report.</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.	Provision in mentioned in section 10.7.2 in EIA report.
10. Procedure for authorization		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 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.	Proponent shall make application after EMP.
	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.	--

	2	In case of refusal of renewal, cancellation or suspension of the authorization by the prescribed authority, the reasons shall be recorded in writing: Provided that the prescribed authority shall give an opportunity of being heard to the applicant before such refusal of the authorization.	--
	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.	--
	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 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.	Proponent shall comply and said information is mentioned in EMP under section 10.7.2 of EIA report.
13. Annual report	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 30th June of every year.	Provision is mentioned in section 10.7.2. in 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 31st July of every year.	Not Applicable
	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 31st August every year.	Not Applicable
	4	The Annual Reports shall also be available online on the websites of Occupiers, State Pollution Control Boards and Central	Not Applicable

		Pollution Control Board.	
14. Maintenance of records	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 as the case may be.	Provision for same is mentioned in section 10.7.2 in EIA report.
	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.	Not Applicable
15. Accident reporting	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 in case of major accident is mentioned in section 10.3.3 in EIA report.
	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.	It is covered in EMP as section 10.7.2 in EIA report.
16. Appeal		As per BMW 2016 rule. Sub points 1 to 4	Not Applicable to facility.
17. Site for common bio-medical waste treatment and disposal facility	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.	Proposed site is selected considering given guidelines. Information is provided in Section 5.1 in EIA report.

Annexure II
CPCB Rules Compliance

COMPLIANCE REPORT FOR CPCB GUIDLINE OF BIO-MEDICAL WASTE TREATMENT AND DISPOSAL FACILITIES, 2016.

SR. NO.	REQUIREMENT AS PER CPCB GUIDELINES FOR BMW FACILITY	COMPLIANCE
1	Location of the CBWTF	Nearest residential area is Tana Annavaram Village at 0.60 km in NE direction which is more than buffer distance of 500 m as per guideline.
2	Proposed land area for CBWTF	3.3 Acre
3	Proposed coverage area of the CBWTF	
	a) Any facility located up to a radius of 75 KM from the proposed locality	No
	b) No. of beds covered by the existing facility:	13683
c) Is locality requires any additional capacity (within a radius of 75 KMs)?.	Present facility covers 13683 beds and does not cover about 4061 beds. So, it is necessary to establish a new bio medical treatment facility in the region. (Ref letter of APPCB is : letter no. 1/APPCB/HO/UH-IV/BMW/In-Principle/2018, dated 23/05/2018, giving in principle approval)	
4	Requirement of Treatment facility to be provided.	
	a) Incineration	Facility consist of Incinerator of 330 kg/hr, Autoclave of 750 Liter capacity, Shredder of 2 x 150 kg/hr capacity. Facility also consist of ETP of 15.5 KL/Day facility, vehicle washing area and sharp pit.
	b) Autoclave	
	c) Shredder	
	d) Sharp pit	
	e) Vehicle washing	
	f) Floor washing	
g) ETP		
5	Segregation of BMW	Waste will be collected in segregated form from waste generator. Facility will provide necessary training to generator. Waste once received at site will be stored in dedicated storage area and then taken for disposal. In general Bio-medical Waste Management Rules, 2016 and CPCB guideline will be followed.

<p>6</p>	<p>Collection of waste</p>	<p>Respective coloured bags with bar code shall be kept in similar coloured container i.e. coloured bags shall not be directly kept in vehicle.</p> <p>(ii) Sharps shall be collected in puncture resistant, leak proof, rigid containers.</p> <p>(iii) Temporary storage at healthcare unit shall be designated.</p>
<p>7</p>	<p>Transport Vehicle</p>	<ul style="list-style-type: none"> a) Dedicated vehicles for collection of Bio-medical waste shall be provided. b) Separate cabins shall be provided for driver/staff and BMW containers c) The base of the waste cabin shall be leak proof to avoid pilferage of liquid during transportation d) The waste cabin will be designed for storing waste containers in tiers e) The inner surface of the waste cabin will be made of smooth surface to minimize water retention f) The waste cabin shall have provisions of sufficient openings in the rear and/or sides so that waste containers can be easily loaded and unloaded g) Vehicle shall be provided with GPS based tracking system for movement records and tracking. <p>The vehicle shall be labeled with the bio-hazard symbol (as per Schedule IV of BMW Rules) and should display the name, address and telephone number of the CBWTF</p>
<p>8</p>	<p>Storage</p>	<p>The flooring and walls (to a height of 2M from floor) shall be finished with smooth and fine material.</p> <p>Sufficient ventilated storage shall be provided.</p>

9	Record Keeping	<p>Documents such as collection advice taken from health care units for each category of waste, records of waste movements, logbook for the equipment and site records shall be maintained. CPCB guideline for Barcode system shall be implemented.</p> <p>All the record (five year) will be prepared and available at the CBWTF site for inspection</p>
10	Treated Waste Disposal method	<p>Incineration ash – (90 kg/day) Secured landfill/near by TSDF</p> <p>ETP Sludge – (15 kg/day) Secured landfill/near by TSDF</p> <p>Glass and Plastic waste after disinfection and shredding – (3 T/Day) will be sent to Registered Recycling Unit</p> <p>Spent activated carbon – (50 kg/month) will be send to TSDF site</p> <p>Sharps after disinfection and shredding – (5 kg/day) shall be sent to iron foundry for recycling or to TSDF site.</p> <p>Waste oil – (15 L/month) shall be send to authorized recycler</p> <p>Used batteries – (4 nos./year) shall be send to authorized recycler</p>
11	Whether the proponent obtained EC as per EIA 2006 and the amendments made thereof	To be obtained.
12	Estimated Energy Consumption	75 KVA
13	Estimated Fuel Consumption	<p>LDO – 4 to 5 Litres/Hr (Incinerator – 330 Kg/Hr)</p> <p>Furnace oil – 16.3 Litres/Hr (DG Set –65 KVA)</p>
14	Whether the proponent obtained necessary approvals from the concerned departments as required	In principle approval obtained from APPCB for the facility vied letter no. 1/APPCB/HO/UH-IV/BMW/In-Principle/2018, dated 23/05/2018, giving in principle approval.

15	Whether the proposal recommended for issuing consent to establish	To be apply after obtaining EC.
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Annexure III
In-principle Letter of APPCB

**ANDHRA PRADESH POLLUTION CONTROL BOARD**

D.no-33-26-14d/2. Near sunrise hospital, pushpa hotel center,
Chalamalavari street, Kasturibaipet, Vijayawada -520 008.
Website : www.appcb.ap.nic.in

Lr.No.1/APPCB/ HO/UH-IV/ BMW/ In-Principle/2018-**Dt: 23.05.2018**

Sub:	APPCB - UH:IV - BMW - M/s. Y.J. Multi Clave, Sy.No. 7/1, 8/1,Tana Annavaram, Tellabadu Village, Nuzendla Mandal, Guntur District - <u>In-Principle Permission</u> - Issued - Reg.
Ref:	<ol style="list-style-type: none">1. CFE application of M/s. Y.J. Multi Clave received at RO: Guntur on 01.12.2015.2. T.O. Lr No APPCB/VJA/GTR/3/HO/CBMWTF/2016 dt 28.12.2015.3. Lr.No. SEIAA/ AP/ AP/ GNT/IND 05/2016/84- dt 13.07.2016.4. Industries request letter dt 16.07.2016.5. District Medical and Health Officer letter dt.14.10.2016.6. Minutes of 15th Bio Medical Waste Technical Committee Meeting held on 22.05.2018.

@@@@@@

This has references to the above cited, wherein you have requested the Board for issue of the In-Principle Permission for Establishment of Second Common Bio Medical Treatment Facility at Sy.No. 7/1, 8/1,Tana Annavaram, Tellabadu Village, Nuzendla Mandal, Guntur District for obtaining Environmental Clearance from the SEAC & SEIAA, Andhra Pradesh.

Based on the EE: RO Guntur report dated 19.10.2016 it was noted that the Total no. of Health Care Facilities (HCFs) and their bed strength as per the registering authority i.e. **The District Medical & Health Officer (DM&HO)** (vide lr dt 14.10.2016) - **there are 541 Nos of Private Hospitals with a Bed strength of 17,744 Nos** (excluding Government Hospitals i.e. HCFs covered under APVVP Area Hospitals, Director of Public Health and Family Welfare and Department of AYUSH).

The existing Common Bio Medical Treatment Facility (CBMWTF) in Guntur District is covering 700 Nos of Health Care Facilities (HCFs) with 13,683 bed strength (as per the BMW annual report 2016 submitted to CPCB). There are about 4061 numbers of beds uncovered by the exiting CBMWTF. There are number of Veterinary Hospitals, Dispensaries, Dental Hospitals, Ayurvedic and Homeopathic Hospitals which need to be covered under BMWM Rules, 2016.

After careful examination on the **bed strength as per the registering authority i.e. The District Medical & Health Officer (DM&HO)** and the reports dt.13.02.2017 and 17.04.2018 submitted by the JCEE: ZO-Kurnool, EE:RO-Guntur respectively, the Board is hereby issues **In-Principle Permission** for the establishment of second Bio Medical Treatment Facility at Guntur District. Further, the proponent shall obtain all the necessary Clearances including Environmental Clearance (EC) from MoEF&CC, GoI / SEIAA, AP under the relevant Environmental Laws in force.

Sd/-
Member Secretary

To
M/s. Y.J. Multi Clave,
Sri.T.Hari Krishna,Manager
H.No. 1 - 12 -52, R&B Road,
Ponnur, Guntur District - 522 124.
harikpnr@gmail.com.

Copy to:

The JCEE, ZO: Vijayawada for information and necessary action.
The EE, RO: Guntur for information and necessary action.

