

XECUTIVE SUMMARY

(English)

for

Proposed New Project of Common Bio Medical Waste Treatment Facility (CBMWTF) Air-Oil fired incinerator capacity of 100 kg/hour, Autoclave capacity of 100 Liters/Batch, Shredder capacity of 100 kg/hour and ETP capacity 10 KL/Day

at

V.M. Techno-Soft Pvt. Ltd.

**Part of Khasra No. 359/2 (1 Acre land), Village: Barbaspur,
District: Korba, Chhattisgarh**

As per 7(da) of Schedule to EIA Notification dated 14th September, 2006 Category B1

EIA Consultant




ENPRO Enviro Tech and Engineers Pvt. Ltd.

**(QCI-NABET Accreditation vide Certificate No.: NABET/EIA/2225/
RA 0236 valid till 12th January, 2025)**

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ENPRO Enviro Tech and Engineers Pvt. Ltd.			
Client	V.M. Techno-Soft Pvt. Ltd.		
Project	Draft Rapid EIA Report		
Report No	EP/REIA/33	Rev.	01
Title	Executive Summary	Date	21/07/2023

EXECUTIVE SUMMARY

1. INTRODUCTION

V. M. Techno-Soft Pvt. Ltd. (ISO 9001:2008 certified), promoted by **Mr. Vipin Malik (Director)** has its registered office at G-3, Sector-1, Avanti Vihar, Raipur, Chhattisgarh. It is a leading company in Raipur, in the field of Waste Management Services (already have granted EC at other 3 places and having experience in running 1 CBMWTF at Surguja), Training & Skill Development and various IT Services like Website Designing & Development, Software Development, M-CAD & Data Processing etc. They have project execution centres at Raipur, Rajnandgaon, Jagdalpur, Korba, Mandla, Jabalpur & Gwalior.

V.M. Techno-Soft Pvt. Ltd. (VMTSPL) has proposed to set up a new Common Bio-Medical Waste Treatment Facility (CBMWTF) at part of Khasra No. 359/2, (1 acre) Village Barbaspur, District Korba, Chhattisgarh. The company has signed an Agreement with Divisional Monitoring Committee Bilaspur Division (District Korba), Government of Chhattisgarh for setting up of the Common Biomedical Waste Treatment Facility. The geographical position of the site is at Latitude: 22°17'39.04"N and Longitude: 82°43'30.04"E.


In order to assess the potential environmental impacts arising due to proposed project activities, promoter has assigned the work of EIA study to M/s. ENPRO Enviro Tech & Engineers Pvt. Ltd. (ENPRO), Surat to prepare Draft EIA Study report for proposed common bio medical waste treatment facility. The proposed project falls under Category B1 and project activity 7(da) as per EIA notification 2006, as amended time to time. ENPRO Enviro Tech and Engineers Pvt. Ltd. (ENPRO) is NABET Accredited (NABET/EIA/2225/RA 0236 valid till 12th January, 2025) under this sector. ENPRO (Environmental Laboratory) has conducted base line monitoring for the period of **16th October 2020 to 15th January 2021**. Environmental Laboratory is recognized by MoEF & CC also Accredited by NABL. ENPRO Team visited site and carried out ground survey for the various aspects which was covered in EIA Report.

2. PROJECT DESCRIPTION

2.1 Need of the Project

Common Bio-Medical Waste Treatment Facilities (CBMWTFs) 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). As per the guideline for CBMWTF, one CBWT facility will cover 75 km area and 10000 number of beds. Currently, there is no CBMWTF within 75 km radius of proposed project site in Korba region, which has around 48 health care facilities (HCFs) with 1321 beds and estimated BMW generation of about 462 kg/d (considering 350 g/bed/d). Own management and treatment of this waste by private Hospitals, Nursing Homes and Clinics is technically as well as economically not viable.

Hence, the proposed new facility will play a vital role in safe handling, treatment and disposal of the generated Bio-Medical Waste from the nearby areas in Korba district of Chhattisgarh.

