EXECUTIVE SUMMARY

(English)

for

Proposed New Project of Common Bio Medical Waste Treatment Facility (CBMWTF) with Rotary Kiln Incinerator (2000 kg/hr * 2 Nos.), Autoclave (500 kg/hr * 8 Nos.), Shredder (500 kg/hr * 8 Nos.), Chemical Disinfection Unit (1000 kg/hr * 2 Nos.) and Plastic Dana Recycler Unit (100 kg/hr * 6)

By

SMS Envoclean Pvt. Ltd.

At

Gut No. 231, Village – Atkargaon, Tehsil – Khalapur, District - Raigad, Maharashtra.

As per 7(da) of Schedule to EIA Notification dated 14th September, 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 12th January, 2022)

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EXECUTIVE SUMMARY

1. INTRODUCTION

M/s. SMS Envoclean Pvt. Ltd. is promoted by SMS Limited who is one of the largest Infrastructure development as well as Environment & Clean Energy Projects providing company. It is having its registered office at IT Park, 20 S.T.P.I, Gayatri Nagar, Parsodi, Nagpur – 440 020, Maharashtra, India.

Unit has established its first Bio Medical Waste Treatment Facility at Plot No. 4, Near Deonar Dumping Ground (W), Opp. Sathe Nagar, Gowandi – Ghatkopar, Mankhurd link Road, Deonar, Mumbai, Maharashtra. Unit was appointed by Municipal Corporation of Greater Mumbai for the project and started its existing facility in 2009. The facility is covering about 50000 no. of beds from Mumbai region. Due to increased rate of receipt of BMW at existing facility and due to space constrain in existing facility; project proponent is now proposing to establish a new common biomedical waste treatment facility at Gut No. 231, Village – Atkargaon, Tehsil – Khalapur, District - Raigad, Maharashtra. Also new facility will collect and treat household biomedical waste generated from surrounding area as well as from the cruises / ships located on nearby ports. The proposed site is situated at Latitude: 18°45'56.57"N, Longitude: 73°19'0.72"E.

The company is an OHSAS 18001:2007, ISO 9001, & ISO 14001 certified leading company and have full-fledged plant with Incinerator, Autoclave, Chemical Disinfection and Shredding Facilities in Ghatkopar, Mumbai. It is having 59 vehicles for BMW collection and each vehicle has its assigned routes and ensures regular biomedical waste collection as per required frequency. Company has been employed with qualified and skilled staff for Management of the facility.

In addition to that, in order to assess the potential environmental impacts arising due to proposed CBMWTF and related activities, promoter has assigned the work of EIA study to M/s. ENPRO Enviro Tech & Engineers Pvt. Ltd. (ENPRO), Surat to prepare the Draft EIA Study report for proposed common bio medical waste treatment facility. 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. (ENPRO) is NABET Accredited (NABET/EIA/1922/SA 0125 valid till 12th January, 2022) under this sector. ENPRO (Environmental Laboratory) has conducted base line monitoring for the period of **6th October 2020 to 2nd January 2021.** the Environmental Laboratory is recognized by MoEF & CC and 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

Existing facility of SMS Envoclean Pvt. Ltd. at Deonar, Mumbai is covering number of health care facilities located in 75 km of radius. Over the years, total number of health care facilities are increased in the region which has increased quantity of beds. Thus, this has resulted into increased quantity of BMW generation as shown in **TABLE 1**.

At present the rate of receipt of biomedical waste is increasing on an average of 10 % per year and on other end, efficiency of overall plant (including incinerator, autoclave and shredder) is decreasing by avg. 2 % every year on its existing common BMW treatment facility located at Gowandi – Ghatkopar Mankhurd link Road, Deonar, Mumbai. The data of waste receipt at existing site is provided as under.

TABLE 1 – TREND OF WASTE RECEIPT AT EXISTING TREATMENT FACILITY FROM 2013 to 2019

Sr. No.	Year	Waste Received (MT)	% Increase in Waste Receipt
1	2013	4564.256	--
2	2014	4576.576	0.26
3	2015	5567.046	21.64
4	2016	6411.062	15.16
5	2017	6925.256	8.02
6	2018	7223.501	4.30
7	2019	7403.700	2.49
	Avg. Increase in Waste in last 5 Years		**10.3**

(Source: SMS Envoclean Pvt. Ltd.)