//T.C.F.B.O//

Wlas 24/5/18

Joint Chief Environmental Engineer
UH-IV

Annexure IV
Demographic Details of the Study Area

Table 1: Demographic details of the project area in 5 km radial distance from the project site

Sr.	Village/Town	Population	Pop_den_km	Sex ratio	Sex ratio_0-6	% of SC Pop	% of ST Pop	Total Liter_ rate	Fem_Lit_ Rate	Work_Pra_ rate	%Main_Work	%Marg_Work
1	Yerrampalem	110	65	1245	1667	4.5	94.5	47.3	44.3	84.5	55.9	44.1
2	Surampalem	414	86	962	1000	0.0	97.8	38.9	34.5	66.2	39.4	60.6
3	Venkatapuram	1426	431	1014	810	15.7	1.3	64.2	63.9	37.9	94.3	5.7
4	Doddigunta	4467	367	948	920	23.6	0.4	50.0	50.4	40.6	93.8	6.2
5	Singampalle	3958	623	889	934	11.4	0.4	52.2	50.9	41.1	66.5	33.5
6	Biccavolu	14278	726	1040	967	15.4	2.2	65.1	60.7	39.8	96.9	3.1
7	Thummalapalle	450	259	1018	792	100.	0.0	72.2	70.9	53.1	52.3	47.7
8	Nallamilli	2106	411	989	1191	22.5	0.0	48.8	51.9	38.2	85.7	14.3
9	Rangapuram	4820	652	1028	860	17.1	0.0	39.8	37.3	54.0	87.2	12.8
10	Anuru	6337	412	949	994	27.3	0.3	50.1	51.5	43.0	88.2	11.8
11	Patharamavaram	406	231	1171	1031	1.2	91.4	51.0	44.7	69.5	100.0	0.0
12	G. Medapadu	9692	541	1033	984	14.3	0.6	57.0	54.1	44.6	96.7	3.3
13	Chinabrahmadevam	2683	2217	910	842	10.1	0.0	46.7	52.0	36.6	94.8	5.2
14	Vetlapalem	15757	801	1050	1009	20.6	0.5	58.6	56.9	42.8	90.7	9.3
15	Jaggammagaripeta R	2969	262	1021	1062	31.6	0.0	60.3	56.1	44.1	69.0	31.0
16	Kothuru	11957	541	1116	966	19.4	3.0	51.0	49.2	40.4	90.9	9.1
17	Rayabhupalapatnam	7725	514	1018	1022	28.6	0.0	50.6	50.5	39.7	96.6	3.4
18	Rameswaram	5218	676	1015	1098	28.2	0.7	73.2	68.1	42.2	81.8	18.2
19	Kotapadu	3839	333	970	914	19.0	0.1	51.0	50.2	40.5	62.8	37.2
20	Peddipalem	4011	400	1014	951	12.5	6.5	36.9	34.7	53.6	88.1	11.9
21	Vetlapalem	15757	801	1050	1009	20.6	0.5	58.6	56.9	42.8	90.7	9.3
22	G. Ragampeta	4882	568	1004	1036	26.5	0.1	62.0	59.7	38.5	66.1	33.9
23	Valuthimmapuram	1550	254	1037	924	85.1	0.0	50.2	50.8	51.0	88.1	11.9
24	Kattamuru	8980	944	988	896	14.5	0.4	55.2	54.1	37.3	93.8	6.2
25	Subbampeta	1242	1365	1070	1113	0.0	0.0	48.3	46.4	47.7	71.5	28.5
26	Marripudi	3250	288	996	1094	28.5	0.0	48.8	49.9	41.2	91.9	8.1
27	Madupalle	2764	429	999	870	35.1	0.2	70.0	66.0	43.0	75.1	24.9

Source: District Census Handbook of Guntur district, 2011.

Table 2. Status of Quality of Life for the project area in 5 km radial distance from the project site

Village Name	Angan wadi	Govt. Primary School	Govt. Vocational Training Centre ITI	Govt. PHC & SC	Tap Water Untreated	River & Canal	Total Sanitation Campaign	Telephone / Mobile	Public/Pvt mode of transportation	Metal Road	Commercial Bank	Agriculture Credit Society	Community Centre	Self Help Groups	Electric Power Supply
Yerrampalem	1	1	2	2	2	2	1	1	1	1	2	2	2	1	1
Surampalem	1	1	2	2	2	2	1	1	1	1	2	2	2	1	1
Venkatapuram	1	1	2	2	2	1	1	1	1	1	2	2	2	1	1
Doddigunta	1	1	2	2	2	1	1	1	1	1	2	2	1	1	1
Singampalle	1	1	2	2	2	2	1	1	1	1	2	1	1	1	1
Biccavolu	1	1	2	1	2	2	1	1	1	1	1	1	1	1	1
Thummalapalle	1	1	2	2	2	2	1	1	1	1	2	2	2	1	1
Nallamilli	1	1	2	2	2	2	1	1	1	1	2	2	2	1	1
Rangapuram	1	1	2	2	2	2	1	1	1	1	2	2	2	1	1
Anuru	1	1	2	2	2	1	1	1	1	1	2	1	2	1	1
Patharamavaram	1	1	2	2	2	2	1	1	1	1	2	2	2	1	1
G. Medapadu	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1
Chandramampalle	1	1	2	2	2	1	1	1	1	1	2	2	1	1	1
Jaggammagaripeta R	1	1	2	2	2	1	1	1	1	1	2	2	1	1	1
Vetlapalem	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1
Kothuru	1	1	2	2	1	2	1	1	1	1	2	2	1	1	1
Rayabhupalapatnam	1	1	2	2	2	1	1	1	1	1	2	1	2	1	1
Rameswaram	1	1	2	2	2	2	1	1	1	1	2	1	2	1	1
Kotapadu	1	1	2	2	2	1	1	1	1	1	2	2	2	1	1
Peddipalem	1	1	2	2	2	2	1	1	1	1	2	1	1	1	1
Vetlapalem	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1
G. Ragampeta	1	1	2	2	2	1	1	1	1	1	2	2	1	1	1
Valuthimmapuram	1	1	2	2	1	1	1	1	1	1	2	2	2	1	1
Kattamuru	1	1	2	2	2	1	1	1	1	1	2	1	1	1	1
Subbampeta	1	1	2	2	1	2	1	1	1	1	2	2	1	1	1
Marripudi	1	1	2	2	2	1	1	1	1	1	1	2	1	1	1
Madupalle	1	1	2	2	1	1	1	1	1	1	2	2	2	1	1

NOTE: 1.Yes 2. No. The status verified in the Panchayat offices of sample villages and for other villages - source: District Census Handbook of Guntur district, 2011.

Annexure V
NABL Certificate of Team Labs & Consultants



**National Accreditation Board for
Testing and Calibration Laboratories**

(A Constituent Board of Quality Council of India)



CERTIFICATE OF ACCREDITATION

TEAM LABS AND CONSULTANTS

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2005

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

B-115, 116, 117 & 509, Annapurna Block, Aditya Enclave,
Ameerpet, Hyderabad, Telangana

in the field of

TESTING

Certificate Number TC-5087

Issue Date 19/12/2018

Valid Until 18/12/2020

"In view of the transition for ISO/IEC 17025:2017, the validity of this certificate will cease on 30.11.2020"

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)

Signed for and on behalf of NABL



89076970100030002279

Anil Relia

Anil Relia
Chief Executive Officer



National Accreditation Board for
Testing and Calibration Laboratories

CERTIFICATE OF ACCREDITATION

TEAM LABS AND CONSULTANTS

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

B-115,116,117 & 509, ANNAPURNA BLOCK, ADITYA ENCLAVE, AMEERPET, HYDERABAD, TELANGANA,
INDIA

in the field of

TESTING

Certificate Number: TC-5087

Issue Date: 27/11/2020

Valid Until: 18/12/2020*

* The validity is extended for one year up to 18.12.2021

*Transition to 2017 version completed w.e.f 27.11.2020 valid until 18.12.2021

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)

Name of Legal Identity : TEAM LABS AND CONSULTANTS

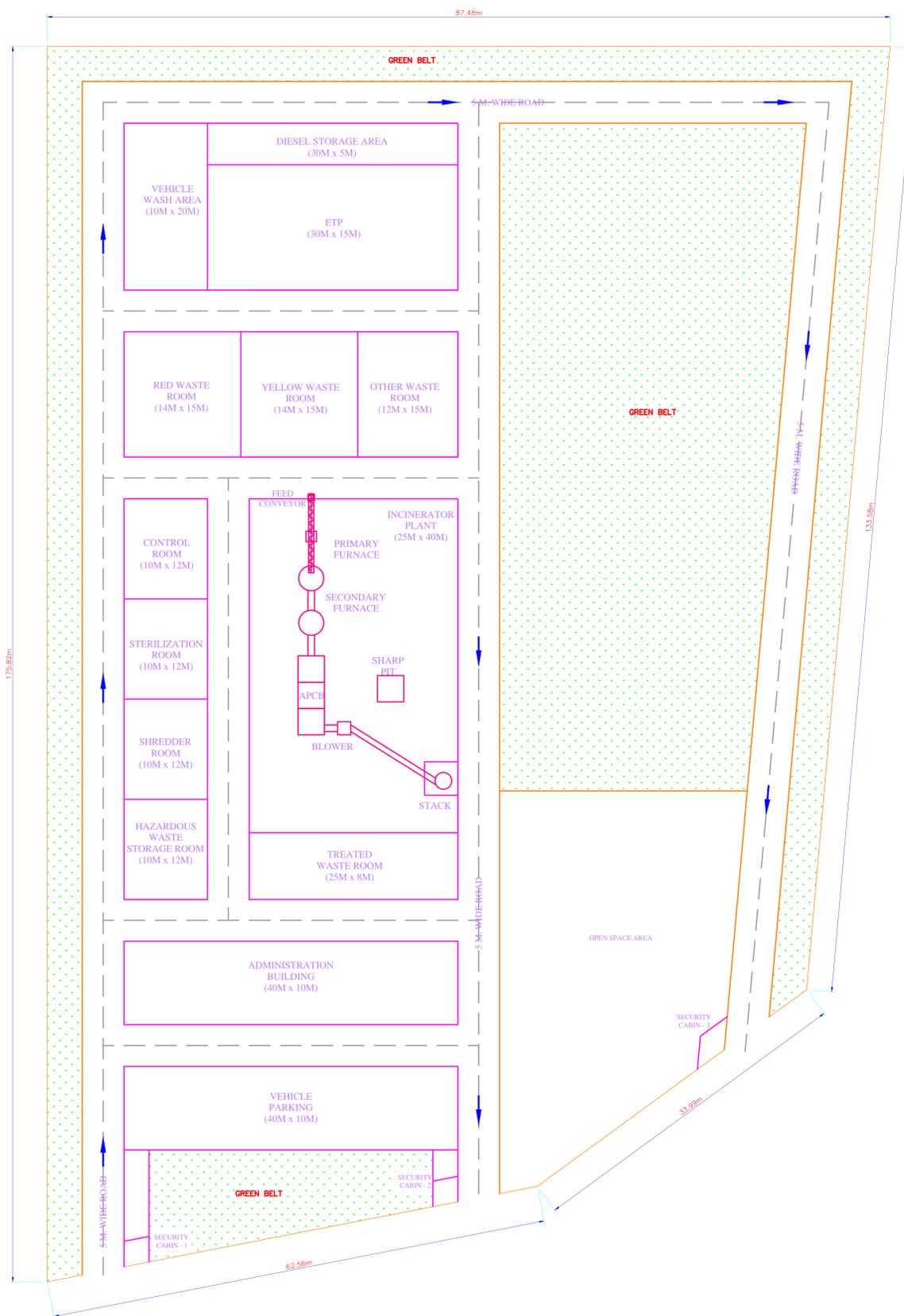
Signed for and on behalf of NABL



N. Venkateswaran
Chief Executive Officer

Annexure VI
Tentative Plant Layout

STATEMENT OF AREAS		
S.N	DESCRIPTION	AREA
1	INCINERATOR PLANT	1000 Sqm.
2	INCINERATOR CHIMNEY	16 Sqm.
3	DIESEL STORAGE AREA	150 Sqm.
4	E.T.P	450 Sqm.
5	VEHICLE WASH	200 Sqm.
6	RED WASTE ROOM	210 Sqm.
7	YELLOW WASTE ROOM	210 Sqm.
8	OTHER WASTE ROOM	180 Sqm.
9	TREATED WASTE ROOM	200 Sqm.
10	CONTROL ROOM	120 Sqm.
11	STERILIZATION ROOM	120 Sqm.
12	SHREDDER ROOM	120 Sqm.
13	HAZARDOUS WASTE STORAGE ROOM	120 Sqm.
14	ADMINISTRATION BUILDING	400 Sqm.
15	VEHICLE PARKING	400 Sqm.
16	GREEN BELT	4491.9 Sqm.
17	ROADS & OPEN SPACE AREA	4936.5 Sqm.
18	SECURITY	30.2 Sqm.
TOTAL SITE AREA		13354.6 Sqm.



