Executive Summary of EIA Report[1]

Project

Common Biomedical Waste Treatment Facility for PMC and adjoining area[2]

(by dismantling the existing CMBWTSDF and installing a new, modern facility compliant with Bio-Medical Waste Management Rules, 2016)

(Environment Clearance Application Proposal No. SIA/MH/MIS/11243/2016)[3]

Project Site

Kailash Crematorium Compound
Sangamvadi, Near Naidu Hospital
Pune, Maharashtra - 411 001

Proposed by

Pune Municipal Corporation (Owner)
PMC Main Building, Near. Mangla Theatre, Shivajinagar, Pune - 411 005

and

Passco Environmental Solutions Pvt. Ltd. (Operator)
34/4 Narayani, Erandvane, behind Eisen Pharma, Pune – 411004

Environmental Consultant

Aditya Environmental Services, Mumbai
107, Hiren Light Industrial Estate, Mogul Lane, Mahim, Mumbai - 400 016.

Contents[4]

March, 2018

---

[1] For details of Project description, impacts and mitigation measures, in addition to adherence of issued Terms of Reference for EIA, please refer the EIA Report and Annexes

[2] EIA Notification, 2006 (17th April, 2015 amendment) – 7 (da), Biomedical Waste Treatment Facility – Category B

[3] Date of EC Application : 27th April, 2016, Additional ToR for EIA issued vide' MoM 128th Meeting, SEAC – 1, 2nd -4th June, 2016

[4] Prepared in accordance with Appendix III A, EIA Notification, 2006 (amended)

01. Project Description

1.1 Project and Project Proponent

Pune Municipal Corporation, established in 1950, governs the second largest city of Maharashtra, covered in 48 municipal wards. Major responsibilities of PMC are to look after the civic and infrastructural needs of the citizens of the Pune.

Owner of the proposed facility - PMC coordinates the Bio-Medical Waste treatment operation within the PMC limits and adjoining area through its Health, Environment Department. PMC carries out periodic registration drives for registration of healthcare facilities (generators of Bio-Medical waste) starting from ward office level upwards in close coordination with Medical Department and Sanitary Inspectors. It carries out activities such as registration of healthcare facilities, payment collection and training on segregation of Bio-Medical waste, etc.

Operator of the proposed facility – M/s Passco Environmental Solutions Pvt. Ltd., incorporated in 2005, is operating a common BMW treatment storage and disposal facility of waste management capacity 1314 MT/year inside Kailash Crematorium Compound, next to Naidu Hospital, Sangamvadi, Pune – 411 001 under valid permissions of the Maharashtra Pollution Control Board. The Kailash Crematorium Compound has multiple crematoria stands and a wood gasifier based crematorium which serve the Pune city. The Kailash Common Bio-Medical Waste Treatment and Disposal Facility has been in operation at the present site since 2001.The Kailash CBMWTSDF site has public acceptance. No complaints have been received for the site since 2009.

The proposed project entails complete demolition and dismantling of the existing facility of 4351.74 sq.m and replacing it with new, higher capacity machinery. About 8 trees present at the site will be transplanted by PMC to create space for the expanded facility or new large trees will be planted. Adequate space is available within the site to park Bio-Medical waste collection vehicles when not in operation.

The proposed CBMWTSDF will cater to the entire activity-span of the Bio-Medical waste management, which includes collection, storage, transportation treatment and disposal of the Bio-Medical waste in a centralized facility.