TABLE 2 – PROJECTION V/S TREATMENT CAPCACITY OF BMW WASTE TO BE RECEIVED AT SITE FROM 2019 to 2025

Sr. No.	Year	Projected incoming waste at 10 % increase/year, MT	Daily Treatment Capacity Required @ 300 Days/Year, TPD	Projected Treatment Capacity by BMW plant @ 2 % reduction every year	Additional Treatment Capacity Required, TPD
1	2020	8740.44	29.13	19.21	9.93
2	2021	9614.48	32.05	18.82	13.22
3	2022	10575.93	35.25	18.45	16.81
4	2023	11633.52	38.78	18.08	20.70
5	2024	12796.87	42.66	17.72	24.94
6	2025	14076.56	46.92	17.36	29.56

The existing facility has total plant area of 4000 m^2. Above data indicates that due to increasing amount of waste received at site, it is required to expand the capacity of existing facility. However, due to unavailability of space at existing facility, it is proposed to establish a new CBMWT facility at Raigad district which will be within 75 Km radius of the existing facility at Gowandi. The existing CBMWTF at Gowandi will be kept operational to handle any emergency shutdown or maintenance of proposed CBMWTF. In that case, additional waste will be sent to this new facility via dedicated truck only along with GPS tracking system. Additionally, this proposed facility will also serve as a backup facility for treatment of additional bio medical

waste generated from nearby vicinity and discarded medicines, potentially infectious wastes such as Masks, Gloves, foods, cloths and other packaging material receive from nearby port, Airports, Railway Stations, Bus stations, Institutions such as colleges and Schools and treated as per Biomedical Waste Rules 2016.

Therefore, by considering all above points; company has decided to propose a new bio medical waste treatment facility at Gut No. 231, Village – Atkargaon, Tehsil – Khalapur, District - Raigad, Maharashtra.

2.2 Location & Study Area

Proposed project shall be located Gut No. 231, Village – Atkargaon, Tehsil – Khalapur, District - Raigad, Maharashtra.

SALIENT FEATURES IN STUDY AREA OF PROPOSED PROJECT

Particulars	Details	Approx. Distance from Project Site
Geographical Co-ordinates	Latitude: 18°45'56.57"N Longitude: 73°19'0.72"E	-
Village /City / Industrial Area	Atkargaon	0.5 km (North)
District	Raigad	-
Nearest Water body	A small stream of Patalganga River Major: Adoshi Dam	0.1 km (S) 0.6 Km (SE)
Nearest Highway	Mumbai-Pune Express Highway	1.02 km (NE)
Nearest Railway station & Railway line	Khopoli Railway Station	4.02 km (NE)
Nearest Airport/ Airbase	Mumbai Airport	58 km (NW)
Protected Area/ Sanctuaries	Few protected forest (PF) within 10 km of the project site	P.F – 2.9 km West direction P.F – 9.1 km North direction
CRZ applicability	Not within study area	-
Seismic Zone	III	

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	Incinerator (Rotary Kiln)	2	2000 kg/hr
2	Autoclave	8	500 kg/hr
3	Shredder	8	500 kg/hr

4	Chemical Disinfection Unit	2	1000 kg/hr
5	Plastic Dana Recycler Unit	6	100 kg/hr
6	Effluent Treatment Plant	1	300 KL/Day

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Proposed Capacity of Effluent Treatment Plant	Flow rate: 295.5 KLD Design Capacity: 360 KLD
Cost of Proposed Project	Rs. 54 Crores
Allocation for CER Activities	Rs. 1,08,00,000/- for next 5 yrs (2 % of total Project cost) for required activities such as: i) Funds provided to support education in nearby villages ii) Provide funds for construction of health centre iii) Providing renewable resources like solar lights, panels, submersible pumps etc in nearby villages. iv) Provide funds for construction of drainage systems.
Estimated Manpower Required	The Proposed project will generate direct and indirect employment during construction and operation phase. It is estimated to generate nearly 60 employments on temporary basis during construction phase and 75 (25 Skilled, 35 Semi-skilled and 15 un-skilled) employments on permanent basis during operation phase.

