PRE- FEASIBILITY REPORT FOR THE PROPOSED COMMON HAZARDOUS WASTE INCINERATION FACILITY

At

Plot No.125,
Gadag Industrial Area,
Narasapura,
Gadag - 582102

By

M/s. Gadag Envirotech Pvt Ltd,
Plot No.125
Gadag Industrial Area,
Narasapura,
Gadag – 582102
Karnataka.

Submitted to

MOEF & CC
New Delhi.

Environmental Consultants

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

EXECUTIVE SUMMARY

Along with encouraging the industrial growth, the Government of Karnataka is also conscious about the environmental compliances of the industries. Karnataka is one of the State generating significant amounts of Hazardous waste in India. In view of this, it had taken steps to encourage private entrepreneurs to install Common hazardous waste incineration facility (CHWIF) for disposal of hazardous chemical Waste (liquid, solid and semi-solid).

The present Hazardous Waste incineration facility proposed by Gadag Envirotech Pvt Ltd. is proposed at Gadag Industrial Area, Narasapura, Gadag District, Karnataka State. It is a planned strategically to cater to the needs of industries in Northern Karnataka. Proposed facility will provide environmentally and economically sound disposal of waste generated in the region, minimizing long distance haulage of waste. As per EIA notification, the project necessary to get Environmental Clearance (EC) prior to establishment of the proposed project. The project falls under Serial No 7(d), A Category, in the schedule of activities under EIA Notification 2006. For this purpose, the application is made for obtaining the Environmental Clearance (EC) to MoEF & CC. The pre-feasibility report is prepared as per the guidelines issued by MoEF & CC under EIA Notification.

Project at a glance:

Sl.No	Description	Project Details
1	Name of project proponent & Address	Hazardous Waste Incineration Facility **Registered Office:** Head office 377, Kurugunteshwar Nilaya, Chikkasandar Nagar, Hesaraghatta Main Road, T. Dasarahalli, Bangalore **Project Site:** M/s. Gadag Envirotech Pvt Ltd, Plot No.125 Gadag Industrial Area, Narasapura, Gadag – 582102, Karnataka State, India.
2	Project Category and Size of the industry	Serial No. 7(d) – "A" Category in the schedule under EIA notification – 2006 Small Scale Unit
3	Project Capital Cost	Rs. 2.5 Crores
4	Constitution of the Organization	Private
5	Product	Transportation, Storage, Stabilization and incinera-

		tion of Incinerable Hazardous Waste.
6	Raw Materials	Hazardous Waste from Industries.
7	Location of the site	Plot No.125 Gadag Industrial Area, Narasapura, Gadag.
8	Coordinates	Latitude 15^0 27' 53.16" N and Longitude 75^0 40' 08.67" E
9	Plot/Survey/Khata No	Plot No.125
10	Contact details	Mrs. Aruna D, Phone No - 9845449405.
11	E mail id	gadagenviro@gmail.com
12	Village	Betageri
13	Taluk	Gadag
14	District	Gadag
15	State	Karnataka
16	**Resource requirement**	
i	Land	Plot area: 4,047 sq m (1 Acres)
ii	Water	Source: KIADB **Operation phase :** • Domestic purpose – 800 LPD • Gardening – 1200 LPD
iii	Electricity	Source: KIADB • 50 HP • Backup power : 63 KVA D.G. set during operation phase in case of power failure
iv	Fuel	**Operation phase :** • For Incinerator: LDO/HSD • For D.G. set, HSD : 12.6 litre/Hr
v	Man power	18 Nos
17	**Sources of pollution**	
i	Waste water generation	Sewage from labors and technical staff of about 900 LPD
ii	Air emission	Flue gas emission: Particulate matters, Sulphur oxides Process emission: Particulate matters, sulphur oxides, nitrous oxides, HCl, CO, Dioxins, Furans, NH3, TOC, Cl2, HC, H2S,Hg (Sb+As+Pb+Cr+CO+Cu+Mn+Ni+V+Cd+Th+Hg) etc.

iii	Solid/ hazardous waste generation	**Construction phase :** Construction waste i.e. Broken brick, waste concrete Operation phase : • Incineration ash : 20 MT/year • Used oil : 2000 lit/year • Discarded containers & bags : 5 MT/year
18	**Mode of treatment**	
i	Waste water	Sewage to be generated during construction as well as operation phase shall be treated in septic tank/soak pit.
ii	Air	Adequate Air pollution control devices (Venturi scrubber) shall be provided to achieve the stipulated norms.
iii	Solid/ hazardous waste	Solid/hazardous wastes will be disposed-off to authorise TSDF.

CHAPTER 2

INTRODUCTION OF THE PROJECT / BACKGROUND INFORMATION

2. INTRODUCTION

2(i) Identification of project & project proponent

2.1 Identification of Project

M/s. Gadag Envirotech Pvt Ltd, has proposed to set up a small scale Common Hazardous waste Incineration Facility for thermal destruction of hazardous waste having characteristics of non-easily biodegradable/toxic/incinerable/combustible in nature. The incinerable waste may be in solid/ semi solid or liquid form.
The unit will be set up on an area measuring One Acre in industrially notified area at Gadag in Karnataka developed by Karnataka Industrial Area Development Board. Where in, all civic amenities and infrastructure facilities required for industrial developments are available. The industrial area is well connected by railways and by road.

The proposed Incinerator facility will have a capacity of 250 kg/hr of hazardous incinerable waste. The prime objective of Gadag Envirotech Pvt Ltd. is to facilitate disposal of incinerable Hazardous waste generated in the northern part of Karnataka.

2.2 About the Project Proponent

Mrs. Aruna D, is the proprietor for M/s. Gadag Envirotech Pvt Ltd, and they intend to set up a Common Hazardous waste incineration facility at Plot No.125 Gadag Industrial Area, Narasapura, Gadag – 582102, Karnataka State, India. The proponent has established Common Bio- medical waste disposal facility at Gadag and is in operation. The Proprietor and her father Mr. Nagaraj has good amount of experience in handling industrial waste. Earlier, he has worked in the capacity of General Manager at Karnataka Waste Management Facility of Ramky Enviro Engineers, Bangalore.

2(ii) Brief description and nature of the project

As per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, hazardous waste generated by industries has to be collected, transported, treated and disposed without causing any environmental damage. The disposal facility should be environmentally sound without causing any adverse impact on health and

environment which may result from such waste. Gadag Enviro tech Pvt Ltd proposes to collect Incinerable hazardous waste generated from industries for incineration in their proposed facility.