Annexure VII
Form-1 as per BMW rules 2016

		<p>(vii) Undertake or support research or operational research regarding bio-medical waste management.</p> <p>(viii) Any other function under these rules assigned by Ministry of Environment, Forest and Climate Change or Central Pollution Control Board from time to time.</p> <p>(ix) Implementation of recommendations of the Advisory Committee.</p> <p>(x) Publish the list of Registered or Authorised (or give consent) Recyclers.</p> <p>(xi) Undertake and support third party audits of the common bio-medical waste treatment facilities in their State.</p>
7	Municipalities or Corporations, Urban Local Bodies and Gram Panchayats	<p>(i) Provide or allocate suitable land for development of common bio-medical waste treatment facilities in their respective jurisdictions as per the guidelines of Central Pollution Control Board.</p> <p>(ii) Collect other solid waste (other than the bio-medical waste) from the health care facilities as per the Municipal Solid Waste (Management and handling) Rules, 2000 or as amended time to time.</p> <p>(iii) Any other function stipulated under these Rules.</p>

SCHEDULE IV

[See rule 8(3) and (5)]

Part A

LABEL FOR BIO-MEDICAL WASTE CONTAINERS or BAGS



HANDLE WITH CARE

CYTOTOXIC HAZARD SYMBOL



HANDLE WITH CARE

Part B

LABEL FOR TRANSPORTING BIO-MEDICAL WASTE BAGS OR CONTAINERS

DayMonth

Year

Date of generation

Waste category Number

Waste quantity.....

Sender's Name and Address

Phone Number

Receiver's Name and Address:

Phone Number

Fax Number.....

Fax Number

Contact Person

Contact Person

In case of emergency please contact :

Name and Address :

Phone No.

Note :Label shall be non-washable and prominently visible.

FORM - I

[(See rule 4(o), 5(i) and 15 (2))]

ACCIDENT REPORTING

1. Date and time of accident :
2. Type of Accident :
3. Sequence of events leading to accident :
4. Has the Authority been informed immediately :
5. The type of waste involved in accident :
6. Assessment of the effects of the accidents on human health and the environment:
7. Emergency measures taken :
8. Steps taken to alleviate the effects of accidents :
9. Steps taken to prevent the recurrence of such an accident :
10. Does you facility has an Emergency Control policy? If yes give details:

Date :

Signature

Place:

Designation

FORM - II**(See rule10)****APPLICATION FOR AUTHORISATION OR RENEWAL OF AUTHORISATION**

(To be submitted by occupier of health care facility or common bio-medical waste treatment facility)

To

The Prescribed Authority
(Name of the State or UT Administration)
Address.

1. Particulars of Applicant:

(i) Name of the Applicant:
(In block letters & in full)

(ii) Name of the health care facility (HCF) or common bio-medical waste treatment facility (CBWTF) :

(iii) Address for correspondence:

(iv) Tele No., Fax No.:

(v) Email:

(vi) Website Address:

2. Activity for which authorisation is sought:

Activity	Please tick
Generation, segregation	
Collection,	
Storage	
packaging	
Reception	
Transportation	
Treatment or processing or conversion	
Recycling	
Disposal or destruction	
use	
offering for sale, transfer	
Any other form of handling	

3. Application for fresh or renewal of authorisation (please tick whatever is applicable):

(i) Applied for CTO/CTE Yes/No

(ii) In case of renewal previous authorisation number and date:

(iii) Status of Consents:

(a) under the Water (Prevention and Control of Pollution) Act, 1974

(b) under the Air (Prevention and Control of Pollution) Act, 1981:

4. (i) Address of the health care facility (HCF) or common bio-medical waste treatment facility (CBWTF):

(ii) GPS coordinates of health care facility (HCF) or common bio-medical waste treatment facility (CBWTF):

5. Details of health care facility (HCF) or common bio-medical waste treatment facility (CBWTF):

(i) Number of beds of HCF:

(ii) Number of patients treated per month by HCF:

(iii) Number healthcare facilities covered by CBMWTF: _____

(iv) No of beds covered by CBMWTF: _____

(v) Installed treatment and disposal capacity of CBMWTF: _____ Kg per day

(vi) Quantity of biomedical waste treated or disposed by CBMWTF: _____ Kg/ day

(vii) Area or distance covered by CBMWTF: _____

(pl. attach map a map with GPS locations of CBMWTF and area of coverage)

(viii) Quantity of Biomedical waste handled, treated or disposed:

Category	Type of Waste	Quantity Generated or Collected, kg/day	Method of Treatment and Disposal (Refer Schedule-I)
(1)	(2)	(3)	(4)
Yellow	(a) Human Anatomical Waste:		
	(b) Animal Anatomical Waste :		
	(c) Soiled Waste:		
	(d) Expired or Discarded Medicines:		
	(e) Chemical Solid Waste:		
	(f) Chemical Liquid Waste :		

	(g) Discarded linen, mattresses, beddings contaminated with blood or body fluid.		
	(h) Microbiology, Biotechnology and other clinical laboratory waste:		
Red	Contaminated Waste (Recyclable)		
White (Translucent)	Waste sharps including Metals:		
Blue	Glassware:		
	Metallic Body Implants		

6. Brief description of arrangements for handling of biomedical waste (attach details):

- (i) Mode of transportation (if any) of bio-medical waste:
(ii) Details of treatment equipment (please give details such as the number, type & capacity of each unit)

No of units Capacity of each unit

Incinerators :
Plasma Pyrolysis:
Autoclaves:
Microwave:
Hydroclave:
Shredder:
Needle tip cutter or destroyer
Sharps encapsulation or
concrete pit:
Deep burial pits:
Chemical disinfection:
Any other treatment
equipment:

7. Contingency plan of common bio-medical waste treatment facility (CBWTF)(attach documents):

8. Details of directions or notices or legal actions if any during the period of earlier authorisation

9. Declaration

I do hereby declare that the statements made and information given above are true to the best of my knowledge and belief and that I have not concealed any information.

I do also hereby undertake to provide any further information sought by the prescribed authority in relation to these rules and to fulfill any conditions stipulated by the prescribed authority.

Date :

Signature of the Applicant

Place :

Designation of the Applicant

FORM -III

(See rule 10)

AUTHORISATION

(Authorisation for operating a facility for generation, collection, reception, treatment, storage, transport and disposal of biomedical wastes)

1. File number of authorisation and date of issue.....

2. M/s _____ an occupier or operator of the facility located at _____ is hereby granted an authorisation for;

Activity
Generation, segregation
Collection,
Storage
packaging

Please tick

Reception
 Transportation
 Treatment or processing or conversion
 Recycling
 Disposal or destruction
 use
 offering for sale, transfer
 Any other form of handling

3. M/s _____ is hereby authorized for handling of biomedical waste as per the capacity given below;

- (i) Number of beds of HCF:
- (ii) Number healthcare facilities covered by CBMWTF: _____
- (iii) Installed treatment and disposal capacity: _____ Kg per day
- (iv) Area or distance covered by CBMWTF: _____

(v) Quantity of Biomedical waste handled, treated or disposed:

Type of Waste	Category	Quantity permitted for Handling
Yellow		
Red		
White (Translucent)		
Blue		

4. This authorisation shall be in force for a period of Years from the date of issue.

5. This authorisation is subject to the conditions stated below and to such other conditions as may be specified in the rules for the time being in force under the Environment (Protection) Act, 1986.

Date

Signature.....

Place:

Designation

*Terms and conditions of authorisation **

1. The authorisation shall comply with the provisions of the Environment (Protection) Act, 1986 and the rules made there under.
2. The authorisation or its renewal shall be produced for inspection at the request of an officer authorised by the prescribed authority.
3. The person authorized shall not rent, lend, sell, transfer or otherwise transport the biomedical wastes without obtaining prior permission of the prescribed authority.
4. Any unauthorised change in personnel, equipment or working conditions as mentioned in the application by the person authorised shall constitute a breach of his authorisation.
5. It is the duty of the authorised person to take prior permission of the prescribed authority to close down the facility and such other terms and conditions may be stipulated by the prescribed authority.

Form - IV

(See rule 13)

ANNUAL REPORT

[To be submitted to the prescribed authority on or before 30th June every year for the period from January to December of the preceding year, by the occupier of health care facility (HCF) or common bio-medical waste treatment facility (CBWTF)]

Annexure VIII
ENPRO-NABET Certificate



Quality Council of India

National Accreditation Board for
Education & Training



Certificate of Accreditation

Enpro Enviro Tech and Engineers Pvt Ltd, Surat

306 Royal Park, Near Deepa Complex
Adajan Road Surat-395009

are accredited as Category - A organization under the QCI-NABET Scheme for Accreditation of EIA Consultant Organizations: Version 3 for preparing EIA/EMP reports in the following sectors:

Sl.No.	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1	Metallurgical industries (ferrous & nonferrous) – both primary and secondary	8	3 (a)	A
2	Chlor-alkali industry	13	4(d)	B
3	Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates)	21	5 (f)	A
4	Isolated storage & handling of hazardous chemicals (As per threshold planning quantity indicated in column 3 of Schedule 2 & 3 of MSIHC Rules 1989 amended 2000)	28	6 (b)	B
5	Common hazardous waste treatment, storage and disposal facilities (TSDFs)	32	7 (d)	A
	Biomedical Waste Treatment Facilities	32A	7(da)	B
6	Common effluent treatment plants (CETPs)	36	7 (h)	B
7	Common municipal solid waste management facility (CMSWMF)	37	7 (i)	B

Note: Name of approved EIA Coordinators and Functional Area Experts are mentioned in SA AC minutes dated July 14, 2017 posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACO/17/0395 dated Sep 11, 2017. The accreditation needs to be renewed before the expiry date by Enpro Enviro Tech and Engineers Pvt Ltd., following due process of assessment.

Sr. Director I NABET
Dated: Sep 11, 2017

Certificate No.
NABET/EIA/1619/ SA 044

Validity till date
Jan 10, 2019

For the updated List of Accredited Consultants with approved sectors please refer QCI-NABET website.



**National Accreditation Board
for Education and Training**

(Member - International Accreditation Forum & Pacific Accreditation Cooperation)



January 09, 2019

QCI/NABET/EIA/ACO/19/0884

Enpro Envirotech & Engineers Pvt. Ltd.