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Project	Draft Rapid EIA Report		
Report No	EP/REIA/33	Rev.	01
Title	Executive Summary	Date	21/07/2023

Chhattisgarh Environment Conservation Board floated a tender (No. 01/2019-2020/Chhattisgarh Environment Conservation Board, Naya Raipur (CECB)/2019 dated 18/07/2019), followed by Corrigendum (No. 01/HO/CECB/SCI/2019-20-Corrigendum 1) for selection of Common Biomedical Waste Treatment Facility Service Provider (CBWTF-SP) for Korba region to setup facility for collection, transportation, treatment and disposal of bio-medical waste generated from HCFs in Korba district in Bilaspur division. M/s. V. M. Techno-Soft Pvt. Ltd. was selected and invited to establish the CBWTF vide Letter of Intent No. 2984/Gen/2019 dated 25/11/2019 from the Office of the Commissioner, Bilaspur Division.

2.2 Location & Study Area

Proposed project shall be located at part of Khasra No. 359/2 (1 acre land), Village Barbaspur, District Korba, Chhattisgarh.


SALIENT FEATURES IN STUDY AREA OF PROPOSED PROJECT

Particulars	Details	Approx. Distance from Project Site
Geographical Co-ordinates	Latitude: 22°17'39.04"N Longitude: 82°43'30.04"E	-
Village / City / Industrial Area	Barbaspur	-
District	Korba	-
Nearest Human Settlement	Barbaspur village	0.53 km (S)
Nearest Water body	Hasdeo river	1.75 km (W)
Nearest Highway	National Highway No. 149B State Highway No. 4	0.39 km (W) 1.96 km (S)
Nearest Railway station & Railway line	Korba railway station	4.94 km (NNW)
Nearest Airport / Airbase	Swami Vivekananda Airport, Raipur Korba Air-Strip	159.5 km (SW) 13.30 km (N)
Protected Area / Sanctuaries / Ecologically Sensitive Area	Not found within study area	-
CRZ applicability	No	-
Densely Populated Area	Urga village	1.5 km (S)
Seismic Zone	II	-
Elevation	280 m	-

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


2.3 Salient Features of the Proposed Project

Proposed Project Capacity:			
Sr. No.	Equipment	Number	Capacity
1	Air-Oil fired Incinerator	1	100 kg/hr
2	Autoclave	1	100 L/batch

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Project	Draft Rapid EIA Report		
Report No	EP/REIA/33	Rev.	01
Title	Executive Summary	Date	21/07/2023

3	Shredder	1	100 kg/hr
4	Effluent Treatment Plant	1	10 KLD

-																			
Proposed Capacity of Effluent Treatment Plant	Flow rate: 4.5 KLD Design Capacity: 10 KLD																		
Cost of Proposed Project	Rs. 2.75 crores																		
Allocation for CER Activities	Rs. 5,50,000 for next 5 yrs. for required activities such as: i) Plantation of 400 plants (Amla, Vad, Pipal, Neem, Mango, Arjun, Bel, etc..)(Pavitra Van Nirman) ii) Soil (1 Truck @ Rs. 2000) = 2 k iii) Pit Making 400 nos. iv) Gardener and Labour Cost v) Fertilizer Cost vi) Water Supply And Protection																		
Estimated Manpower Required	Total Manpower – 25 <table border="1" data-bbox="774 985 1380 1355"> <thead> <tr> <th>Phase of Project</th> <th>Type of Labour</th> <th>No. of Employees</th> </tr> </thead> <tbody> <tr> <td>During construction</td> <td>Contractual</td> <td rowspan="2">12</td> </tr> <tr> <td>During commissioning</td> <td>Contractual</td> </tr> <tr> <td rowspan="3">During operations</td> <td>Managerial</td> <td>02</td> </tr> <tr> <td>Skilled</td> <td>05</td> </tr> <tr> <td>Un-skilled</td> <td>06</td> </tr> <tr> <td colspan="2" style="text-align: right;">Total</td> <td>25</td> </tr> </tbody> </table>	Phase of Project	Type of Labour	No. of Employees	During construction	Contractual	12	During commissioning	Contractual	During operations	Managerial	02	Skilled	05	Un-skilled	06	Total		25
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	Skilled	05																	
	Un-skilled	06																	
Total		25																	
-																			
Area of Land	4050 m ² - for proposed project																		
Area of Green-Belt	1616 m ² (39.9 %)																		
Water Requirement - Total	10 KLD (5.5 KLD Fresh + 4.5 KLD Recycled) Domestic 0.8 KLD Gardening 2.5 KLD Industrial 6.7 KLD Floor Washing 0.8 KLD Vehicle Washing 1 KLD (Recycled water) Scrubber 4.7 KLD (Recycled water) Solution Preparation 0.1 KLD Steam Generation 0.1 KLD																		
Source of Water -	Recycled 4.5 KLD Fresh 5.5 KLD (from Bore well)																		
Waste water Generation	5.2 KLD Industrial 4.6 KLD Domestic 0.6 KLD																		