Table 1.1 Summary Technical Details of the Proposed CBMWTSDF

Sr. No.	Parameters	Description
1	Project Proponent	Pune Municipal Corporation (Owner of the facility) and Passco Environmental Solutions Pvt. Ltd. (Operator of the facility)
2	Plot size	4351.74 m^2 plot allotted within the Kailash Crematorium Compound of PMC Site approved by MPCB for waste treatment and disposal
3	Proposed plant capacity	3285 T per year for incineration 1445.4 T per year for autoclaving **Option 1** - Incinerator (two numbers) - 250 kg/hr each (based on conventional flue gas scrubbing technology) or **Option 2** - Incinerator (one number) – 500 kg/hr (based on dry sorption technology) Autoclave (two numbers) – 110 kg/hr each

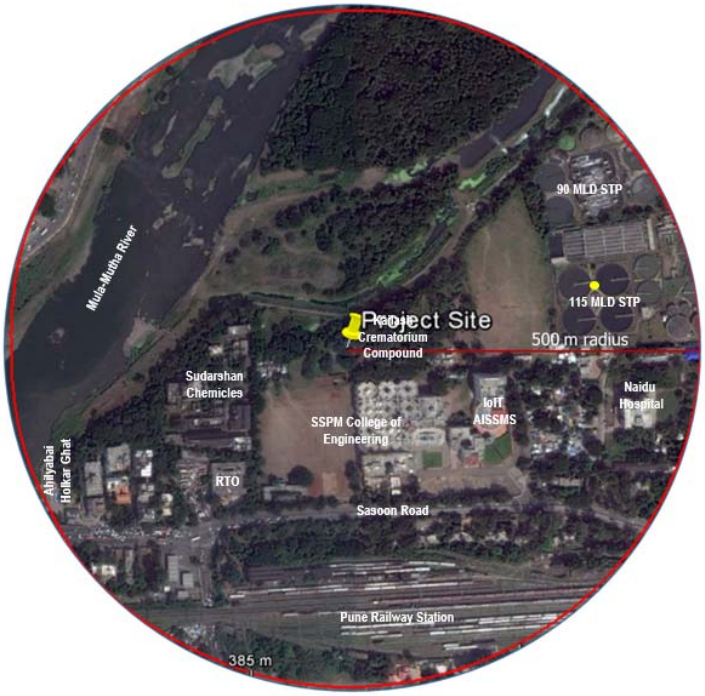
Sr. No.	Parameters	Description
		Shredder- 100 kg/hr Chemical treatment facility ETP - 10 m3/batch (for Option 1) Associated utilities and amenities (Gate, storage shed, internal vehicular pathways, storm water drain, greenbelt, firefighting arrangement, workforce amenities, administration office space, yard illumination, etc.)
4	Water requirement	Construction phase approx. 5 KLD Operation phase approx. 77.5 KLD (Option 1)
5	Source of water	Pune Municipal Corporation piped raw water supply
6	Wastewater	Waste water generated from the treatment of Bio-medical wastes during incinerator flue gas cleaning (scrubbers), autoclaving (jacked bleed), washing of floors, vehicle cargo bed washing, etc. shall be treated in an effluent treatment plant and reused in the process (scrubber media makeup)
7	Manpower	Construction phase - 25 person from local/nearby habitations operation phase - 23 semiskilled/skilled local persons
8	Electricity/power requirement	During construction phase - 15 kVA, three phase power available at site During operation phase - 325 kVA supply from the site, source MSEDCL In case of power failure DG Set will be used (100 kVA capacity)
9	Cost of project	Approx. Rs. 8.7 Crores

1.2 Need for the Project

The Kailash CBMWTSDF is operating almost at its design capacity leaving no room for management of operational contingency. In addition, newer standards of treatment and disposal as prescribed in the Bio-Medical Waste Management Rules, 2016 necessitate replacement of the old hardware with latest state-of-art equipment.

The project site is in the residential and commercial centre of Pune city. Nearest railway station – Pune is less than 1 km from the site. Pune airport is about 6.7 km from the site. The site is on the bank of Mula-Mutha river.

Figure 1.1 Site Key Location and Immediate Neighbourhood



1.3 Project Activities

Bio-medical waste will be segregated in colour coded and bar coded containers by the various Health Care Facilities (generators of Bio-medical waste). The waste will be collected from the waste generators, will be transported in specially designed, GPS tracked, closed vehicle to the proposed CBMWTSDF for treatment and disposal in accordance. The entire process of waste segregation, collection, transportation, treatment and disposal, in addition to operation of the CBMWTSDF facility, operational and environmental monitoring, maintenance of records and reporting will be carried out in accordance with Bio-Medical Waste Management Rules, 2016.