306, Royal Park, Near Deepa Complex,
Adajan Road, Surat-395009

(Kind Attention: Sh. Paresh Mevawala)

Sub: Validity of Accreditation

Dear Sir,

This has reference to the accreditation of your organization under QCI-NABET EIA Scheme, the validity of **Enpro Envirotech & Engineers Pvt. Ltd., Surat** is hereby extended till July 10, 2019 or completion of assessment process, whichever is earlier.

The above extension is subject to the submission of required information/documents related to assessment on time to NABET.

You are requested not to use this letter after expiry of the above stated date.

With best regards,


A.K Jha
Senior Director | NABET



Quality Council of India

National Accreditation Board for
Education & Training



CERTIFICATE OF ACCREDITATION

Enpro Enviro Tech and Engineers Pvt. Ltd.

306, Royal Park, Nr. Deepa Complex, Adajan Road, Surat, Gujarat - 395009

Accredited as **Category - A** organization under the QCI-NABET Scheme for Accreditation of EIA Consultant Organizations: Version 3 for preparing EIA-EMP reports in the following Sectors:

Sl. No.	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1	Metallurgical industries (ferrous & non ferrous)	8	3 (a)	A
2	Chlor-alkali industry	13	4 (d)	B
3	Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates)	21	5 (f)	A
4	Isolated storage & handling of hazardous chemicals (As per threshold planning quantity indicated in column 3 of Schedule 2 & 3 of MSIHC Rules 1989 amended 2000)	28	6 (B)	B
5	Common hazardous waste treatment, storage and disposal facilities (TSDFs)	32	7 (d)	A
6	Bio-medical waste treatment facilities	32A	7 (da)	B
7	Common effluent treatment plants (CETPs)	36	7 (h)	B
8	Common Municipal Solid Waste Management Facility (CMSWMF)	37	7 (i)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated February 01, 2019 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/19/0939 dated March 27, 2019. The accreditation needs to be renewed before the expiry date by Enpro Enviro Tech and Engineers Pvt. Ltd., Surat, following due process of assessment.

Sr. Director, NABET
Dated: March 27, 2019

Certificate No.
NABET/ EIA/1922/ RA 0122

Valid till
12.01.2022

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.





Quality Council of India

National Accreditation Board for
Education & Training



Certificate of Accreditation

Enpro Enviro Tech and Engineers Pvt Ltd.

306, Royal Park, Nr. Deepa Complex, Adajan Road, Surat- 395009, Gujarat

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 –

Sl.No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1	Thermal power plants	4	1 (d)	A
2	Cement plants	9	3 (b)	A
3	Chlor-alkali industry	13	4 (d)	B
4	Pesticides industry and pesticide specific intermediates(excluding formulations)	17	5 (b)	A
5	Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates)	21	5 (f)	A
6	Pulp & paper industry excluding manufacturing of paper from wastepaper and manufacture of paper from ready pulp without bleaching	24	5 (i)	B
7	Isolated storage & handling of Hazardous chemicals (As per threshold planning quantity indicated in column 3 of schedule 2 & 3 of MSIHC Rules 1989 amended 2000)	28	6 (b)	B
8	Common hazardous waste treatment, storage and disposal facilities (TSDFs)	32	7(d)	A
9	Bio-medical waste treatment facilities	32A	7 (da)	B
10	Common Effluent Treatment Plants (CETPs)	36	7(h)	B
11	Common Municipal Solid Waste Management Facility (CMSWMF)	37	7(i)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in SA AC minutes dated Oct. 29, 2020 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/21/1594 dated January 09, 2021. The accreditation needs to be renewed before the expiry date by Enpro Enviro Tech and Engineers Pvt. Ltd., Surat following due process of assessment.

Sr. Director, NABET
Dated: Jan. 09, 2021

Certificate No.
NABET/EIA/1922/SA 0125

Valid up to
12-01-2022

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.

ANNEXURE IX
LIST OF PLANT SPECIES RECORDED

LIST OF PLANT SPECIES RECORDED (* indicates Secondary data)

S.No.	Botanical Name	Common name	Family	Habit
1	<i>Acacia auriculiformis Benth.</i>	Australia thumma	Leguminosae	Tree
2	<i>Acacia leucophloea (Roxb.)</i>	Tella thumma	Leguminosae	Tree
3	<i>Acacia nilotica (L.) Delile</i>	Nalla thumma	Leguminosae	Tree
4	<i>Ailanthus excelsa Roxb</i>	Pedda manu	Simaroubaceae	Tree
5	<i>Alangium salviifolium (L.f.) Wangerin</i>	Vuduga chettu	Cornaceae	Tree
6	<i>Albizia amara (Roxb.) B.Boivin</i>	Konda sigara	Leguminosae	Tree
7	<i>Albizia lebeck (L.) Benth.</i>		Leguminosae	Tree
8	<i>Alstonia scholaris R.BR</i>	Edakula pala	Apocynaceae	Tree
9	<i>Annona squamosa L.</i>	Seethapalam	Annonaceae	Tree
10	<i>Anthocephalus cadamba (Roxb.) Miq.</i>	Kadambe	Rubiaceae	Tree
11	<i>Atalantia monophylla A.DC</i>	Konda nimma	Ruteaceae	Tree
12	<i>Azadirachta indica A.Juss.</i>	Vepa	Meliaceae	Tree
13	<i>Balanitesa egyptiaca (L.) Delile</i>	Gara	Zygophyllaceae	Tree
14	<i>Bauhinia purpurea L.</i>	Bodhanta	Leguminosae	Tree
15	<i>Bauhinia racemosa Linn</i>	Chinnare	Fabaceae	Tree
16	<i>Borassus flabellifer L.</i>	Thadi chettu	Arecaceae	Tree
17	<i>Butea monosperma (Lam.) Taub.</i>	Modhuga	Leguminosae	Tree
18	<i>Carica papaya L.</i>	Bopaya chettu	Caricaceae	Tree
19	<i>Cassia fistula L.</i>	Rela	Leguminosae	Tree
20	<i>Cassia siamea Lam.</i>	Seema thangedu	Leguminosae	Tree
21	<i>Ceiba pentandra (L.) Gaertn</i>	Tella buruga	Malvaceae	Tree
22	<i>Chloroxylon swietenia DC</i>	Billika	Rutaceae	Tree
23	<i>Chukrasia tabularis</i>	Konda vepa	Meliaceae	Tree
24	<i>Citrus limon (L.) Burm. f.</i>	Nimma	Rutaceae	Tree
25	<i>Cocos nucifera L.</i>	Kobbari	Arecaceae	Tree
26	<i>Dalbergia sissoo DC.</i>	Sisu	Leguminosae	Tree
27	<i>Delonix regia (Hook.) Raf.</i>	Chittikesaram	Leguminosae	Tree
28	<i>Dendrocalamus strictus</i>	Sanna vedru	Graminae	Tree
29	<i>Diospyros melanoxylon Roxb.</i>		Ebenaceae	Tree
30	<i>Dolichandron eatrovirens (Roth) K.Schum.</i>		Bignoniaceae	Tree
31	<i>Eucalyptus hybrid</i>	Neelagiri thylam	Myrtaceae	Tree
32	<i>Ficus benghalensis L.</i>	Marri	Moraceae	Tree
33	<i>Ficus hispida L.f.</i>	Medipandu, Bemme du akulu	Moraceae	Tree
34	<i>Ficus microcape</i>		Moraceae	Tree
35	<i>Ficus racemosa</i>	Medi	Moraceae	Tree
36	<i>Ficus religiosa L.</i>	Ravi	Moraceae	Tree
37	<i>Givotia moluccana L. Sreem</i>	Tella Puniki	Euphorbiaceae	Tree
38	<i>Gmelina asiatica L.</i>		Lamiaceae	Tree
39	<i>Gyrocarpus americanus Jacq.</i>	Puniki	Hernandiaceae	Tree

S.No.	Botanical Name	Common name	Family	Habit
40	<i>Lannea coromandelica</i> (Houtt.) Merr.	Gumpena	Anacardiaceae	Tree
41	<i>Leucaena leucocephala</i> (Lam.) de Wit	Jabarichettu	Leguminosae	Tree
42	<i>Limonia acidissima</i> L.	Velaga	Rutaceae	Tree
43	<i>Madhuca indica</i> Gmel.		Sapotaceae	Tree
44	<i>Mangifera indica</i> L.	Mamidi	Anacardiaceae	Tree
45	<i>Morinda tinctoria</i> Roxb.	Maddichettu	Rubiaceae	Tree
46	<i>Murraya paniculata</i> (L.) Jack	Golimi	Rutaceae	Tree
47	<i>Musa paradisiaca</i> L.	Arati	Musaceae	Tree
48	<i>Nerium odoratum</i> Lam.	Erra ganneru	Apocynaceae	Tree
49	<i>Pavetta indica</i> L.	Lakkapapidi	Rubiaceae	Tree
50	<i>Peltophorum pterocarpum</i> (DC.) K. Heyne	Kondachintha	Leguminosae	Tree
51	<i>Phoenix sylvestris</i> (L.) Roxb.	Eethachettu	Arecaceae	Tree
52	<i>Phyllanthus emblica</i> L.	Usiri	Phyllanthaceae	Tree
53	<i>Pithecellobium dulce</i> (Roxb.) Benth.	Sima chinta	Leguminosae	Tree
54	<i>Plumeria alba</i> L.	Tella devaganneru	Apocynaceae	Tree
55	<i>Plumeria rubra</i> L.	Modu Ganneru	Apocynaceae	Tree
56	<i>Polyalthia longifolia</i> (Sonn.) Thwaites	Naramamidi	Annonaceae	Tree
57	<i>Pongamia pinnata</i> (L.) Pierre	Adivi ganuga	Leguminosae	Tree
58	<i>Prosopis chilensis</i> (Molina) Stuntz	Mulla thumma	Leguminosae	Tree
59	<i>Prosopis juliflora</i>	English tumma	Mimosaceae	Tree
60	<i>Psidium guajava</i> L.	Jama	Myrtaceae	Tree
61	<i>Pterospermum heyneanum</i> G. Don	Duddika	Malvaceae	Tree
62	<i>Samanea saman</i> (Jacq.) Merr.	Nidraganeeru	Sapindaceae	Tree
63	<i>Sapindus emarginatus</i> Vahl	Kunkudu	Sapindaceae	Tree
64	<i>Saraca asoca</i> (Roxb.) Willd	Asoka chettu	Leguminosae	Tree
65	<i>Soymida febrifuga</i> (Roxb.) A. Juss.	Somi	Meliaceae	Tree
66	<i>Syzygium cumini</i> (L.) Skeels	Neredu	Myrtaceae	Tree
67	<i>Tamarindus indica</i> L.	Chintha	Leguminosae	Tree
68	<i>Tecoma stans</i> (L.) Juss. ex Kunth	Pasupu ganneru	Bignoniaceae	Tree
69	<i>Tectona grandis</i> L.f.	Teak	Lamiaceae	Tree
70	<i>Terminalia catappa</i> L.	Badham	Combretaceae	Tree
71	<i>Thespecia populnea</i>	Ganga Raavi	Malvaceae	Tree
72	<i>Thevetia neriifolia</i>	Pacha ganneru	Apocynaceae	Tree
73	<i>Trema orientalis</i>	Boggu chettu	Ulmaceae	Tree
74	<i>Vitex negundo</i> L.	Vaavili	Verbenaceae	Tree
75	<i>Ziziphus mauritiana</i> Lam.	Reni	Rhamnaceae	Tree
76	<i>Abutilon indicum</i> (L.) Sweet	Thutturubenda	Malvaceae	Shrub
77	<i>Agave americana</i> L.	Gitta nara	Asparagaceae	Shrub
78	<i>Azima tetracantha</i> Lam	Telluppi	Zygophyllaceae	Shrub