Phase of project	Type of labour	No. of individuals
During construction	Contractual	60
During operations Regular Employment	Skilled	25
	Semi-skilled	35
	Un-skilled	15
	Total	**75**

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Area of Land	12700 m^2 - for proposed project
Area of Green-Belt	4695 m^2 (37 %)
Water Requirement - Total	**505 KLD** (196 KLD Fresh + 309 KLD Recycled)
Domestic	**20 KLD**
Gardening	**22 KLD**
Industrial	**463 KLD**
Incinerator, Scrubber, cooling tower make up	409 KLD
Floor Washing	5 KLD

Vehicle Washing Solution preparation and soaking for chemical disinfection Boiler Makeup for Steam generation	5 KLD 3 KLD 41 KLD
Source of Water - Recycled Fresh	309 KLD 196 KLD (from Bore well)
Waste water Generation Industrial Domestic	**314.5 KLD** 295.5 KLD 19 KLD
Mode of Treatment Industrial Domestic	 Sent to Effluent Treatment Plant and treated wastewater will be reused for Vehicle washing and incineration, scrubber within plant premises. Sent to STP and will be reused into gardening within plant premises.
Power Requirement	Project will consume 2000 KVA power
Source of Power Supply	Maharashtra Electricity Board
Emergency Power Supply	2 Nos. D.G. Set – 750 KVA
Fuel Requirement LDO/Diesel for DG Set LDO/Diesel for Boiler LDO/Diesel for Incinerator	 ~225 Liters/Hr each 350 liter/hr 300 liter/hr each
Sources of Gaseous Emissions	Incinerator – 2 no. – 2000 kg/hr (each) D.G. Sets - 2 no. – 750 KVA (each) (stand-by)
Air Pollution Control Measures	APC system of rotary incinerator will consist of Gas Quencher, High PD Variable Throat Ventury Scrubber, Alkali Scrubber, Carbon Adsorption column along with stack height of 60 m. For Boiler, Adequate stack height of 31.5 m will be provided.
Solid / Hazardous Waste Generation	Incineration ash – 18000 kg/day ETP Sludge – 700 kg/day Plastic Waste after Autoclave and shredding – 1500 kg/day Glass and metallic body implants After Autoclave – 600 kg/day Metal Sharps after Autoclave and Shredding – As generated Waste oil – 10 kg/day Used batteries – As generated STP Sludge – 21.6 kg/day

Solid / Hazardous Waste Disposal Management	Incineration ash – Sent to TSDF for landfilling ETP Sludge – Sent to TSDF Plastic Waste after Autoclave and shredding – Sent to authorized recyclers/in-house plastic dana recycling unit Glass and metallic body implants After Autoclave – Sent to authorized recycler Metal Sharps after Autoclave and Shredding – Sent to foundry for metal recovery / TSDF Waste oil – shall be send to authorized recycler Used batteries – shall be send to authorized recycler STP Sludge – shall be used as manure in gardening.

2.4 Process Description

A. Incineration Plant

Rotary kiln will be provided as primary combustion chamber and will be operated in presence of air where 800+ °C temperature is maintained. The temperature will be maintained by controlling excess air and by support of fuel such as LDO through temperature controller. The flue gas from the rotary kiln is taken to post combustion chamber where flue gas temperature is elevated to 1100+ °C and provided minimum 2 seconds retention time to achieve destruction of toxic organic compounds. Bottom ash having TOC less than 3% or LOI less than 5% is collected in solid form from the bottom of the furnace. Flue gas from the secondary combustion chamber is then taken to waste heat recovery system for generation of hot air and then treated through Air Pollution Control System consisting of gas quencher, high pressure drop variable throat ventury scrubber, alkali scrubber, carbon adsorption column to achieve the flue gas disposal norms before it is vented to atmosphere.