Incineration has benefit of reducing volume and toxicity of wastes. The proposed facility will have facility for Incineration designed to meet CPCB standards and will cater to environmentally and economically sound disposal of Hazardous waste generated. The proposed project is well justified in meeting the need of the industries located in the Northern Karnataka viz districts of Haveri, Dharwad, Hubli, Bijapur, Bidar, Belgaum, Bellary, Gadag etc.

The proposed project will have the following facilities:

a) KSPCB approved Transport vehicle 2 Nos
b) Secured Storage facility within the plant
c) Incinerator of 250 kg/hr capacity with air pollution control equipment
d) DG set – 63 KVA

2(iii) Need for the project & its importance to region

In Karnataka the quantity of different kinds of hazardous waste generated as per the inventory by Karnataka state pollution control Board as on 31-03-2016 is as under.

Recyclable/reprocess able waste : 1,18,765.99 MTPA
Incinerable waste : 61,337.89 MTPA
Land fillable waste : 67,110.46 MTPA
Total : 2,47,214.34 MTPA

(* Assuming that the Units are Operating at 100% Capacity)

SL. No.	Regional Office	Total No. of Industries	Land fillable HW (MT/A)	Recyclable HW (MT/A)	Incinerable HW (MT/A)	Total Qty HW Generation (MT/A)
1	Bagalkot	35	0.00	135.25	9.26	144.51
2	Belgaum-1	109	580.13	326.19	232.28	1138.60
3	Belgaum-2	22	37.40	91.51	114.47	243.38
4	Bellary	68	314.75	13005.36	941.54	14261.65
5	Bidar	49	3753.92	205.72	1408.25	5367.89
6	Bijapur	35	36.50	150.48	441.37	628.35
7	Dharwad	87	1161.26	929.10	1256.55	3346.90
8	Gadag	9	0.60	98.60	4.70	103.90

9	Gulbarga	28	0.00	907.43	1119.10	2026.53
10	Haveri	13	150.00	51.33	5.35	206.68
11	Karwar	33	0.13	2871.76	243.32	3115.21
12	Koppal	42	1220.40	1182.88	9.29	2412.57
13	Raichur	26	2470.50	860.95	1580.91	4912.36
14	Yadgir	11	0.00	16.90	0.65	17.55
NORTHERN KARNATAKA		**567**	**8,627.59**	**29,461.05**	**7,367.04**	**37,926.03**

Out of 61,337.89 MTPA incinerable waste generated in Karnataka, the quantity of incinerable waste generation in Northern Karnataka is 7,367.04 MTPA.

Day by day, waste generation from industries is increasing due to rapid industrialization. As a matter of consequence, a need is arising to develop a common environmental infrastructure to treat and dispose the hazardous waste. At present, there is no facility in the Northern Karnataka for disposal of Hazardous wastes generated from various industries. The proposed facility is planned in Gadag Industrial area. With each passing day industrial waste generation is increasing and in such scenario, the proposed project is well justified in meeting the current and increasing waste management demand.

2(iv) Demand- supply gap

In Northern Karnataka so far there is no Common incineration facility. The incinerable waste having very high calorific value is only being accepted by cement plants for co processing. Therefore, if a common incineration facility is established at Gadag it will cater to the need of industries in the northern Karnataka for disposal of hazardous waste.

2(v) Employment generation (direct and indirect) due to the project

The proposed project shall generate employment during the construction for local skilled and semi-skilled workers. During construction approximately 50 No. of people will get employed.

Approximately 18 nos. of people will get direct employment during operation phase. During the operation phase, technical staff for plant, general staff for administrative work and other ancillary services i.e. Security, O&M contractor and maintenance services will be required.

CHAPTER 3

PROJECT DESCRIPTION

3. PROJECT DESCRIPTION

3(i) Type of Project Including Interlinked and Interdependent Projects, If Any.

The proposed facility will depend on the incinerable hazardous waste generated from industries in the northern part of Karnataka.

3(ii) Location (Map Showing General Location, Specific Location, Project Boundary and Project Site Layout with Coordinates)

The project site is located at Plot No.125, Gadag Industrial Area, Narasapura, Gadag District – 582102, Karnataka State, India. Total extent of land is 4047 sq m or 1 acres. Gadag – Bgalkot State Highway, SH - 6 is towards East of the project site at a distance of about 300 mts. The project site falls in the Latitude 15^0 27' 53.16" N and Longitude 75^0 40' 08.67" E.

Table 3.1: Location Details:

Description	**Details**		
Location	Plot N0.125, Gadag Industrial Area, Narasapura, Gadag District – 582102		
Co-ordinates	**Points**	**Latitude**	**Longitude**
	A	15^0 27' 52.24" N	75^0 40' 06.97" E
	B	15^0 27' 54.19" N	75^0 40' 07.02" E
	C	15^0 27' 54.05" N	75^0 40' 10.70" E
	D	15^0 27' 52.15" N	75^0 40' 10.59" E
	E	15^0 27' 53.16" N	75^0 40' 08.67" E
Village & Plot No.	Plot No. 125, KIADB Industrial Area, Narasapura, Gadag		
Total Area	4,047 sq m (1 Acres)		
Across road	Gadag – Bagalkot State Highway, SH-6 – 300 M towards E		
District Headquarters	Gadag District Headquarters – 4.8 Kms towards NE		
Nearest Town	Manjunath Nagar- 3 Kms towards NE		
Nearest Railway Station	Gadag Railway Junction- 4.2 Kms towards NE		
Nearest Airport	Hubli Airport- 70 Kms towards SW		

Fig 3.1: Location of project site on Google Map

Fig 3.1: Google Map with Project Site Highlighted Approximately By Size (Plot Area: 1 Acres)