1.4 Utility Requirement

A. Water

Raw water to the tune of 5 kld will be required during construction phase for construction, concrete curing and dust suppression activities. Procured mineral water will be used for human consumption. About 77.5 kld raw water will be used during operation of CBMWTSDF, out of which 25 kld will be recycle water and 52.5 kld will be fresh water. Water will be supplied by PMC. The unit will discharge only domestic effluent. The closed loop system for process water will ensures zero discharge of effluent.

B. Power

Power demand for construction phase is estimated at 15 kVA. Three phase power is available at the site. During operation phase about 325 kVA power will be needed. Power will be supplied by MSEDCL. A DG of 100 kVA capacity is proposed as stand by power source.

C. Fuel

HSD/LDO will be used as a fuel in the CBMWTSDF. Fuel requirement for this plant will be about 1320 MT/annum (HSD basis) for incineration. Fuel consumption in the standby DG will base on actual usage. Switching over to better fuels such as natural gas will be possible in future based on availability.

1.4 Description of Pollution Control Measures

Pollution control systems are an integral part of the proposed CBMWTSDF. All pollution control systems will adhere to requirements of the Bio-Medical Waste Management Rules, 2016.

A. Management of Liquid Waste

Water discharged from the process of wet scrubbing of flue gas generated by incinerator will be collected in the seal pit and treated in a 10 kl/batch ETP based on primary treatment. The effluent will be put through screening and alkali-alum flocculation system (in a reactor cum settling tank). Clarified water will be reused for scrubber medium preparation.

B. Air Emissions

The incinerator will have a two stage alkali scrubbing system and a MS stack of 30 m height. The DG set will be fitted with 8 m tall stack. Both equipment will comply with MPCB Consent to Operate.

C. Solid Waste

Solid waste generation during wastewater treatment (ETP sludge) and treatment of CBMWTSDF (incineration ash) will be disposed to the CHWTSDF site at Ranjangaon in accordance with Hazardous and Other Waste (Management, and Transboundary Movement) Rules, 2016. Plastic waste after treatment (disinfection and shredding) will be given to registered recyclers as prescribed in the Bio-Medical Waste Management Rules, 2016.

1.5 Application for Environmental Clearance

The project falls under Category "B", activity 7 (da) as per EIA Notification dated 14th September, 2006 and its subsequent amendment dated 17th April 2015 under Bio-Medical Waste Treatment Facilities. Application for EC was submitted on MoEFCC online portal on 27th April, 2016. The project was heard by the State EAC – I for ToR for EIA approval in its 128th meeting held on 2nd June, 2016 at Mumbai in which additional ToRs for conducting EIA were issued. The EIA report is based on environmental baseline study conducted in summer season of 2016.

02. Description of Environment

2.1 Study Area

Study area for the Integrated Common Bio-Medical Waste Treatment Facility is taken as an area within 10 km radius from the approximate center of the Kailash Crematorium Compound. Baseline monitoring for environmental parameters were carried out in the summer season (March, April and May) 2016.

2.2 Study Components and Methodology

Following components of the environment have been scopes as valued for establishment of baseline environmental status for EIA study for the Project, and have been studied in commensurate details in accordance with nature of the Project and its potential impact on the environment.

(a) Site Topography - based on SOI Toposheet, elevations and drainages
(b) Regional Geology - based on published information
(c) Landuse - based on satellite imagery acquired on 4th December, 2016. Landuse determination using GIS applications and ground truthing
(d) Weather and Climate - based on IMD data
(e) Air environment – based on AAQ monitoring for scoped parameters relevant to the Project at eight locations in the within 10 km of the project site out of which five stations were in downwind direction.
(f) Noise - based on AAQ monitoring at all eight AAQ stations within 10 km of the Project site

(g) Water environment (surface and ground water) – based on grab sampling of Mula Mutha River located at north of the Project site and other two water bodies in the vicinity of project site for surface water and five locations for ground water (borewell)
(h) Soils – based on analysis of four samples taken from site and vicinity
(i) Ecology and Biodiversity – based on qualitative survey of biological components at the site and its immediate vicinity
(j) Socio Economic status - based on Census of India and other secondary data

The environmental components considered valued and relevant in the scoping stage of the EIA have been described in detail in Chapter 3 of the EIA Report.