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Project	Draft Rapid EIA Report		
Report No	EP/REIA/33	Rev.	01
Title	Executive Summary	Date	21/07/2023

Mode of Treatment	Industrial Domestic	Sent to Effluent Treatment Plant and treated wastewater will be reused for Vehicle washing and incineration scrubber Septic tank followed by soak pit
Power Requirement		Project will consume 100 KVA power
Source of Power Supply		Chhattisgarh Vidyut Vitaran Company Ltd
Emergency Power Supply		1 Nos. D.G. Sets – 100 KVA each
Fuel Requirement		
	LDO for DG Set	15 Litres/Hr
Sources of Gaseous Emissions		Incinerator - 100 kg/hr D.G. Sets - 1 nos. – 100 KVA (stand-by)
Air Pollution Control Measures		Quencher cum Packed Bed Scrubber and Venturi Scrubber along with stack height of 30 m
Solid / Hazardous Waste Generation		<ul style="list-style-type: none"> • Ash from incinerator - 75 kg/day • ETP Sludge – 10 kg/day • Plastic Waste after Autoclave and shredding – 500 kg/day • Glass and metallic body implants After Autoclave – 300 kg/day • Metal Sharps after Autoclave and Shredding – As generated • Waste oil – 10 kg/day • Used Batteries – As generated
Solid / Hazardous Waste Disposal Management		<ul style="list-style-type: none"> • Ash from incinerator - Send to TSDF site for secured landfilling • ETP Sludge - Send to TSDF site for secured landfilling • Plastic Waste after Autoclave and shredding -Send to Authorized Recyclers • Glass and metallic body implants After Autoclave – Sent to foundry for metal recovery / TSDF site • Waste Oil - Send to Authorized Recyclers • Used Batteries – Send to Authorized Recyclers


2.4 Process Description

A. Incineration System (Air-Oiled fired)

This is a high temperature thermal process employing combustion of the waste under controlled condition for converting it into inert material and gases.

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Client	V.M. Techno-Soft Pvt. Ltd.			
Project	Draft Rapid EIA Report			
Report No	EP/REIA/33	Rev.	01	
Title	Executive Summary	Date	21/07/2023	

Incineration through Air Oil Fired Incinerator (Refractory Lined - Primary chamber)	Burning of bio-medical waste at relevant temperature - degrading of organic waste to volatiles/gases. Carbons are the non-volatile portion of the waste and are completely incinerated in primary chamber
F.D fan	Forced draft fan is used to provide for combustion/volatilization air.
Post combustion chamber - Secondary chamber	Burning of gases and volatile matter that has a low flash point which gets liberated from primary chamber up to 1050 °C ± 50 °C with 2 second retention time.
Air Pollution Control Section:	
Quencher	Reduce the concentration and temperature of exited heat gas from secondary chamber. Gas shall be cooled down (200 - 250 °C) in circulation of water mixed with aqueous waste Packed bed in quencher also captures SPM from the exit gas. It also restricts recombination reactions, which would otherwise produce toxins like dioxins and furans.
Ventury Scrubber	Flue gas at high velocity contacted with circulating scrubber liquor in Ventury throat to effect intense contact between liquid and gas which results in high efficiency particulate matter removal in Ventury scrubber.
Polishing Scrubber	It is two stage alkali scrubber where gas is contacted with circulating scrubber liquor in presence of packing to ensure that desired removal efficiency of HCl is achieved. In order to ensure efficiency of scrubbing of HCl gas, free alkalinity in form of free NaOH is always maintained in scrubber liquor.
Gas ducting	Containing passage of gases
ID fan	High capacity induced draft fan to create negative pressure to carry the residual gases up-to the chimney's outlet height
Chimney	Discharge the treated gas from the scrubber at 30 m above ground level

ENPRO Enviro Tech and Engineers Pvt. Ltd.				
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Project	Draft Rapid EIA Report			
Report No	EP/REIA/33	Rev.	01	
Title	Executive Summary	Date	21/07/2023	