Proposed Incineration Plant will be designed for following condition:

Capacity
Total Incineration Capacity: 2000 kg /hr
No of Streams: 2 Nos
Total Capacity: 4000 kg/hr
Total Daily Capacity: 80 Tons/Day

Further process description and Technical Specifications of Incinerator are provided in EIA report**.**

B. Autoclave

Design Basis
Capacity

No of Streams:	8 Nos
Capacity of each streams:	500 kg/hr
Total Capacity:	4000 kg/hr
No of Batches:	16 Nos/Day/Autoclave
Time required per batch:	1 Hr 30 Min
Operating hours considered:	24 hrs/day

Operating Conditions

Operating Pressure	1.1 to 1.2 kg/cm2 g
Operating Temperature	125 deg C

Further process description and Technical Specifications of Autoclave are provided in EIA report**.**

C. Shredding

Design Basis

Capacity

No of Streams:	8 Nos
Capacity of each streams:	500 kg/hr each
Operation:	Semi continuous
Operating hours:	20 Hrs per day

Further process description and Technical Specifications of Shredder are provided in EIA report**.**

D. Chemical Disinfection Unit

Design Basis

No of Streams:	2 Nos
Capacity of each streams:	1000 kg/hr each
Batch Size:	500 kg/batch
Operation:	Semi continuous
Operating hours:	24 Hrs per day

Further process description and Technical Specifications of Chemical Disinfection Unit are provided in EIA report**.**

E. Plastic Dana Recycler Unit

No of Units:	6 Nos
Capacity of each Unit:	100 kg/hr each

Further process description of Plastic Dana Recycler Unit is provided in EIA report**.**

3. Description of Environment

Baseline environmental status in the study area was studied for the various environmental attributes, as delineated in TOR, between **6th October, 2020 to 2nd January, 2021** at different locations, including the proposed project site. The water (surface and ground), soil, air and noise samples have been collected and analysed by NABL accredited laboratory ENPRO Enviro Tech and Engineers Pvt. Ltd. (Environmental Laboratories). 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} $PM_{2.5}$ SO_2 NO_X CO NH3 HC VOC PAH	61.5 – 83.5 µg/m^3 21.4 – 41.3 µg/m^3 8.7-15.2 µg/m^3 13.4-19.6 µg/m^3 Below Detection Limit (BDL) Below Detection Limit (BDL) Below Detection Limit (BDL) Below Detection Limit (BDL) Below Detection Limit (BDL)
	Inference	All results (average) were found within NAAQ permissible limits.
2.	**Meteorological Status**	Meteorological data for period of **6th October, 2020 to 2nd January, 2021** was collected by NABL accredited laboratory ENPRO Enviro Tech and Engineers Pvt. Ltd. (Environmental Laboratories).
	Observation	Winter season Pre-dominant wind – East to West Calm condition– 0.66 % Average wind speed – 2.81 m/s Maximum wind speed – 8.7 m/s Temperature range – 14.7 to 31.6 °C Relative Humidity range – 34.3 to 99.8 %
	Inference	• Nearest residential area is Atkargaon village which is 0.5 km from proposed project site.
3.	**Water Quality**	Surface water samples were collected from 5 different sources – 1) Shankar Lake 2) Shivsagar Lake 3) River in Tuksai (Amba River) 4) Patal Ganga River 5) Bati Lake Ground water samples were collected from 8 different locations –

Sr.	Environmental Attributes	Baseline Status
		1) Project Site (Borewell) 2) Golewadi (Handpump) 3) Shashtri Nagar, Khopoli (Borewell) 4) Subhash Nagar, Khopoli (Open Well) 5) Umbare (Handpump) 6) Karambeli (Borewell) 7) Sarsan (Borewell) 8) Kurvande (Borewell)
	Observation	**Surface Water**: Surface water of all samples has BOD and coliform so it is advisable to use it for drinking after primary and disinfection treatment. Presence of coliform and fecal coliform in all samples may be due to domestic activity carried out near river bank and lakes. Domestic activity like washing of utensils, cloths, animal cleaning, human & animal excreta etc. are dumped in river and lake water. These 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. **Ground water**: Ground water sample analysis results indicate that TDS of all sample points are in desirable limit (<500 mg/L) except Nr. Project site and Golewadi locations where TDS levels are 752 mg/l and 544 mg/l respectively. Phenolic compounds have been observed to be greater than permissible limits in some samples. Microbiological parameters Coliform and Fecal Coliform are observed <2 in Ground water. Ground water is fit for use as industrial water and for non-direct contact domestic purpose after basic filtration and disinfection treatment. However, due to project activities and proposed ZLD scheme, there will be no impact on any of the above sources of water. Area falls under safe zone for ground water extraction and based valid permission from concern authority, fresh water will be withdrawn for necessary applications.
	Inference	Surface water sources need treatment of water followed by primary, disinfection, UF/RO in case of drinking water use. Ground water sources need basic filtration and disinfection treatment for the use of domestic purpose.