2.3 Establishment of Baseline for Valued Environmental Components, as Identified in the Scope

Since the proposed project is a brownfield project, there will not be any major changes in existing topography, geology, land use, ecology and biodiversity, etc.

The contour level of the site is 554 m and is fairly levelled. On the north of the site flows the Mula-Mutha river. The site slopes almost by 4 to 5 m. The site land on the banks of river Mula-Mutha are of alluvial deposits which is about 5 to 15 m thick, underlaid with alluvial gravel and weathered basalt which also correspond to the ground water bearing horizon.

The land use of the impact area of the Project has been presented in the form of a map prepared from IRS-P6 LISS III imagery of May 2016, procured from the National Remote Sensing Agency (NRSA), Hyderabad. Major land use percentages of the 10 km impact area is Built-up Land 62.23%, Vegetation 18.55 %, Barren/Uncultivable/Waste Lands/Scrub Land 11.55%, Forest Land 2.42%, Water body 2.31%, Agricultural Crop Land 1.66% and Open Land (Airport) 1.29%.

Pune experiences a tropical wet and dry climate. Summer, monsoon and winter are the major seasons. The summer season is experienced mostly during the months of March to May with April being the hottest month. The mean minimum temperature is about 12°C and mean maximum temperature is about 39oC. Average annual precipitation during the monsoon is about 700 mm. Monsoon sets in the months of June and continues until October, with July usually being the wettest month. Moderate windy conditions prevail all through the year.

2.4 Air Environment

Air quality of Pune city is like of any other metro city, deteriorating, because of re-suspended dust, vehicular emissions and construction generated pollutants. The monitoring stations for Ambient Air Quality (AAQ) study were chosen based on the predominant wind directions. Habitations as most sensitive receptors of the air pollution were given priority over other receptors for the AAQ. Out of 8 monitoring stations, 5 were selected in the downward wind direction. AAQ of the Project site and selected locations was established by carrying out primary survey at eight locations within the study area in summer, 2016 (March, April and May).

Table 2.1 Summary of AAQ in the Study Area

Sampling Point	Location		PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)
AAQ1	Project Site	Average	95.8	59.9	31.6	73.7
AAQ2	Naidu Hospital	Average	108.2	61.1	29.2	62.0
AAQ3	Near Jahangir Hospital	Average	116.6	61.2	38.4	68.7
AAQ4	Vishrant Wadi	Average	131.9	47.5	37.4	54.5
AAQ5	Maruti Nagar	Average	111.7	47.6	34.0	55.4
AAQ6	Hadapsar Industrial Estate	Average	154.2	62.4	43.1	70.6
AAQ7	Pashan	Average	96.2	44.5	33.5	51.6
AAQ8	Koregaon Park	Average	94.2	40.8	20.5	38.6
NAAQS, 2009 Standards		24 hourly avg	100	60	80	80

AAQ results indicate insignificant differentiation of pollutant concentration between the sampling stations. Particulate in almost all the locations are almost close or above NAAQS owing to re-suspended particles, construction, vehicular emissions, etc. The concentration of NOx was high compared to SO_2 in all the monitoring stations. All the other pollutant parameters were well below the limits or below detectable limits.

2.5 Noise Environment

Baseline noise monitoring studies were carried out at eight stations around the proposed project site within 10 km using a noise meter Day and Night per hour 24 hourly in decibel as per CPCB Norms. Noise readings for day and night exceeded the standards at the Project Site, Naidu Hospital, Near Jahangir Hospital (Silence Zone) as the locations are near the railway station. Other locations (residential and industrial) are summarily within noise standards.