S.No.	Botanical Name	Common name	Family	Habit
79	<i>Caesalpinia bonduc</i> (L.) Roxb.	Gacha podha	Leguminosae	Shrub
80	<i>Caesalpinia pulcherrima</i> (L.) Sw.	Rathna gandhi	Leguminosae	Shrub
81	<i>Calotropis gigantea</i> (L.) Dryand.	Tella jilledu	Apocynaceae	Shrub
82	<i>Calotropis procera</i> (Aiton) Dryand.	Erra jilledu	Apocynaceae	Shrub
83	<i>Capparis zeylanica</i> L.		Capparaceae	Shrub
84	<i>Caralluma adscendens</i> Roxb.	Kundeti kkommulu	Asclepidaceae	Shrub
85	<i>Carissa carandas</i> L.		Apocynaceae	Shrub
86	<i>Catunaregam spinosa</i> (Thunb.) Tirveng.		Rubiaceae	Shrub
87	<i>Clerodendrum phlomidis</i> L.f.	Kond-takal	Lamiaceae	Shrub
88	<i>Datura metel</i> L.	Nallummetta	Solanaceae	Shrub
89	<i>Dodonaea viscosa</i> Jacq.		Sapindaceae	Shrub
90	<i>Erythroxylon monogynum</i>	Dedaraaku	Erythroxylaceae	Shrub
91	<i>Euphorbia cactus</i>	Jemudu	Euphorbiaceae	Shrub
92	<i>Euphorbia tirucalli</i> L.	Tirukalli	Euphorbiaceae	Shrub
93	<i>Grewia flavescens</i> Juss.	Jana	Malvaceae	Shrub
94	<i>Grewia hirsuta</i> Vahl	Gundu bontha	Tiliaceae	Shrub
95	<i>Helicteres isora</i> L.	Gooba thadu	Malvaceae	Shrub
96	<i>Hibiscus rosa-sinensis</i> L.	Mandaram	Malvaceae	Shrub
97	<i>Hyptis suaveolens</i> (L.) Poit.	Danthitulasi	Lamiaceae	Shrub
98	<i>Ipomoea carnea</i> Jacq.	Rubber mokka	Convolvulaceae	Shrub
99	<i>Ixora coccinea</i>	Ramabanam	Rubiaceae	Shrub
100	<i>Jasminum roxburghianum</i> Wall. ex C.B. Clarke	Garuda malli	Oleaceae	Shrub
101	<i>Jatropha curcas</i> L.		Euphorbiaceae	Shrub
102	<i>Jatropha glandulifera</i> Roxb.	Yerranepalamu	Euphorbiaceae	Shrub
103	<i>Lantana camara</i> L.		Verbenaceae	Shrub
104	<i>Lawsonia inermis</i> L.	Gorintaku	Lythraceae	Shrub
105	<i>Leonotis nepetifolia</i> (L.) R.Br.	Rana bheri	Lamiaceae	Shrub
106	<i>Malachra capitata</i> L.	Yerribenda	Malvaceae	Shrub
107	<i>Morinda pubescens</i> Sm.		Rubiaceae	Shrub
108	<i>Opuntia dillenii</i> (Ker Gawl.) Haw.	Naga jamudu	Cactaceae	Shrub
109	<i>Phoenix acaulis</i>	Chitteetha	Palmae	Shrub
110	<i>Phyllanthus reticulatus</i> Poiret	Nalla Pulcheru	Euphorbiaceae	Shrub
111	<i>Randia dumetorum</i>		Rubiaceae	Shrub
112	<i>Senna auriculata</i> (L.) Roxb.	Tangedu	Leguminosae	Shrub
113	<i>Solanum pubescens</i> Willd.	Uchintha	Solanaceae	Shrub
114	<i>Wrightia tinctoria</i> (Roxb.) R.Br.,		Apocynaceae	Shrub
115	<i>Xanthium strumarium</i>	Marula-Mathangi	Asteraceae	Shrub
116	<i>Ziziphus oenopolia</i> (L.) Mill.	Parimi	Rhamnaceae	Shrub
117	<i>Azolla pinnata</i> subsp. <i>africana</i> (Desv.)		Salviniaceae	Hydrophyte

S.No.	Botanical Name	Common name	Family	Habit
118	<i>Eichornia crassipes Solms</i>		Pontederiaceae	Hydrophyte
119	<i>Hydrilla Rich.</i>		Hydrocharitaceae	Hydrophyte
120	<i>Ipomoea aquatica</i>	Thooti Koorra	Convolvulaceae	Hydrophyte
121	<i>Lemna minor Hegelm.</i>		Araceae	Hydrophyte
122	<i>Limnophila heterophylla R. Br.</i>		Plantaginaceae	Hydrophyte
123	<i>Marsilea quadrifolia L.</i>		Marsileaceae	Hydrophyte
124	<i>Operculina turpethum (L.) Silva Manso</i>	Erra Tegada	Convolvulaceae	Hydrophyte
125	<i>Typha angustata</i>	Jammu	Typhaceae	Hydrophyte
126	<i>Vallisneria L.</i>		Hydrocharitaceae	Hydrophyte
127	<i>Acalypha indica L.</i>		Euphorbiaceae	Herb
128	<i>Achyranthes aspera L</i>	Uttareni	Amaranthaceae	Herb
129	<i>Aerva lanata (L.) Juss</i>	Thelaga pindi	Amaranthaceae	Herb
130	<i>Aeschynomene aspera L</i>	Neeti jeeluga	Leguminosae	Herb
131	<i>Ageratum conyzoides (L.) L.</i>	Vasavi	Asteraceae	Herb
132	<i>Aloe vera</i>	Kithanara	Tiliaceae	Herb
133	<i>Alternanthera sessilis (L.) R.Br. ex DC.</i>	Ponagantiaku	Amaranthaceae	Herb
134	<i>Amaranthus spinosus L.</i>	Mulla thotakoora	Amaranthaceae	Herb
135	<i>Amaranthus viridis L.</i>	Chilakathotakoora	Amaranthaceae	Herb
136	<i>Andrographis paniculata Nees</i>	Nela vemu	Acanthaceae	Herb
137	<i>Argemone mexicana L.</i>	Brahmadandi	Papaveraceae	Herb
138	<i>Barleria prionitis L.</i>	Pachagorinta	Acanthaceae	Herb
139	<i>Blumea mollis (D. Don) Merr.</i>	Kukkapogaku	Asteraceae	Herb
140	<i>Boerhavia diffusa L.</i>	Atikimamidi	Nyctaginaceae	Herb
141	<i>Borreria hispida Spruce ex K.Schum.</i>		Rubiaceae	Herb
142	<i>Catharanthus roseus (L.) G.Don</i>	Billaganneru	Apocynaceae	Herb
143	<i>Cayratia auriculata Roxb.</i>	Cephichi Theega	Vitaceae	Herb
144	<i>Celosia virgata Jacq.</i>	Guruga	Amaranthaceae	Herb
145	<i>Cleome aspera J.König ex DC</i>		Cleomaceae	Herb
146	<i>Cleome viscosa L.</i>	Kukka vominta	Cleomaceae	Herb
147	<i>Crotalaria juncea L</i>	Janumu	Leguminosae	Herb
148	<i>Croton bonplandianus Baill.</i>	Vana mokka	Euphorbiaceae	Herb

S.No.	Botanical Name	Common name	Family	Habit
149	<i>Desmodium dichotomum</i> (Willd.) DC.		Leguminosae	Herb
150	<i>Eclipta alba</i> (L.) Hassk.	Guntagalagara	Asteraceae	Herb
151	<i>Elytraria acaulis</i> L.f.	Nalamarri	Acanthaceae	Herb
152	<i>Euphorbia antiquorum</i>	Bontha Jemudu	Euphorbiaceae	Herb
153	<i>Euphorbia hirta</i> L.	Nanubalu	Euphorbiaceae	Herb
154	<i>Evolvulus alsinoides</i> (L.) L		Convolvulaceae	Herb
155	<i>Gomphrena serrata</i> L.	Tella bendumalli	Amaranthaceae	Herb
156	<i>Hygrophila auriculata</i> (Schumach.) Heine	Mundla gobbi	Acanthaceae	Herb
157	<i>Indigofera hirsuta</i> L.	Kolapattitulu	Leguminosae	Herb
158	<i>Justicia procumbens</i> L.		Acanthaceae	Herb
159	<i>Leucas aspera</i>	Tummi	Lamiaceae	Herb
160	<i>Ludwigia perennis</i> L.	Lavangakaya mokka	Onagraceae	Herb
161	<i>Mimosa pudica</i> L.	Atthi pathi	Leguminosae	Herb
162	<i>Mollugo cerviana</i> (L.) Ser.		Molluginaceae	Herb
163	<i>Ocimum canum</i> Sims	Kukka Tulasi	Lamiaceae	Herb
164	<i>Oldenlandia umbellata</i> L.	Chiru veru	Rubiaceae	Herb
165	<i>Oxalis corniculata</i>	Indian Sorrel	Oxalidaceae	Herb
166	<i>Parthenium hysterophorus</i> L.	Vayyaribhama	Asteraceae	Herb
167	<i>Pavonia zeylanica</i> Cav.	Karubenda	Malvaceae	Herb
168	<i>Phyllanthus amarus</i> Schum.et Thonn	Nela Usiri	Euphorbiaceae	Herb
169	<i>Phyllanthus maderaspatensis</i> L.		Phyllanthaceae	Herb
170	<i>Plumbago zeylanica</i> L	Agnimaata	Plumbaginaceae	Herb
171	<i>Portulaca oleracea</i> L.	Pappu Kura	Portulacaceae	Herb
172	<i>Rhynchosia beddomei</i> Baker		Leguminosae	Herb
173	<i>Ruellia tuberosa</i> L.	Jurbula gadda	Acanthaceae	Herb
174	<i>Scoparia dulcis</i> L.	Potti boli	Plantaginaceae	Herb
175	<i>Sida acuta</i> Burm.f.	Medabirusaku	Malvaceae	Herb
176	<i>Sida cordifolia</i> L.	Chiru Benda	Malvaceae	Herb
177	<i>Sida spinosa</i> L.	Naga bala	Malvaceae	Herb
178	<i>Solanum surattense</i> Burm. f.	Nela Vakudu	Solanaceae	Herb
179	<i>Sonchus oleraceus</i> (L.) L.		Compositae	Herb
180	<i>Sphaeranthus indicus</i> L.	Bodasaramu	Asteraceae	Herb
181	<i>Tephrosia purpurea</i> (L.) Pers.	Vempali	Leguminosae	Herb
182	<i>Trianthema portulacastrum</i> L.	kadaraku	Aizoaceae	Herb
183	<i>Tribulus terrestris</i> L		Zygophyllaceae	Herb
184	<i>Tridax procumbens</i> (L.) L.	Gaddichamanthi	Asteraceae	Herb
185	<i>Triumfetta pentandra</i> A.Rich.	Chirusitrika	Malvaceae	Herb
186	<i>Urena lobata</i> L.	Pedda benda	Malvaceae	Herb
187	<i>Vanda tessellata</i>	Kodikalla chettu	Orchidaceae	Herb
188	<i>Vernonia cinerea</i> (L.) Less.		Compositae	Herb
189	<i>Waltheria indica</i> L.	Nalla Benda	Malvaceae	Herb