Fig 3.2: Location of the proposed plant on the district map

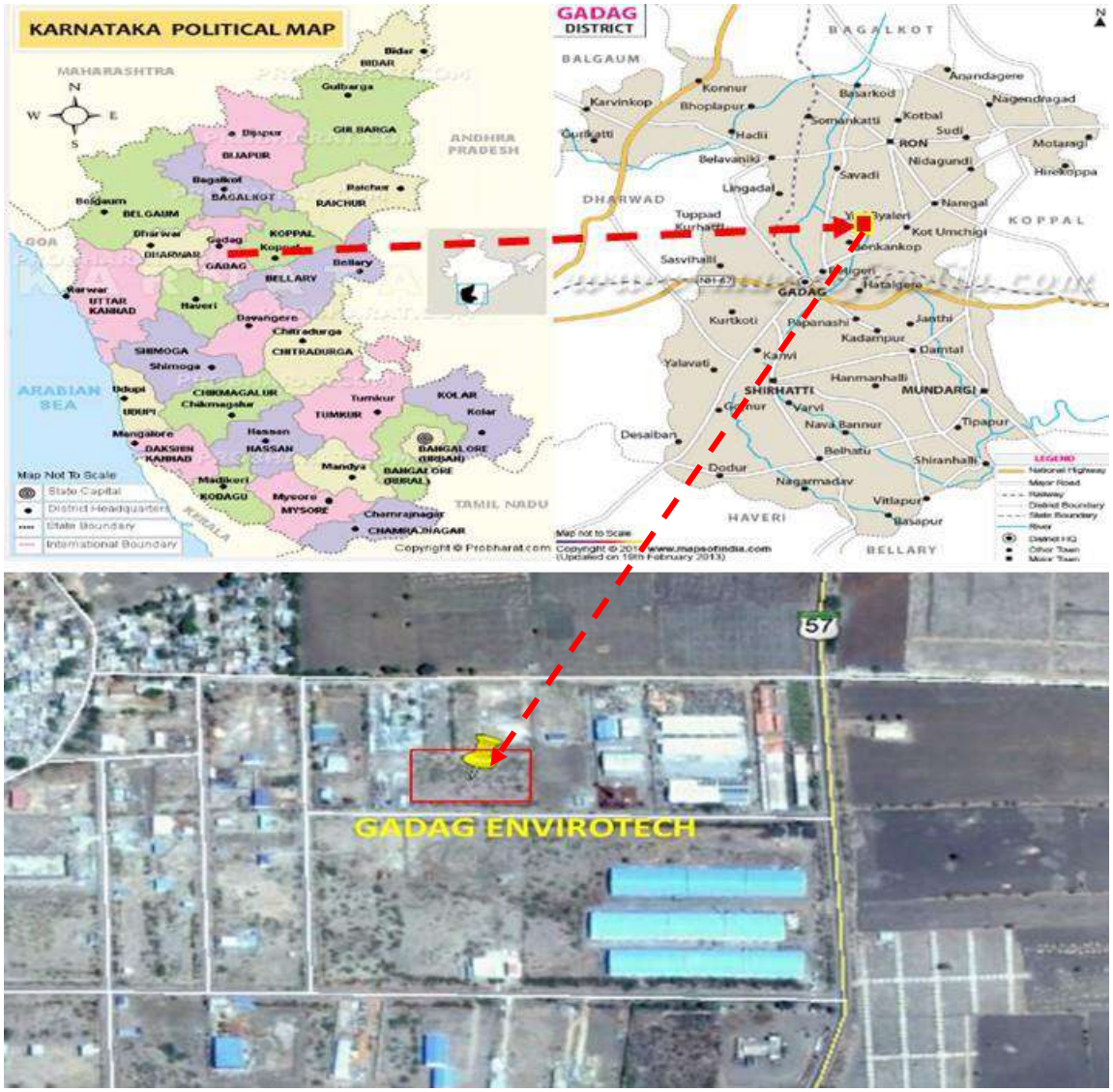


Fig 3.3: SITE PHOTOS






Fig 3.4: PLANT LAYOUT PLAN

Plant layout plan is appended as Annexure 1.

3(iii) Details of alternate sites considered and the basis of selecting the proposed site, particularly the environmental considerations gone into.

No alternative site is considered as the proposed industry location is allotted in designated Industrial area developed by KIADB.

3(iv) Size or magnitude of operation

M/s. Gadag Envirotech Pvt Ltd, intend to set up a small scale Common Hazardous Waste Incineration Facility of capacity 250 Kg/hr. The cost of the project is Rs 2.5 crores.

3(v) Project descriptions with process details (a schematic diagram/flow chart showing the project layout, components of the project etc.)

Common Hazardous Waste Incineration Facility (CHWIF) is a facility where hazardous incinerable waste is collected transported & scientifically disposed of from small/medium / large scale industries. Collected wastes are stored in a secured manner as per the guidelines of CPCB. The wastes are sometimes mixed to attain the required calorific value and then incinerated as per the approved specifications. The incinerator will be operated scientifically and the emissions are controlled with air pollution control equipment viz., Bag filter and scrubber. The emission will be vented out through 30 m height chimney. The incinerated ash is collected separately and disposed to TSDF. The liquid waste from scrubber is treated and reused.

Types of Hazardous Wastes as specified in the hazardous and other waste (Management & Transboundary Movement) Rules, 2016.

Sl. No. as per schedule -1	Waste process/waste streams	Disposal options
5.2	Waste/residue containing oil	Shall be collected in secured manner and transported in approved
20.1	Contaminated aromatic, aliphatic waste/ residue containing naphthenic solvents not fit for originally intended use	
20.3	Distillation residues	
21.1	Process wastes, residues, and	

	sludges	vehicles without causing adverse effect on the environment. After receipt at site, the same is stored in a secured manner. The compatible waste are mixed, analyzed and incinerated.
28.1, 29.1	Process residue and wastes	
28.4	off specification products	
28.5	Date-expired products	
29.3	Date expired and off specification pesticides	

INCINERATION PROCESS

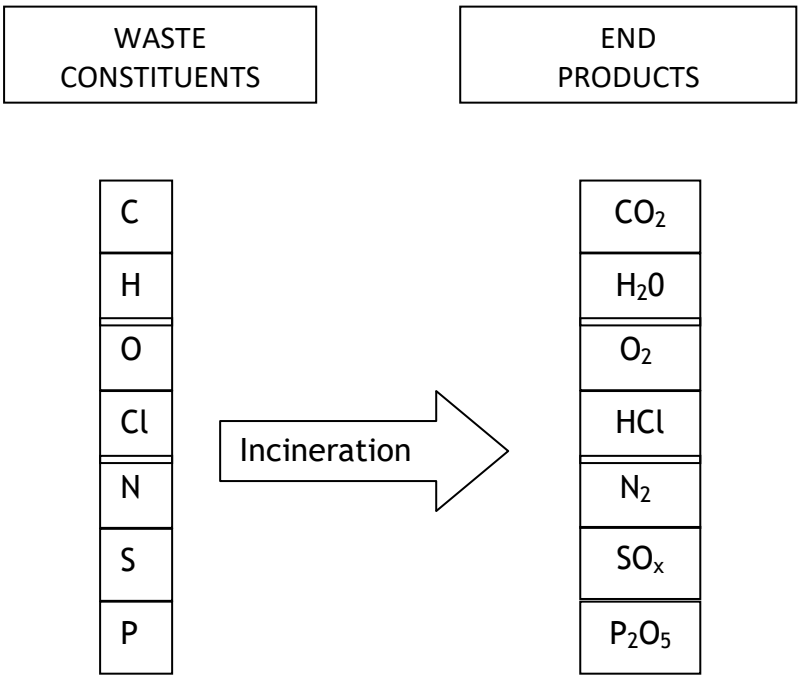
Thermal incineration can be defined as a process that uses high temperature thermal oxidation to convert waste to a less bulky, less toxic and less noxious material. Being oxidation process of organic material, the product of combustion comprises of CO_2, water vapor, inert gases and sterile ash.

