

# Executive Summary

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## 1. Introduction

Management of pollution and the waste generated from the industries is always been a challenging task faced by the country. Due to the rapid development of industries, huge quantum of associated hazardous wastes are envisaged more, especially in a few districts of Chhattisgarh like Baloda Bazar, Raipur. Presently there are no existing TSDFs in Chhattisgarh State and hence, to meet this requirement, Chhattisgarh State Industrial Development Corporation Limited (CSIDCL) has allotted land for the establishment of HWTSDF to Ramky Enviro Engineers Limited (REEL) which proposes to establish a common hazardous waste treatment, storage and disposal facility along with units for recycling of important utilizable components from hazardous wastes. As per EIA Notification S.O. No 1533 dated 14<sup>th</sup> September 2006 and subsequent amendments the proposed project is categorized under Project/ Activity 7 (d) & 7 (da) Common Hazardous Waste Treatment, Storage and Disposal Facility (TSDFs), Category “A”. It requires environmental clearance from EAC, MoEF&CC, New Delhi. The site is proposed at Khasra No. 1004 to 1022, 1027 & 1028 Kesda (V), Simga (T), Baloda Bazar (D), Chhattisgarh. The proposed hazardous waste TSDF at Baloda Bazar District will be established in an area of around 50 acres. The project proposes to set up a Common Hazardous Waste Treatment, Storage and Disposal Facility (CHWTSDF) including Biomedical Waste treatment (BMW), Alternate Fuel and Raw material facility (AFR), aluminium dross, and other recycling facilities, the details of which are presented in Table 1. The present proposal was considered by the Expert Appraisal Committee (Infra – 2) in its 55<sup>th</sup> meeting held during 24<sup>th</sup> – 25<sup>th</sup> September, 2020 for determination of the Terms of Reference (ToR) for undertaking a detailed EIA Study in accordance with the provisions of the EIA notification dated September 14, 2006 and subsequent amendments. The EAC has given ToR vide its letter No. F. No. 10-54/2020 –IA-III dated 3<sup>rd</sup> November 2020.

## 2. Details of project capacity

The Common Hazardous Waste Treatment, Storage and Disposal Facility has the following principal waste disposal/ recycling or recovery units such as facilities for the treatment of all kind of hazardous waste i.e. hazardous in nature/contaminated with hazardous waste/waste which can be dispose through TSDF as per the rules, guidelines issued by MoEF&CC, such as BMW, E-waste, used oil, spent solvent, paper and plastic and Alternative Fuel and Raw Material recovery. The details of the proposed project capacities are given below in **Table 1**.

**Table 1: Proposed project details and capacities**

S.No	Type of Wastes/Unit	Capacity Scalable Up to
1	Secured landfill (Direct to Landfill)	4,50,000 MTA
2	Landfill After Treatment	
3	Hazardous Waste Incineration(Common for Hazardous waste Biomedical & Other incinerable waste)	Incinerator scalable up to 1.5 Tons/hr in modular form
4	Bio Medical Waste (BMW)	15 TPD
5	E Waste Recycling	100 TPD
6	Alternative Fuel and Raw Material Facility (AFRF)	100 TPD
7	Plastic Recycling (hazardous in nature / contaminated elements)	20 TPD
8	Paper Recycling (hazardous in nature /contaminated elements )	50 TPD
9	Solvent Recovery (hazardous in nature/contaminated elements)	18 KLD
10	Aluminum Dross	100 TPD
11	Used / Spent Oil Recycling	15 KLD
12	Renewable Energy	2 MW
13	SPL (Carbon Portion)-Hazardous in nature and contaminated elements	100 TPD
14	SPL (Refractory Portion)-Hazardous in Nature/Contaminated elements	100 TPD
15	Drum / Decontamination Recycling Plant	200 Drum/day

All proposed activities of recycle, reuse recovery, decontamination, disinfection, preprocessing and utilization before any waste goes for scientific disposal and landfill shall be following the Hazardous And Other Wastes (Management and Transboundary Movement) Rules, 2016 and its amendments, guidelines and directions from various statutory bodies and will be established and operated by M/s Ramky Enviro Engineers Limited. The facility will provide a 'one-stop' solution for management of industrial hazardous wastes. The CHWTSDF facility is being proposed for recycling / recovery, alternate fuel and raw material facility along with the TSDF & disposal operations for all kinds of hazardous wastes and biomedical wastes generated in Chhattisgarh.