BRIEF SPECIFICATIONS OF Air-Oiled fired Incenerator


Description	Specification
Type of Incinerator	Air Oil Fired.
Type of Waste	Biomedical Waste
Burning Capacity	100 Kg/Hr
Auxiliary Fuel	Diesel
Type of Burner Operation	Monoblock / Split type fully automatic burners
Burners	
No. of burners	As per standard design of incinerator
Type	Monoblock fully automatic
Fuel	Diesel
Make	"Alfa-Therm" or Equivalent
Combustion Fan	
Type	Centrifugal
Modulation	Manual damper control
MOC	Mild Steel / SS316
Drive	Direct drive
Height of chimney 30 m	
MOC	Mild Steel
Type	Self-supporting
Height	30 m from ground level
Other Standard Accessories	Aviation lamp, lightening arrestor, stack drain, inspection platform, sampling port
Paint	The chimney is painted externally with two coats of heat resistant aluminum paint
Ladder	To be provided
Temperature	800 ± 50°C
➤ Primary Chamber	1050 ± 50°C
➤ Secondary Chamber	

(Source: M/s. V.M. Techno-Soft Pvt. Ltd.)

BRIEF SPECIFICATIONS OF PRIMARY CHAMBER

Description	Specification
Type	Static Solid Hearth
Material of Construction	Mild Steel, 12-16 mm thick
Refractory thickness	115 mm thick
Temperature resistance	1400°C
Insulation thickness	115 mm thick
Material	Insulation bricks confirming to IS-2042
Waste Charging	Automatic through Hydraulic Ram Pusher.
Ash Removal	Manual

(Source: M/s. V.M. Techno-Soft Pvt. Ltd.)

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Project	Draft Rapid EIA Report			
Report No	EP/REIA/33	Rev.	01	
Title	Executive Summary	Date	21/07/2023	

BRIEF SPECIFICATIONS OF SECONDARY CHAMBER

Type	Static Furnace connected to primary furnace
Material of Construction	Mild Steel, 10 mm thick
Refractory thickness	115 mm thick
Material	Refractory bricks confirming to IS-8
Temperature resistance	1200°C
Insulation thickness	115 mm
Material	Insulation bricks confirming to IS-2042
Residence time for flue gases	2 seconds

(Source: M/s. V.M. Techno-Soft Pvt. Ltd.)

B. Autoclave


An autoclave is a specialized piece of equipment designed to deliver 121°C temperature under 15 psi pressures to a chamber, with the goal of decontaminating or sterilizing the contents of the chamber. Microorganisms which contribute to infection do not survive beyond 80 °C. Decontamination is the reduction of contamination to a level where it is no longer a hazard to people or the environment. To ensure safety and quality control, all bio-hazardous materials and items contaminated with potentially infectious agents should be decontaminated before use or disposal. All bio-medical wastes like plastic baggage, syringe, cotton etc. should be sterilized in autoclave as per pollution norms. However, waste that is treated using an autoclave is still recognizable after treatment and therefore it must be shredded to allow for disposal with general waste.

TECHNICAL SPECIFICATIONS OF AUTOCLAVE

Description	Specification
Capacity	100 L/batch
MOC	SS - 304
Model No.	NEET AC100
Insulation	Ceramic wool on outer side
Pressure	2.1 kg/cm ²
Air Emission	Highly Odorous but Non Toxic
Heating Media	By steam generated from Electric Heater Arrangement
Feeding	Hydraulic system
Safety Instrument	Pressure Gauge and Safety Valve
Temperature	121 to 134 °C
Design Temperature	150 °C
Water Emission	Odorous may contain Live Micro-organisms at Base
Treatment Effluent	Low Wet Waste 10 % Heavier all Material Acceptance Recognizable

(Source: M/s. V.M. Techno-Soft Pvt. Ltd.)

C. Shredding

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Client	V.M. Techno-Soft Pvt. Ltd.		
Project	Draft Rapid EIA Report		
Report No	EP/REIA/33	Rev.	01
Title	Executive Summary	Date	21/07/2023

Shredding is a process by which wastes are de-shaped or cut into smaller pieces so as to make the waste unrecognizable. Shredder has non-corrosive sharp blades capable of shredding plastic waste, sharps, bottles, needles, tubing and other general waste. The low speed two shaft system is effective for shredding hard and solid waste.

The disinfected waste shall be segregated into HDPE, PP, rubber, latex, glass and metal. The segregated materials shall then be shredded completing the process of disinfection and ensuring non-recycling of the waste materials for medical/food-grade purposes. Shredder is used for cutting small pieces (10-25 mm) of plastic, agro waste, paper in appropriate size as per pollution norms. In the system, 5 blades will be provided out of which 3 will be movable and 2 fixed blades. It thus reduces the volume of the treated waste significantly.