The design parameters employed to burn all these wastes, have been standardized by Incineration Institute of America in the initial stages and then US Environment protection agency, a body recognized throughout the developed world. Criteria used for design are:

1. Hearth (floor) area of primary chamber.
   Loading rate (kg/hr/cum)
2. Heat release rate in primary chamber.
3. Excess air required.
4. Residence time for flue gas in the secondary chamber at specific temperature.

Incineration is a waste treatment process that involves the combustion of organic substances contained in waste materials. Incineration and other high-temperature waste treatment systems are described as "Thermal Treatment". Incineration of waste materials converts the waste into ash, flue gas and heat.

- Thermal Treatment Process
- Combustion at High Temperature
- Controlled for High Combustion Efficiency Defined as,
- CE=%(CO_2/CO+CO_2))
- With Minimum Undesirable Products
- Treatment of Combustion Products for Safe Disposal



Destruction and Removal Efficiency (DRE) = W_{in} - W_{out}/W_{in} x 100
W_{in}= Mass Feed Rate of POHC to Incinerator
W_{out}= Mass Emission Rate of POHC in the Stack
POHC- Principal Organic Hazardous Constituent

PROCESS DESCRIPTION

Incineration system contains basic elements such as feed system, combustion chamber, exhaust system and residue disposal system. The incinerator equipment includes material storage and sorting system at front end and air pollution control devices at the back end of the incinerator. The incineration plant is divided into following sections:

1. Waste Receiving and Storing Area
2. Feeding Section
3. Incineration Section/Combustion chamber – primary and secondary
4. Pollution Control devices

1. Waste Receiving and Storing Area

Hazardous Incinerable wastes are collected from industries having authorization under the the Hazardous And Other Waste (Management & Transboundary Movement) Rules, 2016**.** The waste is transported in the designated vehicles and brought to the common hazardous

incineration facility. The waste so collected is stored in the facility in a secured manner under the roof.

The general/industrial waste will be stocked on a perforated base to enable its liquid contents if any, to partially seep out. This liquid will be disposed in the incinerator in a controlled manner. Adequate precautions will be taken in storage to avoid any spillage, emission etc. The wastes are labelled with date of receipt, quantity and type. The wastes are randomly analyzed for its composition, especially for calorific value. The inventory is maintained. A separate mixing area is maintained to mix the waste if required for compatibility for incineration.

2. Feeding Section

The hazardous waste stored in the storage area is carried through trolleys to incineration section. The solid waste will be fed to the incinerator directly to the Combustion chamber. The liquid/semi solid will be injected at a controlled rate.

3. Incineration Section

INCINERATOR OPERATING STANDARDS

i. The facility is designed to achieve a minimum temperature of 1100^0 C in secondary combustion chamber and within the gas retention time in secondary time in secondary combustion chamber not less than 2 seconds.

ii. Incinerator will be operated in such temperature, retention time and turbulence so as to achieve total organic carbon (TOC) content in the slag and bottom ashes less than 3% or their loss on ignition is less 5% dry weight of the material.

iii. Combustion efficiency (CE) shall be at least 99%

iv. The combustion efficiency is computed as follows:

$$C.E = \frac{\% CO_2 X100}{(\% CO_2 + \%CO)}$$

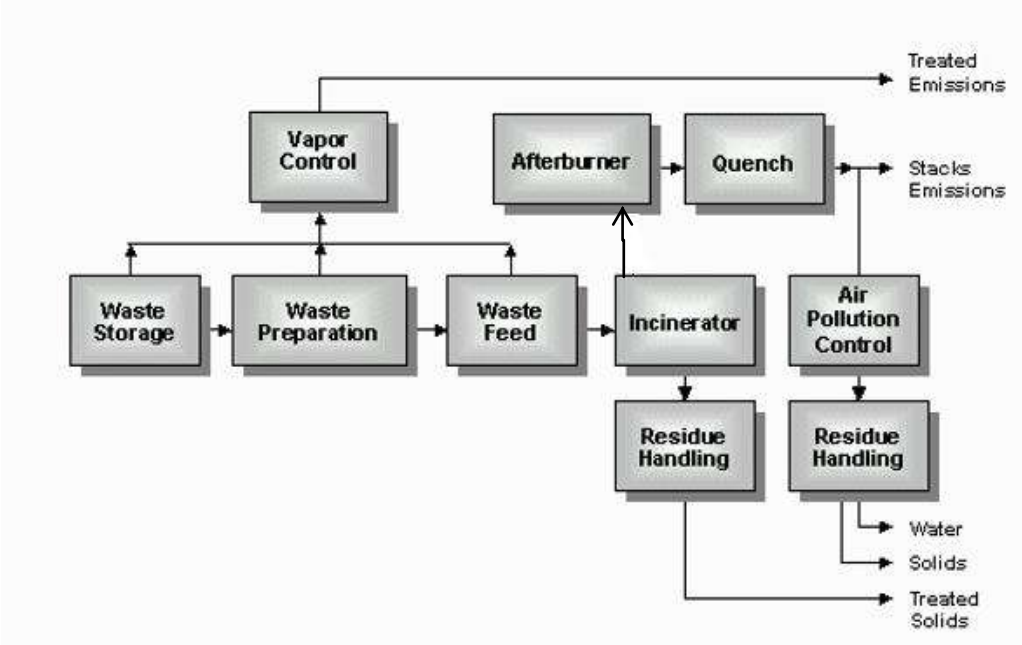


Fig 3.4: Flow diagram of Incinerator

TECHNICAL SPECIFICATIONS OF THE INCINERATOR USED

1) Burn capacity: Min 250 kg/h of hazardous waste
2) Mode of waste handling: Auto loading with ram feeder
3) Type of fuel: LDO/HSD
4) Type of burner operation: Automatic diesel fired

A. INCINERATOR

Incinerator should comprise of 2 static chambers – Primary and secondary combustion chamber. The plant should have structurally stiffened incineration chambers duly lined with environment compatible high alumina hot face and insulation refractory with openings for flue gases, instruments and burners. Incinerator shell thickness should be 6 mm thick and ASTM A36 MOC.