### 3. Size of operation and its associated activities

The project is proposed to be established in an area of around 50 acres (20.42 Ha). The project is proposed to treat hazardous and biomedical wastes as well as comprise of AFRF, paper recycling, plastic recycling, E-waste recycling, used oil / spent oil recycling, lead recycling, drum recycling / decontamination recycling plant, solvent recovery, Aluminum dross reprocessing, Spent Pot Liner (SPL) (Refractory portion) processing & disposal, SPL (Carbon portion) reprocessing and renewable energy facilities.

### 4. Details of land area breakup

The facilities proposed for the treatment of all types of Hazardous waste/contaminated with hazardous waste/Rules having the option to get it disposed through Hazardous waste CHWTSDF comprising of BMW, E-waste, recycling of used oil, spent solvent, paper, plastic,

and Alternative fuel and raw material recovery. The project is proposed in an area of 50 acres, with sufficient green belt and the details of land area breakup are presented in **Table 2**.

**Table 2: Land area breakup**

S. No	Proposed Facility	Land Area in Acres
1	Landfill	28.00
2	Greenbelt	16.4
3	Incinerator	0.29
4	Leachate Collection pond	0.61
5	Other Facility	4.70
Total Area		50.00

## 5. Water requirement

The source of water for the proposed project is from bore well proposed to be dug with prior permission of CGWA and District Collector, Baloda Bazar. The details of the water requirement are given in **Table 3**.

**Table 3: Water requirement**

Process/Facility	Water required (KLD)			Wastewater Generation (KLD)	Remarks
	Fresh	Treated	Total		
Secured Land Fill	-	2	2	1.4	Sent for Leachate treatment & reused
BMW + Incinerator + plant-wet & venturi scrubber	20	16	36	25.2	Sent to wastewater treatment scheme for treatment & reuse in greenbelt
Boiler spent solvent & used oil recovery	22	-	22	13.2	
Plastic, Paper, recycling & E-waste	4	-	4	2.4	
Leachate	-	-	0	0	
Truck wheel wash	-	2	2	1.4	
Sub Total	46	20	66	43.6	
Domestic	4	-	4	3.6	Sent to septic tank or soak pit
Greenbelt	-	30	30	-	
Grand Total	50	50	100	47.2	

The required freshwater will be sourced from CGWA – Chhattisgarh

## 6. Power and fuel requirement

The details of the power required for operation of the facility and fuel required for running DG sets for emergency use during power failure are given in **Table 4**

**Table 4: Power and fuel requirement**

Details	kVA	Remarks
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Power required	375	Sourced from state electricity board
DG set	1 x 375 kVA	Used for emergency power backup
HSD Fuel for DG set/Incinerator	80 Lts/hr	Purchased from local dealers

## 7. Required manpower

The details of skilled and unskilled manpower required for the proposed project are given below in **Table 5**.

**Table 5: Manpower details**

S.No	Description	Direct	Remarks
1	Administrative	5	During Construction period, around 50 persons at peak period Indirect employment during operation will be around 40 persons
2	Skilled Manpower	15	
3	Unskilled Manpower	30	
<b>Total</b>		<b>50</b>	

## 8. Baseline environmental status

The baseline monitoring studies have been carried out during October to December, 2020. The predominant wind direction during study period was NE to SW.

### Air quality

The ambient air quality was monitored at 10 locations. The minimum and maximum 98<sup>th</sup> percentile values of pollutants are shown in **Table 6**

**Table 6: Results of ambient air quality ( $\mu\text{g}/\text{m}^3$ )**

Details	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>x</sub>	O <sub>3</sub>	CO	NH <sub>3</sub>
Minimum In 98 <sup>th</sup> Percentile	43.8	25.8	10.9	21.1	<20	380	15.6
Maximum In 98 <sup>th</sup> Percentile	64.1	38.4	17.4	28.1	25.8	680	26.8
<b>NAAQ Standards 2009</b>	<b>100</b>	<b>60</b>	<b>80</b>	<b>80</b>	<b>100</b> <b>(8 hourly)</b>	<b>2000</b> <b>(8 hourly)</b>	<b>400</b>

### Ground and surface water quality

Water samples in the study area were collected from 10 ground and 5 surface sources respectively. The samples were analyzed for various physical and chemical characteristics, the results of which are given in **Table 7** and **Table 8** respectively.