TECHNICAL SPECIFICATIONS OF SHREDDER


Description	Specification
Capacity	100 kg/h
MODEL No	NEET – SDR 100
Waste Materials	Biomedical waste
Power	5 HP
Motor	3 Phase 50 Hz 415 VAC
Hopper Size	300 mm X 400 mm Height
Drive	V belt Pulley drive
Required Space	2 m ² (only machine)
MOC	MS Fabricated
MOC of Blade	W.P.S. Hardened changeable Blade
Control Panel	Dual starter ON/OFF switch
Shredding Size	25 mm X 50 mm Waste Cutting
Bearing	SKF/ZKL Ball Bearing
Cutting Blades	5 Nos. (3 movable & 2 fixed blade)

(Source: M/s. V.M. Techno-Soft Pvt. Ltd.)


3. Description of Environment

Baseline environmental status in the study area was studied for the various environmental attributes, as delineated in TOR, between **16th October 2020 to 15th January 2021** at different locations, including the proposed project site. Water, Soil, Noise and Ambient Air Monitoring samples were collected and analysed by NABL Accredited and MoEF&CC recognized laboratory M/s. ENPRO Enviro Tech and Engineers Pvt. Ltd., Surat. All the samples were collected, preserved and analysed as per the standard procedures / methods.


Sr.	Environmental Attributes	Baseline Status
1.	Ambient Air Quality	8 stations - at proposed project site & nearest residential area
	Observation - PM ₁₀	46.1 - 98 µg/m ³

ENPRO Enviro Tech and Engineers Pvt. Ltd.		 ENPRO	
Client	V.M. Techno-Soft Pvt. Ltd.		
Project	Draft Rapid EIA Report	Rev.	01
Report No	EP/REIA/33	Date	21/07/2023
Title	Executive Summary		


Sr.	Environmental Attributes	Baseline Status
	PM _{2.5} SO ₂ NO _x CO NH ₃ HC VOC PAH	23 - 58 µg/m ³ 3.3 - 25.7 µg/m ³ 8.8 - 38.2 µg/m ³ Below Detectable Limit (BDL) Below Detectable Limit (BDL) Not Detected (ND) Not Detected (ND) Not Detected (ND)
	Inference	All results (average) were found within NAAQ permissible limits
2.	Meteorological Status	Meteorological data for period of 16th October 2020 to 15th January 2021 was given by NABL approved laboratory M/s. ENPRO Enviro Tech and Engineers Pvt. Ltd., Surat
	Observation	Post monsoon season Pre-dominant wind – NNE to SSW Calm condition– 3.08 % Average wind speed – 1.95 m/s Maximum wind speed – 4.8 m/s Temperature range – 10.3 to 28.2 °C Relative Humidity range – 32.2 to 99.5 %
	Inference	Nearest residential area is Urga village which is 1.5 km from proposed project site. This shall not be affected by Bio-Medical waste treatment activities
3.	Water Quality	Surface water samples were collected from 8 different sources – 1) Canal Water near Bharbhaspur Village 2) Hasdeo River (Location - 1) 3) Hasdeo River (Location - 2) 4) Lake Water near Kurudih Village 5) Lake Water near Dadar Village 6) Lake water near Kashi Nagar Village 7) Lake water near Bhaisma Village 8) Lake water near Kashi Tilkeja Village Ground water samples were collected from 8 different locations – 1) Near Project Site (Hand Pump) 2) Bhulsidih Village (Hand Pump) 3) Dadar Village (Bore Well) 4) Khairbhawana Village (Hand Pump) 5) Kurudih Village (Hand Pump) 6) Urga Village (Bore Well) 7) Tarda Village (Open Well) 8) Sandail Village (Hand Pump)

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Report No	EP/REIA/33	Date	21/07/2023
Title	Executive Summary		