1	Incinerator	Controlled air, pyrolytic design
2	Fuel	LDO / HSD
3	Model	PDR with air pollution control device
4	Duration of use	Suitable for continuous operation - minimum 8 hr/day
5	Capacity	250 kg/h
6	Residence time of gas	2 seconds

i) PRIMARY COMBUSTION CHAMBER

1	Type	Static, horizontal
2	No. of chambers	1
3	MOC	ASTM A 36
4	Type of fuel	LDO / HSD
5	Burners	1 no.
6	Burner heating range	Suitable / as required
7	Design temperature	1400°C
8	Operating temperature of primary chamber	850 – 950°C
9	Refractory	Castable type
10	(i) Thickness	Min.220 mm
	(ii) Insulation	Medium / high purity light weight insulating castable having temperature resistance of 1400°C.
	(iii) Hot face	High strength low cement high alumina castable refractory having temperature resistance of 1500°C.
	(iv) Hearth	Low cement high alumina castable refractory having very high strength at high temperature of 1600°C.
11	Ash door	1 no.

ii) SECONDARY COMBUSTION CHAMBER

1	Type	Static, horizontal
2	MOC	MS – ASTM A 36
3	Type of fuel	LDO / HSD
4	Burner	1 no.
5	Design temperature	1400°C
6	Temperature of secondary chamber	1000 – 1100°C
7	Residence time of secondary chamber	2 seconds
8	Refractory	Castable type
9	(i) Thickness	Min.220 mm
10	(ii) Insulation	Medium / high purity light weight insulating castable having temperature resistance of 1400°C.

	(iii) Hot face	High strength low cement high alumina castable refractory having temperature resistance of 1500°C.
11	Ash door	1 no.

iii) REFRACTORY

1	Type	Castable
2	Anchors	SS-316
3	Coating on anchors	Paraffin
4	CCS at 1000°C	725 kg/cm²
5	Grain size	5 mm
6	Al_2O_3	40 – 60%
7	Bulk density	2.10 g/cm³
8	Service temperature	1500°C

iv) INSULATING CASTABLE

1	Type	Castable
2	CCS at 110°C	35 – 45 kg/cm²
3	Grain size	5mm
4	Bulk density	1.1 gm/cc
5	Service temperature (maximum)	1350°C
6	Anchor keys	SS 310/309

v) COMBUSTION AIR FAN

1	Quantity	1 no.
2	MOC	IS:2062
3	Type	Forced draught, centrifugal, direct drive
4	Motor rating	5.5 kW

vi) DIESEL BURNER

1	Type	Baltur equivalent make oil burners consisting of burner head with photocell for selective flame supervision, nozzle and electrodes, connection hoses, ignition and photocell cable, oil pump, fan and controller
2	Quantity	2 nos.
3	Make	Baltur / Bentone / Ecoflam
4	Power	415/230V, 50Hz
5	Electrical cabling and earthing	Within battery limits
6	Burner output	350-900 kW

vii) AUTOMATIC WASTE FEEDING (RAM LOADER) SYSTEM

1	Quantity	1 no.
2	MOC	MS plate conforming to (IS: 2062).
3	Support	MS angle and channel section (IS: 2062).
4	Ram head	MS plate (IS: 2062).
5	Support leg	MS plate (IS: 2062).
6	Hydraulic rams	
	[a] Ram head loading and retracting ram	Two way operation type with suitable Inner ram
	[b] Incinerator door ram	Two way operation types with suitable inner ram mounted on top of ram loader and incinerator boss.
7	Power pack	Electrically operated power pack consisting of hydraulic oil reservoir, hydraulic pump and limit switches Mounted on ram loader support frame.
8	Hydraulic hoses	High pressure armored hoses as specified by power pack Manufacturer.

viii) EMERGENCY STACK

In the event of power failure, hot gases should be directly exhausted to the emergency stack, by-passing the scrubber, preventing damage. Simultaneously, water from the emergency water tank should flow into the scrubber to bring down the temperature.

1	Quantity	1 no.
2	MOC	IS:2062, refractory lined
3	Operation	By electromagnetic damper

B. SCRUBBING SYSTEM COMPRISING OF GAS COOLER, BAG FILTER, ACID GAS SCRUBBER AND DEMISTER

i) GAS COOLER

Flue gas at a temperature 1100^0C from the secondary combustion chamber should passed into a gas cooler. The gas cooler should have two sections. The first section should be made of steel with refractory lining. The second section should be made of unlined steel. Fresh water is pumped into the gas cooler to cool gas from 1100^0C to 180^0C. The water should evaporate completely in the gas cooler and there should be no water outlet.

1	Type	Horizontal cylindrical	
2	MOC	ASTM A 36 with refractory lining	
3	Re-circulation pump	Type	Centrifugal
		Make	Johnson / KSB
		Material	SS-316 / PP
		Motor rating	9.3 kW

ii) BAG FILTER

Bag house filter should be reverse pulse-jet cleaning type with filter bags. Filter bags should be made of PTFE fabric installed on metal filter cages. Conical bottom sections should be for the collection of ash and coating material.

1	Bags filter type	Online cleaning
2	Bags material	Fiber glass with Teflon membrane
3	No. of bags	Approx 200
4	Pulsing valve type	Solenoid operated diaphragm valve
5	Compressed air type	Oil and moisture free (in client's scope)
6	Air to cloth ratio	1:3

iii) ACID GAS SCRUBBER

Flue gas should be fed into an acid gas scrubber to remove gaseous pollutants like SO2 and HCl. The scrubbing medium should be water / caustic.

1	Type	Tower
2	MOC	SS 316
3	Quantity	1 no.
4	Design inlet temperature	180°C
5	Design outlet temperature	80°C
6	Flow direction - flue gas	Vertical / downwards
7	Flow direction - water	Vertical / downwards
8	Recirculation water tank	1 No.

iV) DE-MISTER

The Scrubbed gases from the venturi scrubber should pass into the demister. This system should ensure that moisture or mist is not carried to the ID fan.

1	MOC	ASTM A 36 with rubber lining and PP fills
2	Details of bottom seal pot	Re-circulation tank
3	Temperature of flue gas at outlet	70 – 80°C
4	Piping and valves	Complete with requisite return pipes, overflow pipes, drains, etc.