<table>
<tr><th>Sr.</th><th>Environmental Attributes</th><th>Baseline Status</th></tr>
<tr><td>4.</td><td>Noise Quality</td><td>Noise levels were measured at 8 locations in study area including proposed project site</td></tr>
<tr><td></td><td>Observation</td><td>Equivalent noise level of villages varied from 46.3 – 53.1 dB [A] and 34.8 – 43.1 [A] during day and night time respectively.</td></tr>
<tr><td></td><td>Inference</td><td>All results were within CPCB permissible limits</td></tr>
<tr><td>5.</td><td>Soil Quality</td><td>Soil samples were collected from 6 locations of study area including proposed project site</td></tr>
<tr><td></td><td>Observation – Physical & Chemical</td><td>pH ranged from 5.23 to 7.35 at 25 °C
Electrical Conductivity ranged from 0.082 to 0.207 mS/cm.
Exchangeable Sodium content ranged from 130 to 222 mg/kg soil.
Exchangeable Potassium content ranged from 57 to 117 mg/kg soil.</td></tr>
<tr><td></td><td>Inference – Physical & Chemical</td><td>The pH of soil samples ranges from Strong acidic to neutral. The cation exchange capacity of the soils is moderate. The calcium magnesium ratios of the samples reflect Calcium (low). The Exchangeable Potassium of the soil is low. The soil texture is predominantly sandy clay loam.</td></tr>
<tr><td>6.</td><td>Land Use / Land Cover</td><td>Satellite IRS P-6 LISS IV 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.</td></tr>
<tr><td></td><td>Observation</td><td>-
<table>
<tr><th>SL No</th><th>LULC Class</th><th>Area (Ha)</th><th>Area (%)</th></tr>
<tr><td>1</td><td>Water Bodies</td><td>2068.31</td><td>7%</td></tr>
<tr><td>2</td><td>Agricultural Fallow</td><td>4980.44</td><td>16%</td></tr>
<tr><td>3</td><td>Open Scrub</td><td>3073.13</td><td>10%</td></tr>
<tr><td>4</td><td>Built Up</td><td>1934.13</td><td>6%</td></tr>
<tr><td>5</td><td>Fairly dense scrub</td><td>1081.00</td><td>3%</td></tr>
<tr><td>6</td><td>Road</td><td>2466.75</td><td>8%</td></tr>
<tr><td>7</td><td>Forest</td><td>13953.69</td><td>44%</td></tr>
<tr><td>8</td><td>Open Mixed Jungle</td><td>1100.00</td><td>3%</td></tr>
<tr><td>9</td><td>Dense mixed jungle</td><td>650.00</td><td>2%</td></tr>
<tr><td>10</td><td>Railways</td><td>366.75</td><td>1%</td></tr>
<tr><td colspan="2">Total</td><td>31674.19</td><td>100%</td></tr>
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Sr.	Environmental Attributes	Baseline Status
	Inference	The area is mostly covered with Agricultural Fallow Land 16% and Open Mixed Jungle around 3 % respectively of the total area. which is taken up for cultivation but is temporarily allowed to rest, cropped for one or more season, but not less than one year. Thus, total cultivable land is 19%. The dense mixed Jungle is with 2%, Other class is Roads within the study area 8%, Around the Agricultural Fallow edges the Settlement (Built-up area) is located and occupies around 6%, and Forest are around 44% of the total study area. It is an area of human habitation developed due to non-agricultural use and that has a cover of buildings, transport and communication, utilities in association with water, vegetation and vacant lands. The proposed project is on Open land in Industrial area land and does not have any significant impact on the surrounding villages and habitation. The water bodies cover 7% of the total area. The water bodies cover Patalaganga River, Lonavala Lake, Amba River flowing from E to W.
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	The project site shows predominant growth of weeds like Blumea sp, Calotropis. gigantea and Argemone mexicana. There are some industries surrounding the project site. The river Patalganaga flows in south west direction of the project site. The most common trees in the project vicinity were Ficus bengalensis, Ficus religiosa, Terminalia catappa, and Albizia saman. The common weeds were Calotropis gigantia, Blumea sp, Argemone Mexicana and Alternanthera sessillis. Grasses like Cyanodon dactylon were sporadically found near the site. Agriculture was avaible but not the predominant occupation of the villagers and very few villagers cultivated paddy (rice) and some vegetables like chilli and onion. Mango orchards were observed at many places thereby attracting many frugivore birds like parakeets, barbets and koels. The entire area was devoid of any ecologically sensitive biological resources.
	Inference	The ratio between abundance and frequency was used to interpret the distribution pattern of species (Whitford, 1949). Distribution pattern of species in the study area