Sr.	Environmental Attributes	Baseline Status
	Observation	<p>Surface Water: Surface water samples SW4, SW5, SW6, SW7 and SW8 are lake water, SW 1 is canal water and SW2 & SW3 are Hasdeo river water. As water of all samples has colour, BOD and coliform it can't be used for drinking without treatment and disinfection. The reason for this may be presence of some coal mines nearby the project site</p> <p>Presence of coliform and faecal coliform in all samples may be due to use of these sources by cattle, local residents and mixing of domestic sewage.</p> <p>Ground water: GW1, GW2, GW5 and GW8 are hand pump samples, GW3, GW4 and GW6 are bore well samples and GW7 is an open well sample. All samples have deep colour. High turbidity, TDS, calcium, alkalinity, total hardness, copper and aluminium is observed in some samples. Fluoride and phenolic compounds have been observed to be greater than permissible limits in some samples. The reason for this may be the presence of some industrial activities.</p>
	Inference	Surface water sources need water treatment plant consisting of clarification, sand filter, carbon filter and disinfection treatment before they can be used for domestic purpose. For drinking water purpose, these sources need further treatment such as UF/RO plant.
4.	Noise Quality	Noise levels were measured at 8 locations in study area including proposed project site
	Observation	Equivalent noise level of villages varied from 48.2-52.1 dB [A] and 40.2-43.2 dB [A] during day and night time respectively.
	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 silt loam. Water Holding Capacity ranged from 10% to 17.6 %. Sand is ranged from 8.3 to 35 %. Silt ranged from 54.5 to 75 %. Clay is ranged from 8.3 to 36.4 %.
	Chemical	pH ranged from 7.33 to 8.58 at 25 °C Electrical Conductivity ranged from 0.188 to 0.306 mS/cm. Cation Exchange Capacity ranged from 13.2 to 35.6 meg/100gm soil. Exchangeable Sodium content ranged from 34.7 to 97 mg/kg soil.

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Sr.	Environmental Attributes	Baseline Status																																																								
		Exchangeable Potassium content ranged from 118 to 217 mg/kg soil.																																																								
	Inference – Physical & Chemical	The pH of soil samples ranges from neutral to Mildly Alkaline. The cation exchange capacity of the soils is moderate to High. The soil texture is predominantly Silt loam.																																																								
6.	Land Use / Land Cover	Satellite IRS P-6 LISS III 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	- <table border="1" data-bbox="662 817 1396 1411"> <thead> <tr> <th>Sr. No.</th> <th>LULC Class</th> <th>Area (Ha)</th> <th>Area (%)</th> </tr> </thead> <tbody> <tr><td>1</td><td>Water Bodies</td><td>3968.31</td><td>13%</td></tr> <tr><td>2</td><td>Agricultural Fallow Land</td><td>14280.44</td><td>46%</td></tr> <tr><td>3</td><td>Open Scrub</td><td>1173.13</td><td>4%</td></tr> <tr><td>4</td><td>Built Up</td><td>2834.13</td><td>9%</td></tr> <tr><td>5</td><td>Industrial area</td><td>1281.00</td><td>4%</td></tr> <tr><td>6</td><td>Road</td><td>3566.75</td><td>11%</td></tr> <tr><td>7</td><td>Railways</td><td>1166.75</td><td>4%</td></tr> <tr><td>8</td><td>Forest</td><td>2953.69</td><td>9%</td></tr> <tr><td>9</td><td>Open Mixed Jungle</td><td>881.00</td><td>3%</td></tr> <tr><td>10</td><td>Fairly Dense Mixed Jungle</td><td>812.00</td><td>3%</td></tr> <tr><td>11</td><td>Dense Mixed Jungle</td><td>415.00</td><td>1%</td></tr> <tr><td>12</td><td>Mining Area</td><td>2300.00</td><td>7%</td></tr> <tr> <td>Total</td> <td></td> <td>31224.19</td> <td>100%</td> </tr> </tbody> </table>	Sr. No.	LULC Class	Area (Ha)	Area (%)	1	Water Bodies	3968.31	13%	2	Agricultural Fallow Land	14280.44	46%	3	Open Scrub	1173.13	4%	4	Built Up	2834.13	9%	5	Industrial area	1281.00	4%	6	Road	3566.75	11%	7	Railways	1166.75	4%	8	Forest	2953.69	9%	9	Open Mixed Jungle	881.00	3%	10	Fairly Dense Mixed Jungle	812.00	3%	11	Dense Mixed Jungle	415.00	1%	12	Mining Area	2300.00	7%	Total		31224.19	100%
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Total		31224.19	100%																																																							
	Inference	It is clearly seen that the area is mostly covered with Agricultural Fallow Land - 46%, which is taken up for cultivation but is temporarily allowed to rest, cropped for one or more season, but not less than one year. Open Scrub - 4%, Protected Forest - 9%, Open Mixed Jungle - 3%, Fairly Dense Mixed Jungle - 3% and Dense Mixed Jungle - 1% are the other green areas. Around the agricultural fallow edges, human settlements (built-up area) occupies about 9% of study area. About 13% of the area is covered by water bodies like Hasdo river flowing from N to S, few nalas and some lakes.																																																								
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																																																								