2.6 Surface Water

Surface water was sampled from Mula Mutha river and two other surface water sources (rivers and ponds/lakes) falling within the 10 km impact area of the project. The surface water samples were collected and analyzed for pollution parameters as these are not used as drinking water sources.

Table 2.2 Surface Water Monitoring Results

Sample Identification	SW1	SW2	SW3
Parameter	Location Details		
	Mula Mutha River	Pashan Lake	Katraj Lake
Dissolved Oxygen, mg/L	2.8	5.4	6.2
BOD	28.3	15	19
COD	80	38	32
Coliforms (/100ml)	280	198	145

The river water showed low DO and high BOD and COD, indicating untreated sewage draining into the river and getting mixed with the water. Presence of high number of coliforms also indicated the poor health of the river. The water samples from the lakes showed better condition than the river in terms of pollution.

2.7 Ground Water

Ground water was sampled in summer season, 2016 from bore wells at five locations within 10 km of the project site (Project Site, Vishrantwadi, Pashan, Maruti Nagar, Hadapsar Industrial Estate). Analysis for surface and ground water has been carried out for relevant scoped parameters per IS 10500, 2012. The ground water samples were slightly alkaline and showed medium salinity. The analyzed samples were within the limits prescribed in IS 105000:2012, Drinking Water standards. Low Nitrate values and absence of coliform bacteria indicates that the samples were free from contamination.

2.8 Soil Quality

Soil samples were collected near the locations of the ground water sampling and analyzed for relevant Physico-Chemical parameters. The soil at the sampling stations varied from sandy silt and loamy almost black in colour. The soil pH was found to be slightly alkaline. The conductivity was low showing less salinity of the soil. Organic content was good in locations except industrial area. Micronutrients were found to be adequate. No heavy metal contamination (Lead, Mercury, Nickel, Boron) of soil was observed.

2.9 Ecology and Biodiversity

Pune City is located at 559 m from the mean sea level and is located at the confluence of Mula - Mutha Rivers. Geographical area of Pune city is 450.69 km2. Out of the total area, 38.6 % is residential area, 1.8 % is commercial area, 9.5 % is defense area, 11 % is industrial area and 9.7 % is recreational area. It is bounded by hills on the western side. One can see the Sinhagad - Katraj hilly area to the south. About 12% area of the city is hilly area.

Pune district is divided into four agro-climatic zones as
Zone - 3: Western Ghat Zone
Zone - 4: Sub-Mountain Zone – Transition Zone-1 with red to reddish brown soils
Zone - 5: Western Maharashtra Plain Zone – Transition Zone-II with Grayish Black Soils
Zone - 6: Scarcity Zone- with kharif - cum Rabi Cropping

Many rivulets and rivers like Mula, Mutha, Pawna originates in hill ranges on west of study area, flows east ward meeting Bhima, Krishna finally emptying in Bay of Bengal. At few places along the length of rivers, Aquatic Macrophytes were observed. Riparian plants observed are excellent indicators of river condition and human activities are reasons for alterations to the environment that act to degrade rivers ecosystems causing shifts in plant community composition. Species observed were *Eichhorniacrassipes, Pistiastratiotes, Lemna sp., Azollapinnata, Alternantherasessilis, Persicariaglabra, Cyperuscompressus, Amaranthus tricolor*, etc. Published results of various studies and research papers on these riverine health indicates that due to various developmental activities in and around banks of Mula, Mutha and Pavana rivers the dominance of weed species are more common than natural vegetation clearly indicating the human activities influence in riverine vegetation.

Though, each above identified habitat experiences similar climatic conditions, they differ in edaphic conditions, location, use/interference of human and shows variation in floral composition. These members of flora support different kinds of fauna associated with it. Some species are present in more than one habitat. Floral & faunal species noted and observed/reported within study area are listed in the Chapter 3 of the EIA report.

2.10 Socio Economic Profile

The project is not likely to have any effect on the socio economic aspect of the nearby area. Summary demographic profile of the wards in the study area are given below.