Sr.	Environmental Attributes	Baseline Status
		is identified as random as the value of A/F ratio is **0.04.** As a general rule higher frequency and lower abundance indicates regular distribution whereas reverse indicates the contagious distribution. This may be due to project location being surrounded by industrial belt and remaining buffer area is enriched with forested species. The Shannon indices value of buffer zone is **2.45** indicates moderate diversity within the study area. Evenness is around **58%** (Indicates the species are not much evenly distributed in core and buffer zones). This might be due to random patches of Weed species and natural species such Ficus bengalensis,Terminalia catappa (near the villages), Albizia saman, Tectona grandis and Delonix regia (near road side).
8.	**Geology**	The area is regionally underlain by the stratified basaltic lava flows of upper Cretaceous to lower Eocene age. The shallow alluvial formations of recent age also occur as narrow stretches along the Patalganga River and its tributaries and stream courses flowing in the area. Basaltic lava flows occupies more than 95% of the area of the district. These flows are normally of amygdaloidal variety and horizontally disposed over a wide stretch and give rise to table land type of topography also known as plateau. These flows occur in layered sequences ranging in thickness from 7 to 45 m and represented by massive unit at the bottom and vesicular unit at the top of the flow. These flows are separated from each other by marker bed known as 'bole bed'. A great geological feature of the Deccan Traps is its columnar jointing with its prismatic disposition. Perfect columns are generally small, of four five or six sides, but prismatic structure sometimes shows itself in basaltic and amygdaloidal columns many feet in diameter. Small columns occur in most of the slopes of the narrow winding valleys and on the flanks of the platforms. Spheroidal weathering of surficial rocks is also a characteristic feature of the area.
	Hydrology	Ground water occurrence, movement and recharge to aquifers are controlled by the degree of weathering, fracture pattern, geomorphological setup and rainfall. In the major part of the district, basalt rock units form shallow and deep aquifers whereas alluvium deposits occurring along the Patalganga River and its tributaries and its stream courses. The weathered basalts formations covered by soil / morum, and valley fills form

Sr.	Environmental Attributes	Baseline Status
		potential aquifers in the vicinity of streams and rivers and in the vast undulating plains adjacent to hilly terrain. The massive portions of basaltic flows are normally devoid of water, but when it is weathered, fractured and jointed forms potential aquifer Thus the ground water potential in basalts in the area are more site specific than general, as the intensity of weathering and presence of structures like fractures and joints provide the availability of open space for storage and movement of ground water. Generally, the water table follows topographic configuration. The depth to water is deeper in upland areas whereas in valley portion and shallow grounds, the levels are very shallow. The thickness of the fluvial alluvium varies from much less or more than 10.0 m bgl. The dug wells in the area range in depth from 7 to 15 m. The diameter of the dug wells usually varies from 4 to <12 m. In-well bores were drilled in some dug wells down to a depth of 20 to 30 m. The depth of the bore wells varies from 40 to >150 m, and even some were drilled down to 200 m. In Deccan Trap Basalt, the yield of the dug wells in different formations ranges from 40 to > 60 lpm/day depending upon the local hydrogeological conditions. The yields of borewells also show wide variations and it ranges from meagre to > 20 m2/hr. The ground water potential in fluvial alluvium areas is moderate. According to the CGWB, transmissivity and storativity of the deeper aquifer in most of the areas of basaltic terrain varies from 40.80 to 50.52 m2/day and storativity varies from 3.34x10-4 to 5.934x10-5.
	Inference	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 buildup of water levels in response to rains, and declines are due to erratic monsoon, less recharge (due to urbanization), and exploitation of groundwater resources. The depth to water levels in the study area generally varies from 1.5 to > 7.0 m bgl. The dug wells usually show phreatic, and the borewells indicate semi-confined conditions.