ENPRO Enviro Tech and Engineers Pvt. Ltd.		 ENPRO	
Client	V.M. Techno-Soft Pvt. Ltd.		
Project	Draft Rapid EIA Report		
Report No	EP/REIA/33	Rev.	01
Title	Executive Summary	Date	21/07/2023


Sr.	Environmental Attributes	Baseline Status
		of any Rare or Endangered or Endemic or Threatened (REET) species of flora or fauna in the study area.
	Observation:	The proposed project site has no vegetation cover. Few shrubs and weed species are present here. The entire area is with terrestrial vegetation 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. No major faunal species are observed here. The most commonly seen flora in the project site are <i>Achyranthes aspera</i> , <i>Hyptis suaveolens</i> , <i>Tridax procumbens</i> are dominant here. <i>Lantana camara</i> , <i>Prosopis juliflora</i> are sporadically found near the boundary of the proposed project site. Various common types of grasses present near the site are found throughout the region.
	Inference	The ratio between abundance and frequency was used to interpret the distribution pattern of distribution pattern of species in the study area is identified as random distribution as the value of A/F ratio is 0.032 . The Shannon indices value of buffer zone is 2.794 indicates moderate diversity within the study area. Population size and Dominance of the species is 6.2% (which means no individual or few tree species are occurred continuously in the study area) and Evenness is around 96% (Indicates the species are evenly distributed in core and buffer zones).
8.	Geology	Korba district is situated in the northern part of Chhattisgarh state. The district can be divided into two physiographic divisions. viz. southern part comprising the study area (including Korba) representing Chhattisgarh pediplains with an elevation ranging between 250 and 320 m above mean sea level (m amsl). The northern parts of the district (and north Korba) are predominantly representing denudation hills of Maikal ranges of the Satpura hills. This is characterized by hilly tracks and intermediate plateau, flanked by high mounds and hillocks rising to an altitude of 1000 m. The elevation of this region ranges from 400 to 1000 m amsl. The elevation at the project site ~282 m amsl. The slope is in westerly and southwesterly directions. The main Geomorphological features and landforms developed in the district are structural plain, plateaus and denudational hills. Hasdeo (Hasdo) River is the main catchment in the area.

ENPRO Enviro Tech and Engineers Pvt. Ltd.		 ENPRO	
Client	V.M. Techno-Soft Pvt. Ltd.		
Project	Draft Rapid EIA Report		
Report No	EP/REIA/33	Rev.	01
Title	Executive Summary	Date	21/07/2023

Sr.	Environmental Attributes	Baseline Status
	Hydrology	Ground water occurrence, movement and recharge to aquifers are controlled by the degree of weathering, fracture pattern and geomorphological setup. 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 water bearing fracture zones are generally occurring within a depth of 80 m, but deeper potential fractures are also encountered at selective places. Ground water is usually developed by means of dug wells and bore wells. The weathered zones in hard rocks and fluvial alluvium along river/stream courses have been tapped extensively by the dug wells in the area and sustain 4 - 6 hours of pumping with yields of over 30 to 100 m ³ /day and even up to 200 m ³ /day at some places.
	Inference	As per ground water resource estimation studies carried out by the Central Ground Water Board (CGWB) in collaboration with the Water Resources Department (WRD), Government of Chhattisgarh for the year 2009, the Korba taluka in Korba district is in the safe category with a groundwater draft of 928 ham as against the available resource of 4235 ham. Thus the stage of ground water development is 8.37%, which denotes a scope for further development.
9.	Socio-Economic Status	The primary data were collected from the selected number of villages within the 10 km of the study area.
	Observation	A total of 57 villages and one urban town fall fully or partially in the radial distance of 10 km from the project site M/s V.M. Techno-Soft Pvt. Ltd. at Part of Khasra No. 359/2 (1 acre land), Village: Barbaspur, District: Korba, Chhattisgarh. All the project area is largely rural covering 21% of villages from Kartala taluka, 28% Katghora and 52% villages (includes one town) from Korba taluka of Korba district of Chhattisgarh State. Thus, macro level study has been carried out in the radial distance 10 km for all three talukas of Korba district.
	Inference	The study area in radial distance of 10 km comprises of 100 % of the area covering three talukas of Korba district. The study area population is 1.7% of Chhattisgarh state and 36.7% of the Korba district. The

ENPRO Enviro Tech and Engineers Pvt. Ltd.				
Client	V.M. Techno-Soft Pvt. Ltd.			
Project	Draft Rapid EIA Report			
Report No	EP/REIA/33	Rev.	01	
Title	Executive Summary	Date	21/07/2023	

Sr.	Environmental Attributes	Baseline Status
		decadal population growth rate of the study area is highest comparative to three talukas, Korba district and the Chhattisgarh state. This shows there is in-migration of the population in Korba district for livelihood.