S.No.	Botanical Name	Common name	Family	Habit
190	<i>Ziziphus nummularia</i>	Nela regu	Rhamnaceae	Herb
191	<i>Apluda mutica</i> L.f.	Grass	Poaceae	Grass
192	<i>Aristida hystrix</i> L.f.	Grass	Poaceae	Grass
193	<i>Brachiaria eruciformis</i> (Sm.) Griseb.	Grass	Poaceae	Grass
194	<i>Chloris barbata</i> Sw.	Uppu Gaddi	Poaceae	Grass
195	<i>Chloris virgata</i> Sw.	Grass	Poaceae	Grass
196	<i>Chrysopogon lancearius</i> (Hoo k.f.) Haines	Grass	Poaceae	Grass
197	<i>Cymbopogon citratus</i>		Poaceae	Grass
198	<i>Cynodon dactylon</i> (L.) Pers.	Arukampul	Poaceae	Grass
199	<i>Cyperus castaneus</i> Willd.	Grass	Poaceae	Grass
200	<i>Cyperus rotundus</i> L.	Grass	Cyperaceae	Grass
201	<i>Digitaria ciliaris</i> (Retz.) Koeler	Grass	Poaceae	Grass
202	<i>Fimbristylis cymosa</i> R.Br.	Pulupu gaddi	Cyperaceae	Grass
203	<i>Abrus precatorius</i> L.	Gurivinda	Leguminosae	Climber
204	<i>Aganosma dichotoma</i> (Roth) K. Schum	Pala malli	Alangiaceae	Climber
205	<i>Argyreia nervosa</i> (Burm.f.) Bojer.		Convolvulaceae	Climber
206	<i>Asparagus racemosus</i> Willd.	Pilli Gaddalu	Asparagaceae	Climber
207	<i>Cassytha filiformis</i> L.	Paachi theega	Lauraceae	Climber
208	<i>Cissus quadrangularis</i> L.	Nalleru	Vitaceae	Climber
209	<i>Clitoria ternatea</i> L.	Sanku-Pushpamu	Leguminosae	Climber
210	<i>Cuscuta reflexa</i> Roxb.		Convolvulaceae	Climber
211	<i>Dioscorea pentaphylla</i>	Adavi gunusuthega	Dioscoreaceae	Climber
212	<i>Ipomoea mauritiana</i> Jacq.	Pappucharu theega	Convolvulaceae	Climber
213	<i>Ipomoea nil</i> (L.) Roth.		Convolvulaceae	Climber
214	<i>Ipomoea obscura</i> (L.) Ker Gawl.		Convolvulaceae	Climber
215	<i>Merremia tridentata</i> (L.) Hallier f.		Convolvulaceae	Climber
216	<i>Mucuna pruriens</i> (L.) DC.	Dulagondi	Leguminosae	Climber
217	<i>Passiflora edulis</i> Sims.	Fashion fruit	Passifloraceae	Climber
218	<i>Pergularia daemia</i> (Forssk.) Chiov.	Dustapu-Teega	Apocynaceae	Climber
219	<i>Rivea hypocrateriformis</i> Choisy.	Bodditeega	Convolvulaceae	Climber
220	<i>Tinospora cordifolia</i> (Willd.) Miers.	Tippa teega	Menispermaceae	Climber
221	<i>Tylophora indica</i> Burm.F.Merr.	Mekameyani Aku	Asclepiadaceae	Climber

Source: Forest department Working plan data (2005-2015), Krishna district, Andhra Pradesh

Fauna photos



***Colias eogene* (fiery clouded yellow)**



***Papilio demoleus* (lime butterfly)**



Grey heron (*Ardea cinerea*)



Little egret (*Egretta garzetta*)



Buffer zone habitat



Mango plantation in buffer zone

Annexure X
Minutes of SEIAA and its Relevant
Documents



MINUTES OF THE 114th MEETING OF STATE LEVEL ENVIRONMENT IMPACT ASSESSMENT AUTHORITY (SEIAA), A.P, HELD ON 29.01.2019 & 30.01.2019 AT VIJAYAWADA, A.P.

	<p>The proposed project falls under Item No. 1(a) of the schedule of the EIA Notification 2006- (i). Mining of minerals (<100 ha of mining lease area in respect of non-coal mine lease).</p> <p>The Committee noted that this is Road Metal and Gravel mining project for the production quantities: Colour Granite - 1,50,000 m³/annum and falls under Category B-2 at par with Category B-1.</p> <p><i>The Committee after detailed discussions recommended for issue of the Standard Terms of Reference (TOR) with Public hearing for mining of Colour Granite - 1,50,000 m³/annum.</i></p> <p>Decision of SEIAA: Agreed with recommendation of the SEAC, A.P for issue of the Standard Terms of Reference (TOR) with Public hearing.</p>
114.40	<p>Common Bio-Medical Waste Treatment facility at M/s. YJ Multiclave at Sy.No. 7/1 & 8/1, Tana Annavaram (V), Nuzendla (M), Guntur District, Andhra Pradesh.</p> <p>Recommendations of the SEAC on 10.01.2019</p> <p>The representative of project proponent and their Consultant have attended the meeting and presented their case.</p> <p>Earlier the project proponent submitted the application through online on 13.07.2017 for consideration of TOR for the proposed Common Bio-Medical Waste Treatment facility - 7.0 TPD. The issue was placed SEAC in its meeting held on 07.06.2016, 30.06.2018 & 25.08.2018 and the SEIAA in its meeting held on 20.06.2016, 02.08.2018 & 24.09.2018 and recommended for TOR with public hearing. Accordingly TOR with public hearing was issued on 10.10.2018.</p> <p>The Committee noted that the project proponent submitted the request through online on 10.12.2018 for TOR corrigendum i.e. for correction in co-ordinates. And also stated that, there is no change in capacity and site area.</p> <p><i>The Committee after detailed discussions recommended that the proponent has to submit a certificate from the revenue department with relevant coordinates.</i></p> <p>Decision of SEIAA: The request for change of co-ordinates in the proposal is taken note of. Since we are not mentioning co-ordinates in TOR, in respect of proposal the correction does not arise.</p>
114.41	<p>Construction Project of Fame Horizon Residential Apartments by M/s. Fame Builders at Sy.No.'s 94/1, 94/2B, 94/3A, 94/4, 94/5A, 94/5B, 94/6A, 94/6B, 94/7, 94/8A, 94/8B, 94/10A, 94/10B & 96/2, Sagar Nagar, Yendada Village, Chinagadilla Mandal, Visakhapatnam District, Andhra Pradesh.</p> <p>Recommendations of the SEAC on 10.01.2019</p> <p>The representative of the Project Proponent and their consultant M/s. Right source</p>

జిల్లా :
DISTRICT : GUNTUR
మండలము :
MANDAL : VINUKONDA

భూమి కొలతల పటము
FIELD MEASUREMENT SKETCH

(గ్రామము నెంబరు : 50
(VILLAGE NUMBER)
గ్రామము పేరు :
VILLAGE NAME : TANA ANNAVARAM
వస్త్రం : హెక్టార్లు 0 పర్చు 0 మై. 0
AREA: HECTARES - AREES Sq.Mts
ఎకరములు 0 సెంట్లు 0
ACRES - CENTS



ROUGH COMBINED SKETCH

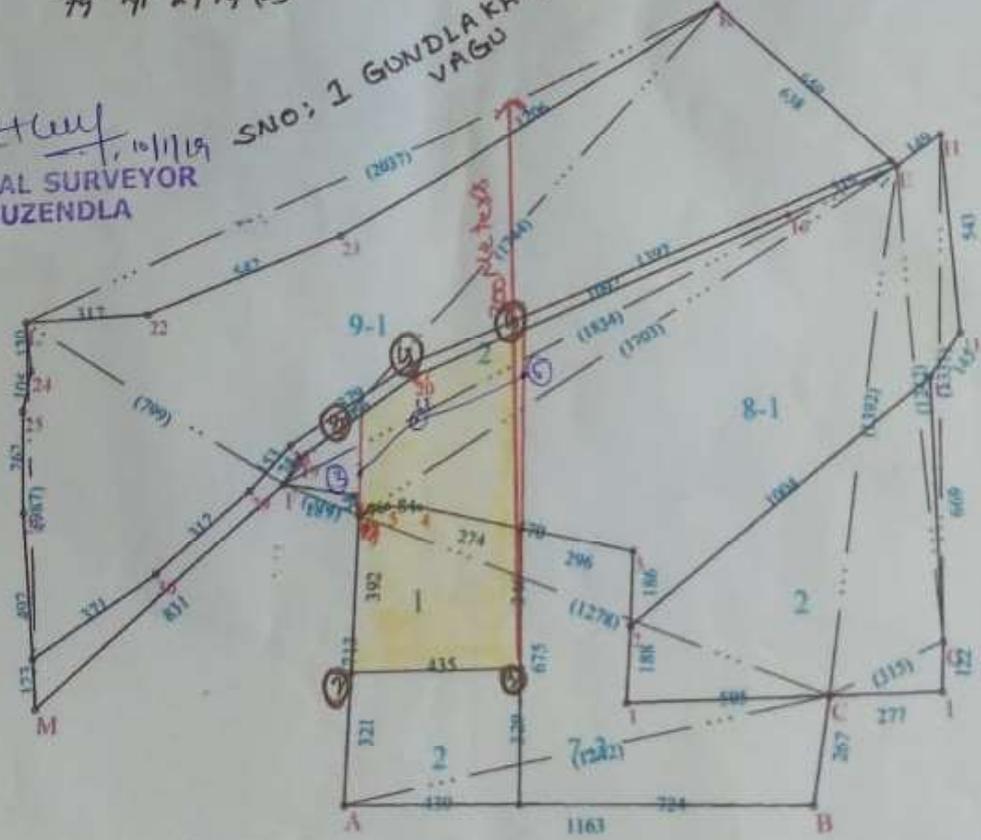
- ④ $15^{\circ} 59' 54.08'' (N)$ ③ $15^{\circ} 59' 53.68'' (N)$
 $79^{\circ} 41' 25.42'' (E)$ $79^{\circ} 41' 24.54'' (E)$
- ⑤ $15^{\circ} 59' 54.39'' (N)$
 $79^{\circ} 41' 27.14'' (E)$