**Table 7: Results of ground water analysis**

Parameters	Units	Minimum	Maximum	Drinking water Standards IS:10500:2012	
				Acceptable	Permissible
pH	-	6.8	7.9	6.5-8.5	No Relaxation
TDS	mg/l	275	905	500	2000
Chlorides	mg/l	142	308	250	1000

Hardness	mg/l	197	648	200	600
Fluorides	mg/l	<0.1	<0.1	1.0	1.5

**Table 8 Results of surface water analysis**

Parameters	Units	Min	Max	CPCB water quality criteria as updated on 11 <sup>th</sup> September, 2017				
				A	B	C	D	E
pH	-	7.2	8.2	6.5-8.5		6-9	6.5-8.5	6-8.5
EC	µS/cm	119	150	-	-	-	-	2250
DO	mg/l	5.2	5.8	6	5	4	4	-
BOD	mg/l	2	6	2	3	3	-	-
Total coliform	MPN/100ml	63	122	50	500	5000	-	-

**Noise quality**

Baseline noise levels have been monitored at 10 locations within the study zone, using a continuous noise measurement device. The results are presented in **Table 9**. The day equivalents during the study period ranged between **49.9 to 55.8 dB (A)** whereas the night equivalents were in the range of **39.9 to 45.5 dB (A)**. It was observed that the day equivalents and the night equivalents were within the AAQ standards in respect of Noise SO 123 (E) dt 14<sup>th</sup> Feb 2000 for Residential and Commercial area. From the results it can be seen that the day equivalents and night equivalents were within the specified standards except day equivalent on site (53.6), which is near to the standards of residential area.

**Table 9: Noise levels – dB (A)**

Parameters	Minimum	Maximum	Standards	
			Residential	Commercial
Day Equivalent ( $L_{Day}$ )	49.9	55.8	<b>55</b>	<b>65</b>
Night Equivalent ( $L_{Night}$ )	39.9	45.5	<b>45</b>	<b>55</b>

**Soil quality**

To determine the impact of proposed activity on soil and agricultural productivity soil samples were collected from 10 locations. The results of important parameters are summarized in **Table 10**.

**Table 10: Soil quality in the study area**

Parameters	Minimum	Maximum	Standard Soil Classification – (Indian Council of Agricultural Research, New Delhi)
pH	6.2	6.9	Acidic<6.0, Normal to Saline 6.0-8.5, Tending to become Alkaline8.6 to 9.0, Alkaline above 9.
EC (µS/cm)	111	200	Normal<1000, Critical for germination 1000-2000, Critical for growing 2000 - 4000, Injurious to most crops>4000

Parameters	Minimum	Maximum	Standard Soil Classification – (Indian Council of Agricultural Research, New Delhi)
Organic carbon (%)	0.16	0.64	Low < 0.5, Medium 0.5 – 0.75, High > 0.75
Nitrogen (kg/Ha)	123	262	Low below 280, Medium 280-560, High above 560
Phosphorous (kg/Ha)	8	16	Low below 10, Medium 10-25, High above 25
Potassium (kg/Ha)	244	354	Low below 110, Medium 110-280 High above 280

## 9. Anticipated impacts

Construction phase works include site clearance, site preparation, building works, infrastructure provision and activities. The impacts due to construction activities are short term and are limited to construction phase. The impacts will be mainly on air, water and soil quality, landuse and socio-economic conditions. The major sources of air pollution are as follows:

1. Area source emissions from Landfill operations
2. Point source emissions from Incinerator, DG set.
3. Boilers for used oil and solvent recovery facility

The area source emissions and line source emissions will be within the plant premises, whereas point source emissions expected from the proposed project and predicted GLCs are given in **Table 11**.