ENPRO Enviro Tech and Engineers Pvt. Ltd.		 ENPRO	
Client	V.M. Techno-Soft Pvt. Ltd.		
Project	Draft Rapid EIA Report		
Report No	EP/REIA/33	Rev.	01
Title	Executive Summary	Date	21/07/2023

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 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 CLOUDTM Version 18 Rev. 86 to assess incremental ground level concentration within study area. Incremental ground concentration due to proposed project was found **insignificant Negative** in study area.


There shall be an 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 39.9 % green belt cover.

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	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], VOC	Quarterly - At project site and at villages in 10 km radius of project site by External Lab - 6 stations
2.	Gaseous Emission from Incinerator Stack	PM, NO _x , HCl, HF, Total Organic Carbon Dioxin & Furan CO, O ₂	Quarterly by External Lab Annually by External Lab Online monitoring (CEMS) connected to CPCB / SPCB server

ENPRO Enviro Tech and Engineers Pvt. Ltd.		 ENPRO	
Client	V.M. Techno-Soft Pvt. Ltd.		
Project	Draft Rapid EIA Report	Rev.	01
Report No	EP/REIA/33	Date	21/07/2023
Title	Executive Summary		


Sr. No.	Item	Parameters	Frequency & Responsible Party
3.	Work Place Monitoring	PM _{2.5} , PM ₁₀ , SO ₂ , NO _x , Noise, Temperature, Humidity	Quarterly by External Lab Or in-house by EHS Exe./Sr. Chemist
4.	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 in-house lab (or online, as per future guideline of CPCB)
		Flow at inlet and outlet	Online monitoring on continuous basis provided with recorder
5.	Hazardous Waste	General Parameters	Annually by External Lab.
6.	Noise	Equivalent Noise Level in dB (A)	Quarterly by External Lab At least 1 hr. continuous
7.	Ground Water	As per IS 10500	Twice in a year (except monsoon) 5 locations in 5 km radius
8.	Soil	pH, EC, Moisture, Organic matter, N, P, K, SO ₄ ⁻² , Cl ⁻ , Ca ⁺² , Mg ⁺² & Na ⁺	Annually
9.	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
10.	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.

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 V.M. Techno-Soft 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:

ENPRO Enviro Tech and Engineers Pvt. Ltd.			
Client	V.M. Techno-Soft Pvt. Ltd.		
Project	Draft Rapid EIA Report		
Report No	EP/REIA/33	Rev.	01
Title	Executive Summary	Date	21/07/2023

- Wastes produced by hospitals
- Laboratories
- Health care sub centre

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, laboratories and health care sub centre and other 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. Other Operational Activities Carried Out at Site

- Hazardous Solid Waste transportation from generation site to Bio-Medical Waste Treatment Facility (V.M. Techno-Soft) site
- Weighing and Sampling of Waste
- Incineration
- Autoclave
- Shredding

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

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 equipment (PPEs). Periodical medical check-up shall be done for all employees at least once in a year.

ENPRO Enviro Tech and Engineers Pvt. Ltd.			
Client	V.M. Techno-Soft Pvt. Ltd.		
Project	Draft Rapid EIA Report		
Report No	EP/REIA/33	Rev.	01
Title	Executive Summary	Date	21/07/2023

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 of 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 to sustain the development of this area including further development of physical infrastructural facilities. The beneficial impact of proposed project on the civil amenities will be substantial after the commencement of project activities.

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 25 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 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.

ENPRO Enviro Tech and Engineers Pvt. Ltd.			
Client	V.M. Techno-Soft Pvt. Ltd.		
Project	Draft Rapid EIA Report		
Report No	EP/REIA/33	Rev.	01
Title	Executive Summary	Date	21/07/2023

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.
- HR Manager, Plant in-charge 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.