Geographical co-ordinates

- ① $15^{\circ} 59' 50.69'' (N)$
 $79^{\circ} 41' 26.36'' (E)$
- ② $15^{\circ} 59' 51.09'' (N)$
 $79^{\circ} 41' 23.89'' (E)$

H. K. Reddy
MANDAL SURVEYOR
NUZENDLA

SNO: 1 GONDLA KAMMA
VAGU



 From southern boundary
to VAGU Distance is 300 Meters

H. K. Reddy
MANDAL SURVEYOR
NUZENDLA

Annexure XI
Approved Minutes of Public Consultation



**ANDHRA PRADESH POLLUTION CONTROL BOARD
REGIONAL OFFICE :: GUNTUR**

D.No. 4-5-4/5C, 4/3- Navabharath Nagar, Ring Road, Guntur – 522 006

e-mail: rogtr-ee1@appcb.gov.in
Phone : 0863 - 2215537

Lr. No. G-2193/APPCB/RO-GNT/EPH/2021- 690

Dt. 24.08.2021

To
M/s. Y.J. Multiclave (CBMWTF),
Sy.No. 7/1, 8/1, Tana Annavaram Village,
Nuzendla Mandal,
Guntur District

Sir,

Sub.: APPCB, Regional Office, Guntur - M/s. Y.J. Multiclave – Proposal for establishment of Common Bio Medical Waste Treatment Facility (CBMWTF) at Sy.No. 7/1, 8/1, Tana Annavaram Village, Nuzendla Mandal, Guntur District with proposed investment of Rs.2.32 Crores – Environmental Public Hearing held on 19.09.2019 at 11.00 AM at Project Site, Thana Annavaram, Nuzendla Mandal, Guntur District – **Signed Minutes - Communicated - Reg.**

- Ref.: 1. MoE&F Notification Dt.14.09.2006 and its subsequent amendments.
2. Terms of reference (TOR) issued by the MoEF& CC (SEIAA, Andhra Pradesh) vide letter dated. 10.10.2018.
3. Hon'ble High Court of A.P., W.P. No. 11945 of 2019.
4. Orders of the Member Secretary, APPCB on 01.08.2019.
5. Note orders of the District Collector, Guntur on 09.08.2019.
6. Board office mail dt. 18.09.2019
7. EPH conducted on 19.09.2019.
8. Standing Council, SEIAA letter dt.18.08.2021.

With references to the above, it is to submit that the Environmental Public Hearing (EPH) was conducted under the Chairmanship of the Joint Collector & Additional District Magistrate, Guntur on 19.09.2019 at 11.00 AM., at Project Site, Thana Annavaram, Nuzendla Mandal, Guntur District in connection with the proposal for establishment of Common Bio Medical Waste Treatment Facility (CBMWTF) by M/s. Y.J. Multiclave, Sy. No. 7/1, 8/1, Tana Annavaram Village, Nuzendla Mandal, Guntur District with an investment of 2.32 Crores. The signed minutes of the Environmental Public Hearing is herewith enclosed for favour of information.

Further, it is requested to arrange for display of the above proceedings conspicuously at your office premises for public information & access, as required under the provisions of EIA notification, 2006 & amendments thereof.

Please acknowledge the receipt of the same by return post for record purpose.

Encl: a/a

Yours faithfully,

**MAKANI
NARAYANA**

Digitally signed by
MAKANI NARAYANA
Date: 2021.08.24
13:17:58 +05'30'

ENVIRONMENTAL ENGINEER

MINUTES OF THE PUBLIC HEARING HELD ON 19.09.2019 AT 11.00 AM AT PROJECT SITE, THANA ANNAVARAM, NUZENDLA MANDAL, GUNTUR DISTRICT ON THE PROPOSAL FOR ESTABLISHMENT OF COMMON BIO MEDICAL WASTE TREATMENT FACILITY (CBMWTF) BY M/S. Y.J. MULTICLAVE, SY. NO. 7/1, 8/1, TANA ANNAVARAM VILLAGE, NUZENDLA MANDAL, GUNTUR DISTRICT.

Panel Members:

1.	Sri A. S. Dinesh Kumar, IAS., Joint Collector & Additional District Magistrate, Guntur	Representative of the Collector & District Magistrate, Guntur District.
2.	Sri V.R. Maheswara Rao, Environmental Engineer, A.P. Pollution Control Board, Regional Office, Guntur	Representative of the State Pollution Control Board (APPCB)

Project proponent :

1.	Sri Y.S.Murthy	Representative of M/s. Y.J. Multiclave CBMWTF
2.	Sri Srinivasa Reddy	Consultant M/s. Enpro Enviro Tech and Engineers Pvt Ltd., Surat
3	Sri Siva Rama Krishna	Consultant M/s. Enpro Enviro Tech and Engineers Pvt Ltd., Surat

The list of Public participated in the public hearing is appended.

At the outset, the Environmental Engineer, A.P. Pollution Control Board, Regional Office, Guntur welcomed the Joint Collector & Additional District Magistrate, Guntur and public gathered at the venue. He informed that Environmental Public Hearing (EPH) is convened under the provisions of the EIA Notification. 1533 (E), Dated. 14.09.2006 & amendments thereof, notified by the Ministry of Environment, Forest & Climate Change (MoEF & CC), Gol on the proposal by M/s. Y.J. Multiclave, Sy. No. 7/1, 8/1, Tana Annavaram Village, Nuzendla Mandal, Guntur District. The proposal is meant for establishment of second common biomedical waste treatment facility, in addition to one facility already existing in Guntur District. Further informed that the MoEF & CC (SEIAA, GoAP) issued Terms of Reference (TOR) to the project proponent vide letter dated. 10.10.2018 to prepare draft Environmental Impact Assessment (EIA) for obtaining Environmental Clearance, to undergo the process of

public hearing in consultation with APPCB, to furnish final EIA along with minutes of the public hearing and response of the proponent on the issues emerged in the process of public hearing for further appraisal. The estimated project cost is Rs. 2.32 Crores for the proposed Common Bio Medical Waste Treatment Facility. The draft EIA reports and executive summaries (in Telugu & English languages) of the proposed project has been circulated to various Government offices and local panchayats surrounding to the project site for wide publicity and public access. Further informed that Environmental public hearing notification was published on 17.08.2019 in "Andhra Jyothi" and "Indian Express" news dailies inviting the public to express their views, comments, suggestions and objections, if any within 30 days and to participate in the EPH scheduled on 19.09.2019 at project site. Further, informed that 14 No.s of representations were received so far in response to the EPH Notified for the above project, recommending for commencement of activities. He requested the Joint Collector & Addl. District Magistrate, Guntur to chair the public hearing proceedings.

Sri A.S. Dinesh Kumar, IAS., Joint Collector & Additional District Magistrate, Guntur stated that the Environmental public hearing is proposed for establishment of new Common Bio Medical Waste Treatment Facility with proposed investment of Rs. 2.32 Crores. He informed that the M/s. Y.J. Multiclave has proposed for collection, reception, Treatment and disposal of Bio Medical wastes. He explained the provisions of Public Hearing Notification issued by the Ministry of Environment, Forest & Climate Change vide S.O. 1533, dated 14th September, 2006. He informed that entire proceedings of the Environmental Public Hearing will be video recorded and minutes will be furnished to the MoEF & CC along with written representations received from public. The project proponent, Villagers, NGOs, Revenue Department staff attended the meeting. He requested the gathered public to express their views, comments, objections and suggestions on the proposed Common Bio Medical Waste Treatment Facility.

With the permission of the Chair, the Environmental Engineer, APPCB requested the representatives of the project proponent and their consultant carried out EIA for the above project to explain the salient features of the project and study findings of EIA studies.

Sri. Srinivasa Reddy, Coordinator represented the consultant M/s. Enpro Enviro Tech and Engineers Pvt Ltd., informed that they have prepared EIA to undertake feasibility studies for establishment for Common Bio Medical Waste Treatment facility and completed studies on environmental impacts from the proposed activity. He

further added that the project proponent acquired 3.3 Ac of land with an estimated project cost of Rs.2.32 Crores. He informed that a common bio medical waste treatment facility is required for every 10,000 bed strength of Hospitals. As per the registered Health Care Establishments in Guntur District, the Bed strength is 17,600 in the Guntur District as on 2016. Hence, there is need for second common bio medical waste treatment facility and obtained ToR to prepare draft EIA report on impacts of the proposed project. Further, informed that the EIA was prepared based on the baseline studies of Soil, Air, Water on the impact on surrounding environment.

He informed that the facility proposed to install 330 Kgs/hr incinerator, 750 Lts autoclave and 2 No.s X 150 Kg/hr Shredder to treat the biomedical waste, the facility proposed water requirement is 28 Kl/Day will be met from the borewell and generates at about 17.3KLD waste water. The facility proposed to provide ETP to treat the waste water and the treated waste water is proposed to recycle. The facility proposed to provide Ventury scrubber and packed Bed Scrubber as Air pollution control equipment to the Incinerator. The Incineration ash and ETP sludge will be disposed to TSDF for scientific disposal, Plastic waste after autoclave and Shredder will be disposed to Authorised recyclers. Sharps after autoclave will be send to iron foundry/TSDF for scientific disposal, Diesel generator set of 65 KVA will be installed as alternative power backup. The proposed capacity of Common Biomedical waste treatment facility is about 7.0 Tons /day to treat and dispose the Bio Medical Waste. He informed that alternative approach road to the facility will be provided in coordination with R&B Department. Further, he added that total employment generation would be 20 members, among 20 members 12 members would be appointed from local & 8 members Technical peoples from outside. Also proposed to allocate Rs.4.0 Laths under Corporate Social Responsibility (CSR) for development of social development the activities and Medical camps etc.

Later, the Environmental Engineer, APPCB, Guntur with the permission of the Chair requested the gathered public to express their suggestions, views, comments and objections about the proposed project.

1. **Sri Srinivasa Rao**, T. Annavaram Village, Nuzendla Mandal, Guntur District, Andhra Pradesh. While welcoming the proposed project, he informed that the proposed facility shall not cause any Air and Water Pollution problems to the surrounding agricultural fields and to the nearby village.
2. **Sri Nageswara Rao**, T. Annavaram Village, Nuzendla Mandal, Guntur District, Andhra Pradesh. He raised concerned on potential for pollution generation from melting of plastic waste from the above activity and requested to implement

requisite measures to prevent any impacts of air and water pollution problems to surrounding environment. He welcomed the project and request to address the above concerns.