**Table 11: Post project scenario (units in  $\mu\text{g}/\text{m}^3$ )**

Particulars	Particulate Matter (PM <sub>10</sub> )	Particulate Matter (PM <sub>2.5</sub> )	Sulphur Dioxide (SO <sub>2</sub> )	Oxides of Nitrogen (NO <sub>x</sub> )
<b>Baseline Scenario (Max)</b>	64.1	38.4	17.4	28.1
<b>Predicted GLC (Max)</b>	2.2	2.2	3.5	5.1
<b>Overall Scenario (Worst Case)</b>	66.3	40.6	20.9	33.2
<b>NAAQ Standards 2009(24 hr)</b>	100	60	80	80

## 10. Environmental monitoring program

The main essence of environmental monitoring program is that there should not be much time lack between commencement of damage to environment and adoption of mitigation measures to control the damage of various environmental parameters that are being affected due to proposed activity. Environmental monitoring program has been prepared for assessing the efficiency of implementation of Environment Management Plan and details of the same are given in **Table 12**.

**Table 12: Environmental monitoring during operational phase**

S.No	Potential Impact	Action to be followed	Parameters for monitoring	Frequency of monitoring
1.	Air emissions	Stack emissions from Incinerator	Operating hours, Temperature, Pressure, TOC of residues, LOI of residues, Stack temp, CO, PM, HCl, HF, SO <sub>2</sub> , NO <sub>x</sub> , TOC, Mercury, Heavy metals, dioxins and furans as prescribed in CFE /CTE	Once in a month/ as per CTO conditions given by SPCB.
		Gas quality from landfill areas	VOC, H <sub>2</sub> S	
		Stack emissions from DG sets	As per CFE conditions PM, SO <sub>2</sub> , NO <sub>x</sub>	
		AAQ within the project premises. The vehicles used shall have PUC certificate.	As per CFE conditions/ NAAQ Standards Vehicle logs to be Maintained	
		Meteorological data	Wind speed, direction, temp., relative humidity and rainfall.	
2.	Noise	Noise generated from operation of boilers, cooling towers, etc. to be monitored	Continuous noise level recording	Once in a month/ as per CTO conditions given by SPCB
3.	Wastewater discharge (leachate)	Comply with wastewater discharge standards as per CPCB/SPCB	pH, TSS, TDS, BOD, COD & Heavy metals	Daily at regular intervals/ as per CTO conditions given by SPCB
4.	Solid waste/Haz. waste	Comply with HWM rules	Comply with HWM rules	Once in a month/ as per CTO conditions given by SPCB
5.	Ground water quality	Monitoring ground water quality in and around project site	Monitoring parameters as per CPCB norms	Once in a quarter/ as per CTO conditions given by SPCB
6.	Flora and fauna	Vegetation, green cover and greenbelt development	Survival of native plant species and maintenance of planted species	Once in a season/ as per CTO conditions given by SPCB
7.	Soil quality	Checking and maintenance of soil	Physico-chemical parameters such as NPK,	Once in a quarter/ as per

S.No	Potential Impact	Action to be followed	Parameters for monitoring	Frequency of monitoring
		quality in and around the project site	heavy metals etc.	CTO conditions given by SPCB
8.	Health	Health check-ups for employees and migrant labour	All relevant parameters of occupational health	Once in six months/ as per CTO issued by SPCB/ as per Factories Act

## 11. Risk analysis

Risk assessment was carried out to identify and quantify major hazards and the risk associated with various operations of the proposed project that may lead to an emergency (disaster) affecting public safety and health. A systematic analysis of the chemicals and their quantities of storage has been carried out to determine threshold quantities as notified by GoI Rules, 1989 and amended in 2000. The computations of FETI for HSD and other solvents at proposed TSDF is carried out. Based on F&EI, HSD and other solvents come under “low” category and “nil to moderate” toxicity. The effects on humans due to variations in heat flux and duration of exposure have been developed in the form of a probit model. For computing the damage, distance from the tank failure area, ALOHA software is used. It is observed that for HSD, heat radiation of 12.5 kW/m<sup>2</sup> the damage distance is found to be less than 10 m from the accidental site, for heat radiation of 4.5 kW/m<sup>2</sup>, the impact distance is in the range of 10-14 m, for heat radiation intensity of 1.6 kW/m<sup>2</sup>, the damage distance is in the range of 16- 20m m. However, all necessary measures to minimize the risk due to the proposed project will be taken during design stage and also during operation period. In view of the hazardous nature of products/process handled at the project site, proposed project shall prepare (both on-site and off-site) Emergency Preparedness Plan. The plan is based on various probable scenarios like fire, explosion, natural calamities etc. Besides, it has also got good infrastructure and a dedicated team to handle emergency situations.