V) ID FAN

The ID fan should maintain the balance draft and should draw out the clean gases into the atmosphere through 30 m high stack.

1	Type	Centrifugal, complete with inlet chamber, inlet/outlet, motor, base plate and other accessories.
3	Quantity	1 no.
4	Motor rating, kW	55 kW

vi) CHIMNEY

A chimney should be provided to ensure release of flue gases 30 m from ground level.

1	Type	Self-supported designed as per IS 6533
2	Lining	Rubber lining
3	Height	30 mtrs
4	Accessories	Platform, sampling port, ladder, protection rings, lightning arrestor and foundation bolts

PRINCIPLE OF INCINERATION:

The waste is incinerated in two stages. That is primary chamber and secondary chamber, which are positioned adjacent to each other. Full burnt gases are let out to atmosphere through the eductor and chimney of 30 m height above ground level.

The primary combustion chamber operates under near pyrolitic conditions (800^0 C) wherein the wastes are decomposed and all volatiles are released. The substrate remaining gets converted into sterile ash. The volatiles released from the Primary Combustion chamber is then completely burnt in the secondary combustion chamber under high temperature (1100^0 C) and excess air.

FUEL:

Wastes fed into the incinerator forms the fuel for startup and for maintaining the set temperature in case of low waste burning diesel is used as a fuel. For this purpose diesel tank with 1000 L capacity and a pump is also provided with the incinerator.

STACK:

A self-support MS stack with rubber lining is provided for releasing the gases after incinerator from the secondary combustion chamber. Stack height 30 m above ground level. Stack dia 0.80 m

SAFETY AND CONTROLS:

The electrical system is interlocked with the eductor fan. Unless and until the eductor fan is on, no electrical system comes on line. When this fan trips the system goes into Lockout. The eductor mechanism creates negative draft in the system which ensures safety of the operator by preventing flame/hot gases coming out of the charging door. The limit switch on the charging door trips the primary burner when the door opens there by preventing the operator from facing the flames. Thermocouples provide in the primary and secondary chambers bring

the burner on and off the line with the help of temperature indicators cum controllers thereby ensuring optimum fuel consumption.

EMISSION EFFLUENT STANDARD FOR INCINERATOR AS PER EP RULES SERIAL NO 68 'B' OF SCHEDULE I OF EP RULES

Emissions	Limiting concentration in mg/Nm^3	Sampling duration in minutes
Particulate matter	50	30 or more
Hcl	50	30
SO_2	200	30
CO	100	Daily average
Total Organic Carbon	20	30
Dioxins and Furans	0.1 ng TEQ/Nm^3	8 Hours
Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V+Cd+Th+Hg and their compounds	1.5	2 Hours

The existing plant shall comply with norms for Dioxins and Furans as 0.1 ngTEQ/Nm^3 by 1st January, 2014.

Note:

i) All monitored values shall be corrected to 11% oxygen on dry basis

ii) The CO_2 concentration in tail gas shall not be less than 7 %.

iii) In case, halogenated organic waste is less than 1% by weight in input waste, all the facilities in twin chamber incinerator shall be designed so as to achieve a minimum temperature of 850 ± 25 ^{0} c in primary chamber and 950^0 c in secondary combustion chamber and with a gas residence time in secondary chamber not less than two seconds.

Or

All the facilities in single chamber incinerator for gaseous hazardous waste shall be designed so as to achieve a minimum temperature of 950 ^{0}C in the combustion chamber with a gas residence time not less than two seconds.

iv) In case of halogenated organic waste is more than 1% by weight in input waste, waste shall be incinerated only in twin chamber incinerators and all the facilities shall be designed to achieve a minimum temperature of 850±25^0 C in primary chamber and

1100^0 C in secondary combustion chamber with a gas residence time in secondary combustion chamber not less than two seconds.

v) Scrubber meant for scrubbing emissions shall not be used as quencher.

vi) Incineration plants shall be operated with such temperature, retention time and turbulence, as to achieve TOC content in the incineration ash and residue less than 3% and their loss on ignition is less than 5% of the dry weight. In case of non-conformity, ash and residue, as the case may be, shall be re-incinerated.

vii) The incinerator shall have a chimney of at least thirty meters high.

EFFLUENT STANDARDS FOR INCINERATOR

Note: i) effluent from scrubber and floor washing shall flow through closed conduit or pipe network and be treated to comply with the effluent standards.

ii) The built up in TDS in waste water of floor washings shall not exceed 1000 mg/l over and above the TDS of raw water used.

STORM WATER

i) Storm water shall not be allowed to mix with scrubber water and/or floor washings.

ii) Storm water shall be channeled through separate drains passing through a HDPE lined pit having holding capacity of 10 minutes (hourly average) of rainfall.

3(vi) Raw material required along with estimated quantity likely source, marketing area of final products, mode of transport of raw material and finished product.

Proposed project is development of Common Hazardous Waste Incineration Facility and involves incineration of the solid/hazardous wastes collected from industries.

There is no raw material requirement or finished product as such.

3(vii) Availability of water its source, energy/power requirement and source.

Resource requirement:

Capital investment, land, water, fuel, man power, power, other utilities etc. are main requirement of proposed project.

- **Water Requirement**

The water requirement for the project during operation is augmented from KIADB water supply sources. Total water requirement is 4 KLD.

- **Manpower Requirement**

The proposed project shall generate employment during the construction for local skilled and semi-skilled workers. Approximately 18 nos. of people will get direct employment during operation phase. During construction phase approximately 50 no of people will get employed.

- **Energy Requirement**

The power requirement of about 50 HP for the project is augmented from KIADB. Further one diesel generator of 63 kVA capacity is proposed to be installed to serve as an alternative source of power supply to this unit.

3(viii) Quantity of wastes to be generated (liquid and solid) and scheme for their management/ disposal.

i. Water Environment & Management:

The water requirement for the project during operation is augmented from KIADB water supply sources.

The total quantity of water requirement for the plant is about 4 KLD. The break-up of the consumption of water and waste water generation details is as presented in table 3.2 & 3.3 below.

Table 3.2: Water Consumption

Water consumed for	**Consumption (LPD)**
(a) Domestic	800
(b)Scrubbing, vehicle wash and cleaning	2000
(c)Gardening/Landscape development	1200
Total	4,000 LPD

Table 3.3: Waste Water Generation Details

Water consumed for	**Discharge (LPD)**
(a) Domestic	700
(b) Scrubber bleed	2100
Total	2800

Waste Water Treatment Scheme

Sewage generated from Domestic purposes will be treated in Septic Tank and Soak pit. Scrubber effluent and floor wash will be treated in ETP and disposed for Gardening.

ii. Air Environment & Management:

The major air pollution sources from the project is Incinerator and DG set. These sources are provided with stacks of adequate height so as to disperse the emanating flue gases.