Table 2.3 Summary Socio Economic Properties of the Study Area

Details	Study Area
District	Pune
Number of wards in Study area	15
Total number of households	7,44,335
Total Population	94,29,408
Male	49,24,105
Female	45,05,303
Total Literacy	71,71,723
Male	39,40,210
Female	32,31,513
Total working population	16,63,364

03. Anticipated Environmental Impacts and Mitigation Measures

3.1 Environmental Impacts due to Project Location

The present BMWTSDF is operating inside Kailash Crematorium Compound site since 2001 under valid permissions of the Maharashtra Pollution Control Board in accordance with Bio-Medical Waste (Management and Handling) Rules, 1998 (amended) following all pollution control and environmental safeguard norms. The site has multiple crematoria stands and a wood gasifier based crematorium which serve the Pune city. Thus similar activity of disposal of corpses is being carried out at the site since several decades. The site is socially accepted for cremation/terminal disposal since a long time. The site is very heavily wooded and exerts no aesthetic and minimal operational footprint with respect to incineration stack emission and operational odor. Present traffic of 5 to 8 trips of 1 ton capacity waste transport vehicles over a 24 hour period does not have a significant impact on the prevailing traffic scenario. The waste transport vehicles traffic in the proposed, enhanced capacity CBMWTSDF will be about 15 to 22 trips.

3.2 Environmental Impacts due to Project Construction

The expansion Project will entail civil work comprising construction of the building, equipment foundation, structural fabrication and cladding. Civil construction will also include boundary wall, gate room, storm water drains, internal vehicular pathways, storage sheds, amenities, ETP, etc.

Disposal of excess soil from equipment/building foundations, dismantling and construction debris will be carried out as instructed by the PMC at sites identified by them. Steel from existing structurals will be scrapped to a recycler.

Transportation of construction material shall be carried out in covered trucks and stored at site with care (with water sprinkling or geotextile cover to eliminate dusting). Good construction phase housekeeping practices will be followed.

Project activities which register adverse impacts on most number of environmental attributes are dust and noise generation and increased traffic during construction phase, additional traffic volume during the operation phase and emissions and discharge from operation of CBMWTSDF treatment hardware.

It is observed that most of the negative/adverse project impacts are related to construction phase activities and are transient in nature. All of these impacts can be mitigated by following good construction practices.

3.3 Environmental Impacts due to Project Design and Operation

The proposed CBMWTSDF will be designed and operated in accordance with requirements of Bio-

Medical Waste Management Rules, 2016 with proper treatment for all streams of pollutants, namely, emissions from incinerator, wastewater from autoclave jacket condensate and incinerator flue gas scrubbing and from chemical disinfection.

The proposed 500 kg/hr cumulative capacity incinerator(s) will be equipped with flue gas cleaning system and will meet the emission norms as specified in the Schedule II, part B of the Bio-Medical Waste Management Rules, 2016. This incinerator(s) will be a continuous point source of emissions generated out of combustion of incinerable waste and low sulphur, BS IV compliant clean fuel (HSD).

Mathematical modelling for dispersal of pollutants in the atmosphere from the incinerator stack has been carried out on Gaussian Plume Model. The mathematical dispersion modelling exercise indicates negligible/less incremental pollutant levels at the first highest concentration at 500 m east - SO2 0.06 µg, NOx 8.34 µg, PM10 1.05 µg and PM2.5 1.05.

Identification and quantitative evaluation of impacts from various construction and operation activities of the project on various attributes of the environment has been carried out by a weighted matrix method. Project activities which register adverse impacts on most number of environmental attributes are dust and noise generation and increased traffic during construction phase, additional traffic volume during the operation phase and emissions and discharge from operation of CBMWTSDF treatment hardware.

It is observed that most of the negative/adverse project impacts are related to construction phase activities and are short-term in nature. All of these impacts can be mitigated by following good construction practices.

The project would have a significant overall positive, long-term impact due to infrastructure development and new job opportunities, in addition to catering to the essential requirement of scientific disposal of Bio-Medical waste. Ecology and soil will improve due to extensive landscape and plantation of large number of trees on the site.