## 12. Project benefits

The main benefits of the proposed project are:

- Wastes generated from existing industries will be addressed in a better and environmentally safe way.
- The hazardous biomedical wastes generated in the state shall have a scientific and clean management and disposal system through the proposed BMW treatment facility
- It provides a one stop solution for the management of various types of wastes such as hazardous waste, biomedical waste and domestic hazardous waste etc.
- Minimizes pollution load on environment with an additional benefit of green and clean surroundings.



- Possibility for recovery of materials thereby conserving the natural resources
- Management of wastes is relatively easier and economically viable at a common facility
- Most viable option in the absence or availability of expertise.
- Reduced environmental liability due to captive storage of hazardous waste in the premises of industries
- Prevention of natural resource contamination
- Employment opportunity is envisioned for the nearby inhabitants thereby improving their lifestyle & economic conditions
- New infrastructure and development of amenities in and around the project site is expected

### 13. Environmental management plan

The Environmental management plan (EMP) is required to ensure sustainable development in the area of the proposed project site. The purpose of the EMP is to minimize the potential environmental impacts from the project and to mitigate the adverse impacts. Details of EMP are given in **Table 13**.

**Table 13: Mitigation measures proposed during operation phase**

Air quality management	Incinerator and boiler will be provided with APCDs with a stack height meeting MoEF&CC Guidelines, spray dryer, multi cyclone, bag house, wet scrubber etc.
	DG set will be provided with a stack, the height of which shall meet MoEF&CC Guidelines or 1 m above the tallest structure in the project area for proper dispersion of sulfur dioxide and oxides of nitrogen.
	Internal roads will be concreted / asphalted to reduce dust emissions
	Speed restriction will be followed within the project and speed breakers will be provided at entry and exit points
	Gas management system in secured landfill will be provided
	Sufficient greenbelt and buffer areas will be provided
Odor control	Dilution of odorant by odour counteraction or neutralize by spraying Ecosorb (organic and biodegradable chemical) around odour generation areas at regular intervals.
	Covering the landfill area under operation daily with layer of earth, clay or a similar material
Gas management	To minimize the gas generation in the landfill, the organic based waste will be diverted to incineration
	To manage the gas generated a venting system with flaring arrangement will be provided.
Water quality mitigation	The leachate generated from landfill will be collected into leachate collection ponds.

measures	The leachate collected will partly treated and will be sent in to spray drier of incinerator and a part is sprayed back onto landfill for dust suppression, stabilization of hazardous waste, etc.
	The domestic wastewater will be collected and treated in septic tank/soak pit or portable STP and reused for greenbelt
	The wastewater from TSDF operations, floor washings, workshop etc., will be collected, disinfected (in case of BMW wastewater) then treated for oil and suspended solids by skimming and settling in sedimentation tank and the clarified water would be recycle for incinerator spray drier, washing, spraying on landfill and for dust suppression, etc.,
Noise mitigation measures	Proper enclosures as per CPCB guidelines will be provided for all the high noise generating equipment. All the design/installation precautions as specified by the manufacturers with respect to noise control are strictly adhered to. Major noise generating sources would be insulated adequately by providing suitable enclosures. Other than the regular maintenance of the various equipment, ear plugs are provided to the personnel working close to the noise generating units. All the openings like covers, partitions are designed properly.
Solid waste mitigation measures	The ash generated from incineration plant will be used as daily cover in secured landfill
	The sludge generated in the leachate pond will be disposed in the secured land fill of the proposed facility
Occupational health & safety	Periodic health checks to the workers and employees of facility shall be undertaken for early detection and control of communicable diseases
	Personal protective equipment (PPE) shall be provided to all workers handling TSDF operations and their work safety shall be ensured.
	Preventive measures for potential fire hazards with requisite fire detection, firefighting facilities and adequate water storage, etc.
	Provide regular training for workers with respect to OHS/EHS etc.

#### 14. Cost estimate of the project

The costing for each of the plant facilities has been done with appropriate and high quality civil structures, buildings, plant and machineries. The total cost of the project is estimated to be around **Rs. 36 Crores**. The overall project cost works out to be around Rs. 70-75 Crores, which includes Land and other CSIDCL regulatory costs. The EMP cost of the project is estimated to be **3.2 Crores** and recurring amount is **Rs 32 lakhs** per annum. The CSR budget will be allocated as per rule prescribed by the Government of India / Companies Act 2013.