Table 3.4: Air pollution sources and control measures:

Incinerator

Sl.No	Stack Details	Stack attached to
1	Incinerator furnace	Chimney of 30 m height and Scrubber

D.G Set

Sl. No.	Stack Details	Stack Attached to
Physical Details		DG Set
1	Capacity	1 X 63 kVA
2	Fuel quantity	12.6 L/hr
3	Fuel used	Ultra Pure Low Sulfur Content Diesel
4	Stack height	Chimney of 3 m (Above roof level)
5	Stack diameter	80 mm

iii. Noise Generation and Its Management

The main sources of noise from the proposed project is movement of vehicles on the roads during transportation of waste from Industries and the DG set for which acoustic enclosure is proposed. The ambient noise levels will be ensured within the ambient standards by inbuilt design of mechanical equipment apart from vegetation (tree plantations) along the periphery and at various locations within the plant premises.

iv. Solid Waste Generation and Management

Solid Waste Generation during the Operation Phase is Incinerated ash. One is from the furnace and the other from the emission collected in the bag filter. The ash is collected and disposed to TSDF. The approximate quantity of ash generation is about 20 MT/Year.

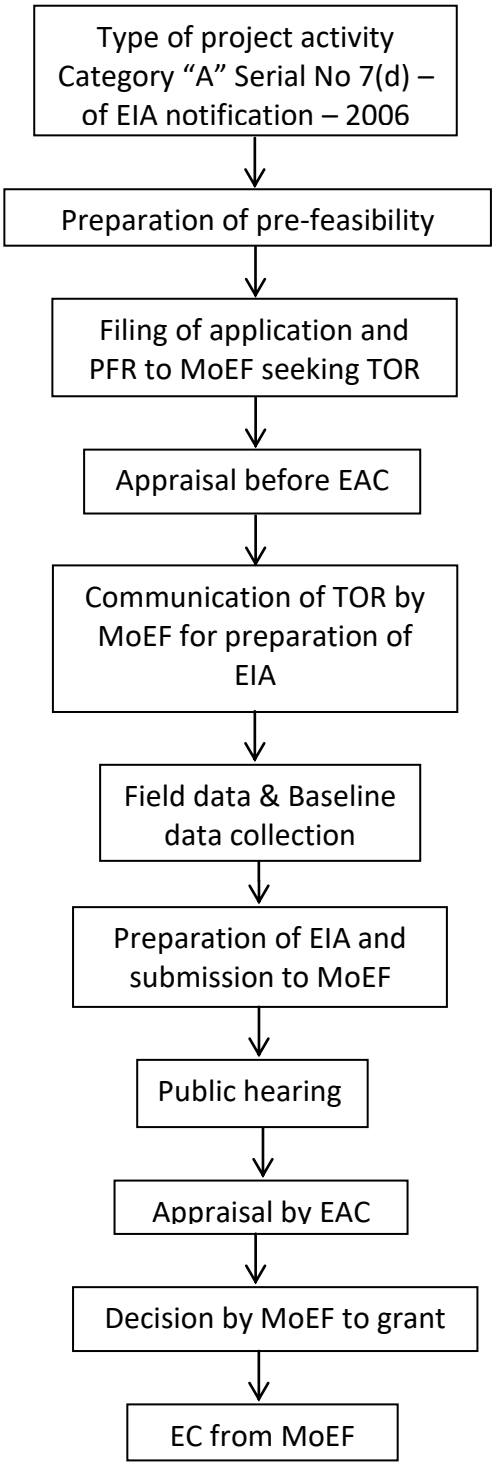
v. Hazardous waste Management:

Hazardous waste generation quantity is given in the following table:

Table 3.5: Hazardous waste generation quantity:

Sl. No.	Waste Category	Type of Hazardous waste generated	Generation Qty.	Handling & mode of disposal
1	5.1	Used Oil/Lubricant oil	0.05 KL/A	Shall be collected in leak proof containers and disposed only to CPCB registered reprocessors /common collection Centre provided the oil meets the standards as per schedule- 5 of the rules.
2	37.2	Incinerator ash	20 MT/Year	Collected Stored in Secured manner and send to TSDF.

3(ix) Schematic representation of the feasibility drawing which give information of EIA purpose.



CHAPTER 4

SITE ANALYSIS

4. SITE ANALYSIS

4(i) CONNECTIVITY

The project site is located at Plot N0.125, Gadag Industrial Area, Narasapura, Gadag District, Karnataka State. The unit is well connected by all modes of transportation. The Google map showing connectivity is as shown in below figure.

- **Rail and Road Connectivity**
  - The nearest railway station is Gadag Railway Junction and is located at a distance of 4.2 Kms towards North East.
  - Gadag – Bagalkot State Highway SH-6 is 300 m towards East of the Site.

- **Airport connectivity**

  The nearest Airport is Hubli Airport at approximately 70 Kms from the site towards South west direction.

- **Communication**

  The site has access of telephone, internet and mobile connectivity.

4(ii) LAND FORM, LAND USE AND LAND OWNERSHIP

Land is owned by M/s Gadag Envirotech Pvt Ltd which has been allotted by KIADB in the Industrial Area of Gadag. The plant facilities are spread over 4047 sq m or 1 acres land. The land use is for proposed Common Hazardous Waste Incineration Facility.