From the evaluation of the proposed project activities, with and without mitigation measures, it is found that even though there are negative impacts concerned mainly with the construction phase with proper mitigation measures, there is a significant positive impact on environment during operation phase. Specific impacts identified, likely from construction and operation activities, and their mitigation measures have been dealt with in detail in the Chapter 4 of the EIA Report.

04. Environmental Monitoring Plan

4.1 Technical Aspects of Monitoring

Environmental Monitoring for the proposed CBMWTSDF will be carried out in accordance with the BMW Management Rules, 2016. Summary of monitoring proposed to be carried out is as follows.

Table 4.1 Environmental Monitoring during Decommissioning Phase

Sr.	Parameter	Location	Frequency
1	Ambient air quality – PM10, PM2.5, NOx and SO_2	One ambient air quality monitoring stations near the present facility gate	Minimum of 2 measurements in a month taken twice a week, 24 hourly
2	Noise	Above locations	One, 24 hourly readings once on the day of AAQ monitoring

Table 4.2 Environmental Monitoring during Construction Phase

Sr.	Parameter	Location	Frequency
1	Ambient air quality – PM10, PM2.5, NOx and SO_2	One ambient air quality monitoring stations near the present facility gate	Minimum of 2 measurements in a month taken twice a week, 24 hourly
2	Noise	Above locations	One, 24 hourly readings once on the day of AAQ monitoring

Table 4.3 Environmental Monitoring during Operation Phase

Sr. No.	Area of Monitoring	Sampling Locations	Parameters to be Analyzed	Frequency of Sampling
Air Pollution Monitoring (Ref: Bio-Medical Waste Management Rules, 2016, Schedule II, 1, B, and Note, (h))				
1.	Stack Emission	Each stack	PM, SO_2, NOx, HCl, Hg and its compounds	Once in three months
1a.	Stack Emission	Each stack	Total Dioxins and Furans	Once in an year
Water Pollution Monitoring (Ref: Bio-Medical Waste Management Rules, 2016, Schedule II, 8)				
2.	Liquid effluent	ETP outlet	pH, Suspended solids, Oil and grease, BOD, COD and/or as per consent of MPCB	Once daily
			Bio-assay test	Once in six months

Procurement of environmental monitoring services will be done on an annual basis from laboratory (ies) recognized under Environmental (Protection) Act, 1986, or NABL accredited laboratory (ies).

05. Additional Studies

5.1 Risk Assessment

Both incineration and autoclaving are potential hazardous operations owing to following reasons.

a. Storage and handling of infections wastes
b. High temperature operations of incineration, potential for pressure build up in the system due to fuel surge or occlusion of flue gas path
c. High pressure operation of autoclave
d. Storage of fuels and chemicals (HSD/LDO, caustic lye, sodium hypochlorite and alum)

Safety systems are built in features of all the hardware proposed in the CBMWTSDF. The key safety systems integral to the hardware are as follows.

a. Incinerator - PLC controlled pressure/temperature sensing based fuel introduction, emergency shutdown mode, explosion flaps in the flue gas train, etc.
b. Autoclave - Pressure release valve

Incidences of offsite nature with any likelihood of adverse impact on public health are unlikely. An emergency containment protocol is in place for any event of loss of containment of infections waste during transport of wastes. A quantitative Risk Assessment involving identification of credible loss scenarios, consequence modelling and overlapping the consequence footprints over the CBMWTSDF site has been carried out**.** Loss of containment of a 200 l MS drum of HSD has been modelled for pool fire. The fire flame distance from the source is approx. 35 m. The fire can be fought with a non-protein foam type portable extinguisher.

5.2 Social Impacts

Proposed replacement of CBMWTSDF does not involve any land acquisition or displacement of habitations, therefore general negative impacts associated with any expansion project such as loss of land (agricultural or residential) of existing occupants is not associated with the project. Proposed expansion of CBMWTSDF will lead to added secondary and tertiary benefits due to opportunity for economic activity and employment creation during construction and operation phase of the Project.