Sr.	Environmental Attributes	Baseline Status
		The CGWB has categorized the area as 'safe' with the stage of ground water utilization of 8.54 %, indicating good scope for further ground water 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 72 villages/towns fall fully or partially in the radial distance of 10 km from the project site. The project area shows that the population of the project area is just 0.1% to the state of Maharashtra, 2.5% to Raigad district and 31.5% of Khalapur taluka. The project area has the lowest (negative) decadal population growth rate (-43.6%), suggest for the out migration of the population from the project area to nearby sub urban area of Pune, Thane and Mumbai. The total and rural sex ratio is lowest in the project area, while urban sex ratio of project area is the highest (1059 females per thousand males) compared to the state of Maharashtra, Raigad district and its talukas. The proportion of Urban population is the lowest when compared to all four talukas of Raigad district and the state of Maharashtra. The project accommodates 21.8% of tribal population being the third highest while in total literacy rate and female literacy rates, it is stand lowest when compared to all four talukas of Raigad district and the state of Maharashtra.
	Inference	The villages within the 10 km radial distance from the project sites shows that amenities like presence of Presence of Anganwadi centers; Govt. Primary School; Use of mobile/telephone; Black toppled metal road (Damar); Total Sanitation Campaign; and regular domestic power supply are witnessed in almost 93% to 100% villages. While the other facilities like presence public/Private mode of transportation, self-help group, of untreated tap water, presence of nearby river and canal, untreated piped tap water and agriculture credit societies are present in 78% to 44% of the villages. The other public facilities like commercial bank, Community Centre, Govt. Vocational Centre ITI and Govt. PHC & SC are restricted to below 10% of the village.

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, incineration scrubber etc. within plant premises, there will be reduction in the fresh water requirement. 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.

APC system of rotary incinerator will consist of Gas Quencher, High PD Variable Throat Ventury Scrubber, Alkali Scrubber, Carbon Adsorption column along with stack height of 60 m. For Boiler, Adequate stack height of 31.5 m will be provided. Modelling of pollutant emission (TSPM, HCL, NO_X, SO_2) was carried out using AERMODCloudTM Version 18.1 Rev. 97 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 37 % green belt cover. Impact identification matrix has been developed which indicates insignificant negative impact on environmental attributes due to proposed project activities.

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[NOx] and Carbon Monoxide [CO] , VOC	Once in 3 months at project site and at Villages within 10 KM radius (Min 3 stations) By External Lab
2.	Process Gas Emission from Stack (Incineration)	PM, HCl, NOx	Once in 3 months By External Lab
		HF, 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, O2 (Or as added in future by CPCB)	Online 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
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, $SO4^{-2}$, 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 (Unit), 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.

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 SMS Envoclean Pvt. Ltd. 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
- 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

    - Biomedical Waste transportation from generation site to Bio-Medical Waste Treatment Facility (SMS Envoclean Pvt. Ltd.) site
    - Weighing and Sampling of Waste
    - Incineration
    - Autoclave
    - Shredding
    - Chemical Disinfection
    - Plastic Dana recycling
    - ETP

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 CBMW 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.

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.

The Proposed project will generate direct and indirect employment during construction and operation phase. It is estimated to generate nearly 60 employments on temporary basis during construction phase and 75 (25 Skilled, 35 Semi-skilled and 15 un-skilled) employments on permanent basis during operation phase.

Moreover, The facility has planned to spend ₹ 1,08,00,000/- Budget (2 % of the total cost Rs. 54 Crores) for social development programs under CER activities for the upcoming 5 years in nearby villages.

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, autoclaving, chemical disinfection & plastic dana recycling.

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.
- 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.