3. Sri K. Nageswara Rao, Ex.Sarpanch, T. Annavaram Village, Nuzendla Mandal, Guntur District, Andhra Pradesh. He welcomed the proposed project and requested the project proponent not to cause any Air and Water Pollution problems to the surrounding agricultural fields and to the nearby village.
4. **Smt K. Eswaramma**, T. Annavaram Village, Nuzendla Mandal, Guntur District, Andhra Pradesh. She requested the project proponent to implement necessary measures and not to cause any Air and Water Pollution problems to the surrounding environment.
5. **Sri N. Anjaiah, NGO**. He welcomed the proposed project and informed that the line of activity of the proposed project is collection of Bio Medical Waste (BMW) generated in the Guntur District and proposed to treat the BMW as per the Rules, without causing any pollution problems to the surrounding agricultural fields and to the nearby village. He expressed that the project proponent is ability to run the facility without causing any water and air pollution problems to the nearby surroundings. He opined that the proposed project proponent is utilizing the lands of the village, hence employment shall be given to local people only. He recommended to grant Environmental Clearance to the proposed project.
6. **Sri B.V. Reddy, NGO**. Ananthapuram, Andhra Pradesh. He welcomed the proposed project and informed that the line of activity of the proposed project is collection of Bio Medical Waste (BMW) generated in the Guntur District and to provide treatment to the BMW as prescribed. Further informed that the villagers are welcoming the project, since the project proponent has implemented several social activities in the village. He requested the project proponent to operate the facility without causing any water and air pollution problems to the nearby surroundings. He informed that the project proponent shall develop minimum 33% of greenbelt. He requested to recommend Environmental Clearance to the proposed project.
7. **Sri. Y. Chennakesava Reddy, Social Activist, Kadapa**, Andhra Pradesh. He welcomed the proposed project. He requested the project proponent to maintain same ambience even after establishment and operation of the facility without causing any water and air pollution problems to the surrounding environment. He requested to establish Effluent Treatment Plant (ETP) to treat the waste water generated and shall utilize the treated waste water. He requested the project proponent to explain disposal mode of incinerator ash. He further requested to develop thick greenbelt around the facility and also requested to give employment to the local people, to organize Medical camps periodically in the

surrounding villages. Finally, requested the project proponent to utilize latest technology to treat the Bio Medical Waste as per the norms and informed to recommend to MoEF&CC for grant of Environmental Clearance to the proposed project.

8. **Sri T. Hussain Naidu, NGO.** He welcomed the proposed project. He requested the project proponent to cover the Bio Medical Waste with tarpaulin sheets. He requested the project proponent to inform the nature of chemicals proposed to utilize to treat the Bio Medical Waste. He informed that the proponent shall dispose solid waste generated to M/s. Ramky Pharma City for scientific disposal. He requested the project proponent to develop thick greenbelt with local neem species, which will give oxygen and filter air pollution.
9. **Sri S. Venkateswarlu, NGO.** He welcomed the proposed project. He requested the project proponent to provide RO Plant for supply of drinking water to the nearby villages since drinking water is not sufficiently available, and to provide medical health camps to the nearby villages periodically.
10. **Sri. Sudarshan, Cheyutha, NGO.** He welcomed the project and requested the proponent to give employment opportunities to the local youth.

Sri. Srinivasa Reddy, Coordinator representing M/s. Enpro Enviro Tech and Engineers Pvt Ltd., on behalf of M/s. YJ Multiclave, replied to the objections / suggestions raised by the public during Public Hearing. The details are as follows:

- a) As per the Bio Medical Waste Management Rules, 2016, Bio Medical Waste shall be treated within 48 hours and they will comply the norms without causing Air and Water pollution to the nearby Agricultural fields and human habitation.
- b) The proposed project is a Bio Medical Waste treatment facility and abide by all the Rules stipulated. The proposed project will not burn plastic. The plastic waste will be sterilized and treated plastic waste will be disposed to authorized plastic recyclers.
- c) The proposed project will provide incinerator with primary chamber and secondary chamber for incineration of Bio Medical Waste. Primary chamber will maintain at a temperature of more than 850°C and secondary chamber is maintained at a temperature of more than 1050°C. The incineration ash will be disposed to M/s. Ramky Pharma, TSDF for scientific disposal.
- d) The proposed project will provide Effluent Treatment Plant to treat the waste water generated from the treatment of Bio Medical Waste. The treated waste water will be recycled.

- e) The project proponent will provide alternative arrangement for moment of Bio Medical Waste carrying vehicles without entering into the village roads.
- f) The incineration ash will be disposed to M/s. Ramky Pharma city through closed vehicles which are provided with GPS tracking system.
- g) The proposed project will provide Online Continuous Emission Monitoring System in compliance with the Central Pollution Control Board norms.
- h) The proposed project will give employment to the local people and shall comply CSR norms.

After repeated call to the gathered public to express their views if any, the Joint Collector & Additional District Magistrate, Guntur concluded the public hearing informing that the entire proceedings of the Environmental Public Hearing held on 19.09.2019 was video recorded and minutes will be furnished to the authorities for further examination & to take decision in the matter. The details of the 14 No. of written representations received in response to the EPH notified for the above project are tabulated below -

S. No.	Name & address of the persons submitted representations	No. of pages	Gist of the re presentation
1	Sri. T. Hussain Naidu, National Environment Committee, NGO, Hyderabad.	01	Expressed No objection for proposed project & requested to develop greenbelt and to support social development in the nearby villages
2	Sri. P.Ramarao, NGO, Green Field Environment Organization, RR District	01	Expressed No objection for proposed project.
3	Sri. K. Ramakrishna reddy, NGO, Jatiya Paryavarana Parirakshana – Ganula Bhugarbha jalamula Samrakshana Samithi	01	Expressed No objection for proposed project
4	Sri. B. Kota Naik, NGO Sri Vivekananda Environment Organization	01	Expressed No objection for proposed project.
5	Sri Sd Rashid Pasha, NGO Gramina Haritha Kala Parishat, Suryapet	01	Expressed No objection for proposed project.
6	Sri M. Krishna Prasad, NGO Prudvi Environment Organization, Vajinepalli Village, Suryapet	01	Expressed No objection for proposed project.
7	Sri Ch. Sasi Kumar, NGO Paryavarana Parirakshana Samithi, Chintalapalem, Suryapet	01	Expressed No objection for proposed project.
8	Sri M. Rama Krishna, NGO Rythu Mithra Paryavarana Sangham, Huzur Nagar, Suryapet	01	Expressed No objection for proposed project.
9	Sri S. Muninder Reddy, NGO	01	Expressed No objection for

	Mithra Foundation Neredcherla, Suryapet		proposed project.
10	Sri T. Manikanta Naidu, NGO Bharathi Paryavarana Mandali, Macherla	01	Expressed No objection for proposed project.
11	Sri. J. Venkateswarlu, NGO Dharani Paryavarana Vikasa Samstha, Chintalalpalem, Suryapet	01	Expressed No objection for proposed project.
12	Sri Y. Nageswara Naidu, NGO Palnadu Paryavarana Samrakshana Samithi, Rentachintala, Guntur District	01	Expressed No objection for proposed project.
13	Sri M. Sambasiva Rao, NGO Mother Thressa Rural Development Trust, Neredcherla, Suryapet	01	Expressed No objection for proposed project.
14	Sri V. Ravi Teja, NGO Avani Paryavarana Vedika, Huzur Nagar, Suryapet	01	Expressed No objection for proposed project.

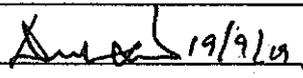
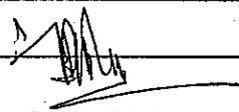
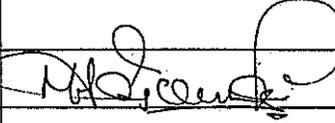
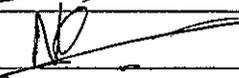
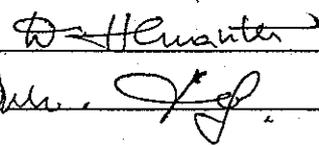

Environmental Engineer,
APPCB, RO, GUNTUR


Joint Collector &
Additional District Magistrate
Guntur

S-NO	Name and Address (to person)	Signature
	k. chandra shekar (H.V.O)	k. chandra
	D. Siddu (HYD) 9.982235	D. Siddu
	S. Venkateshwarlu (NGO/ARL/MSRSL) 9865566098	S. Venkateshwarlu
	V. Narayana 9989226465	V. Narayana
	T. V. S. R. Krishna 9866 164723	T. V. S. R. Krishna
	M. Chiranjeevi (Volunteer) 9652 52 7655	M. Chiranjeevi
	M. Kumar (Volunteer) 9993161938	M. Kumar
	S. Venkateshwarlu 8340971486	S. Venkateshwarlu
	K. V. Prasad 9849770111	K. V. Prasad
	Shakti Shakti	
	K. Kupakar 7702859045 NGO, HYD	K. Kupakar
	A. Shankar Reddy Hyd upl	A. Shankar Reddy
	B. S. Reddy Kadapa	B. S. Reddy
	M. Krishna Murthy NGO Hyd	M. Krishna Murthy
	M. BACHAIAN (N.G.O) 9494246122	M. Bachaian
	X. S. SWAMY 8121856744	X. S. Swamy
	N. Srinivas Reddy N. Co.	N. Srinivas Reddy
	A. Bhaskarao (NGO) Amaravathi	A. Bhaskarao
	Sudharshan (NGO)	Sudharshan
	K. S. Prasad	K. S. Prasad
	M. Venkata Rao (Reporter Venkata Rao)	M. Venkata Rao

S.No	Name & Address of the person	Signature	S.No
	SANKU SRINIVASULU (NGO)	9440569092	
	K. Ranga Rao (NGO) 7386657187		
	NAMA. RAMESH N:GO 8304200		
	C. Chandrashekar NGo-950050163		
	Chepuri raja - 9030695836 - NGo -		
	T. Vishwal 9640036809 HMA		
	V. Chenu Keranabag 91191893019		
	20000308600		
	530983 86005		
	A-805055 T. Gij 8000		
	T. 8525588		
	P. Jay Gejaban T. 652588		
	Jamagra Parivartana Samudaya (NGO) Karnataka		
	P. VENUGOPAL NGO. KADAPA.		
	D. Ramdhan - NGo - RJY 9440176123		
	D. Anjrich NGo. 9505896125		
	P. V. Indhakar Rao. N-go.		
	B. V. Reddy NGo Anantapur		
	V. Vijay Kumar, NGo. HYP.		
	CH 805 8978836455		
	Y. M. N. Reddy. 9908917127		
	A-8052120 - 9948489131		
	P. 8050600 T. 625888		
	9160599196		
	T. Hussain Waidi NGo 8978261478		
	K. Adinarayana 2013307664		
	P. 8050600 T. 625888		
	8978261478		

Attendance of the Environmental public hearing
 for establishment of CBMWTF by M/S Y.J. MULTICARE
 at sy. No 7/1, 8/1, Tana Annamaram village, Nugendak mandal Chintur
 district on 19.09.2019.

SNO	Name of official & designation	Signature
1)	Joint Collector, Adls District Magistrate, Gunur	 19/9/19
2)	V.R. Maheshwara Rao, EE - APPR, Regional Office Gunur	
3)	M. ARJUN NAIK, Tahsildar FAC Nuzendak Mandal.	
4)	P. NASARAJAH MRI.	
5)	D. Y. Sreeni VRO Tella Palakota	
6)	N. Parvathi Devi VRO T-Annaram	
	Siva Rama Krishna ISUKAPALLI Sriwinger Reddy Manchala.	
	D. Hemant Kumar of M.D. Y.J. Multicare.	
	M. Chennaras IPS - Local level	M. Chennaras