06. Project Benefits

The basic objective of the project is to treat Bio-Medical Waste to reduce it's adverse impact on the environment, resultant pollution control and safeguard against occupational and societal health hazards due to exposure of infectious medical waste. The fundamental benefit of the proposed CBMWTSDF will be scientific collection, treatment and disposal of Bio-Medical waste in a scientific manner and in compliance with the recently revised, stringent BMW Management Rules, 2016 All the civic infrastructure necessary for operation of the CBMWTSDF is available at the site. Thus, there will not be any tangible addition, improvement or additional stress over the physical infrastructure of the site.

The site will employ 18 semi-skilled person and 5 skilled persons. The facility will continue to employ the present trained employees for the new CBMWTSDF. Improved collection and disposal of Bio-medical waste in the PMC and adjoining area will be the intangible improvement in social service delivery due to the project.

The project will generate direct employment/hire opportunity for about 15 laborers and 10 technicians during eighteen to twenty four months construction period of the facility.

07. Environmental Management Plan

EMP for the project will be systematically implemented by two distinct Environment Management teams during dismantling and construction phase, and operation phase. Environment Management teams for dismantling and construction phase, and operation phase as well as responsibilities of the various persons in the EMP Team are listed in detail the EIA Report, Chapter 10.

Summary Environment Management actions during construction phase will comprise the following:

- Ensuring zero environment and safety incidences on the site
- Compliance of Environmental Clearance and other statutory permissions, communication of the same to statutory agencies during construction phase
- Drafting the contract document with contractors, ensuring site environment and safety responsibility clearly spelt out with frequency and mode of reporting, and penalty and encouragement clauses
- Proper barricading extent for any activity in the construction zone
- Medical attention in case of any injury
- Zero environmental and safety incidences while unloading, storage, site fabrication, erection and commission of all hardware
- To ensure that all utilities (power, water, sewage evacuation, storm water, etc.) are made available in an environmentally acceptable and safe manner at the battery limit of the

construction site

- To ensure good construction practices and environmental safeguards during construction activities
- Implementation of fire safety plan, working at heights plan, excavation plan, lock and tag out plan, confined space entry plan, machine guarding, power tools safety, electrical safety, ergonomics, availability of PPE, medical evacuation preparedness, availability of portable fire extinguishers stocking of first aid boxes, maintenance of labor amenities

Summary Environment Management actions during operation phase will comprise the following.

- Training of the healthcare facilities (generators of Bio-medical waste) in proper segregation of BMW at source in accordance with BMW Rules, 2016
- Collection of wastes in accordance with bar coded bags, ensuring proper segregation of wastes according to color codes
- Adherence of all provision of the BMW Rules, 2016
- Proper SOPs for logistics operations pertaining to collecting vehicles operation, rounds to collect all wastes in most trip- economy manner
- Adherence to system for receipt of waste and incoming storage, receipt, tagging/bar code reading, storage and timely forwarding of the waste for treatment (incineration/autoclaving)
- Proper vehicle fleet maintenance and management, cleaning and upkeep
- All statutory compliances (MPCB CtO and Maharashtra EIAA EC)
- Prompt response to any offsite loss of containment of wastes (site of generation/collection and transportation)
- Statutorily compliant operation of the installed treatment hardware in the CBMWTSDF, proper maintenance, upkeep and preventive maintenance of the hardware
- Proper operation of ETP and scrubber
- Maintenances of records in accordance with BMW Rules, 2016
- Stocking of scrubbing medium and coagulation compounds
- Coordinate with the Incinerator and Autoclave Operator for monthly pollution monitoring from 3rd party laboratories, chemical analysis in the site laboratory to ensure proper operation of the scrubber and ETP
- Maintain greenbelt through on-contract horticulture agency
- Maintain overall site, storm water drains, municipal solid waste, rainwater recharge, etc.

Figure 7.1 Environment Management Team for Dismantling and Construction Phase, and Operation Phase