Table 4.1: Description of surrounding area of the project site:

Direction	Description
North	Rukmini Food Processing
South	KIADB Internal Road
East	Vacant KIADB land
West	Manjunath Power loom Works

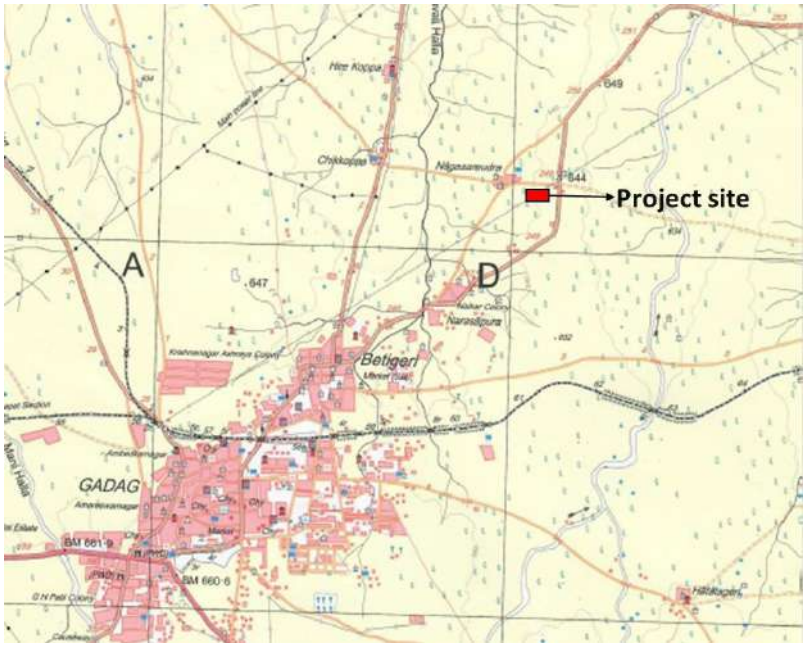
4(iii) TOPOGRAPHY (ALONG WITH MAP)

The site is a flat land and the average elevation is 645 above MSL. The Latitude and Longitude of project site is given below table.

Table 4.2: Site Co-ordinates:

Points	Latitude	Longitude
A	15^0 27’ 52.24” N	75^0 40’ 06.97” E
B	15^0 27’ 54.19” N	75^0 40’ 07.02” E
C	15^0 27’ 54.05” N	75^0 40’ 10.70” E
D	15^0 27’ 52.15” N	75^0 40’ 10.59” E
E	15^0 27’ 53.16” N	75^0 40’ 08.67” E

Fig 4.1: Shows the location of the plant on the topo map



4(iv) Existing Land Use Pattern (Agriculture, Non-Agriculture, Forest, Water Bodies (Including Area Under CRZ)), Shortest Distance From The Periphery Of The Project To Periphery Of The Forests, National Park, Wildlife Sanctuary, Eco Sensitive Areas, Water Bodies (Distance From The HFL of The River), CRZ. In Case of Notified Industrial Area, a Copy of the Gazette Notification Should be given.

The existing plot is in designated industrial area. There are no water bodies, eco sensitive areas such as forest International Park, wildlife sanctuary, biosphere reserves and wildlife corridors etc. located within 5 Kms radius of project area.

Table 4.3: Land use pattern:

Sl. No.	Particulars	Area (m^2)	In %
1	Total Plot Area	4,047	100
2	Ground coverage area (total built up area)	2,023.5	50
3	Green belt	1,214.1	33
4	Hard paved area	809.4	17

4(v) Existing Infrastructure

This Gadag industrial area is well developed and following infrastructure facilities have been provided to the provided. The list of existing infrastructure at the project site is

1. Water supply from KIADB.
2. Power supply from KPTCL, KIADB.
3. Domestic sewage & domestic garbage treatment is proposed in-house
4. The internal asphalted road is provided in industrial area.

4(vi) Soil Classification

The soils of Gadag District are (a) granitic soils and (b) sandy to clayey soils.

4(vii) Climatic data from secondary sources

Meteorological Data

Assessment of the micro and macro meteorology is important from the standpoint of understanding the nature and for future prediction of air pollution in the study area.

The classification of months according to the seasons is given in the following table 4.5.

Table 4.5: Classification of Months According To Season

Season	***Period***
Summer	March to May
Monsoon	June to September
Post monsoon	October to November
Winter	December to February

The metrological data reflecting minimum, maximum temperature in ^{0}C, relative humidity in %, rainfall in mm/hr, wind speed in m/s, mixing height in m, cloud cover in tenths and atmospheric pressure in mb for the year 2016 is collected from http://www.myweather2.com the details shown in table 4.6.

Table 4.4: Climate between JAN 2016-DEC 2016:

	Min. Temperature (°C)	Max. Temperature (°C)	Humidity %	Precipitation /Rainfall (mm)	Wind Speed Km/hr
January	16	30	47	1	48
February	18	33	40	2	78
March	21	35	39	17	74
April	23	37	48	49	74
May	17	41	57	62	83
June	10	40	75	83	74
July	19	38	79	90	59
August	19	33	80	89	59
September	21	30	75	97	100
October	14	35	69	111	85
November	10	39	59	21	41
December	11	33	54	7	74

Fig 4.2: Temperature Graph of Gadag during JAN 2016 – DEC 2016

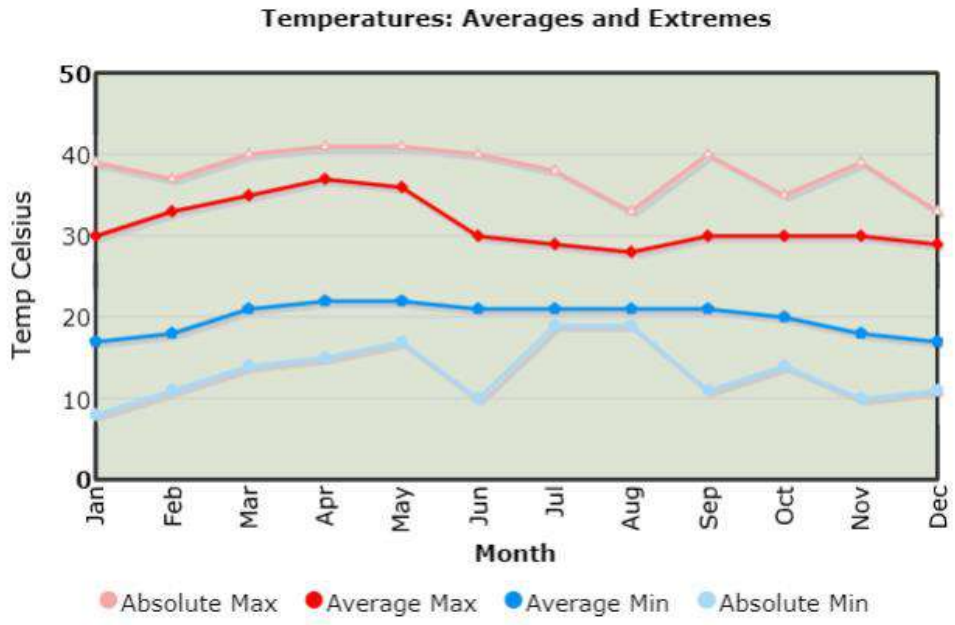


Fig 4.3: Precipitation Graph of Gadag during JAN 2016 – DEC 2016

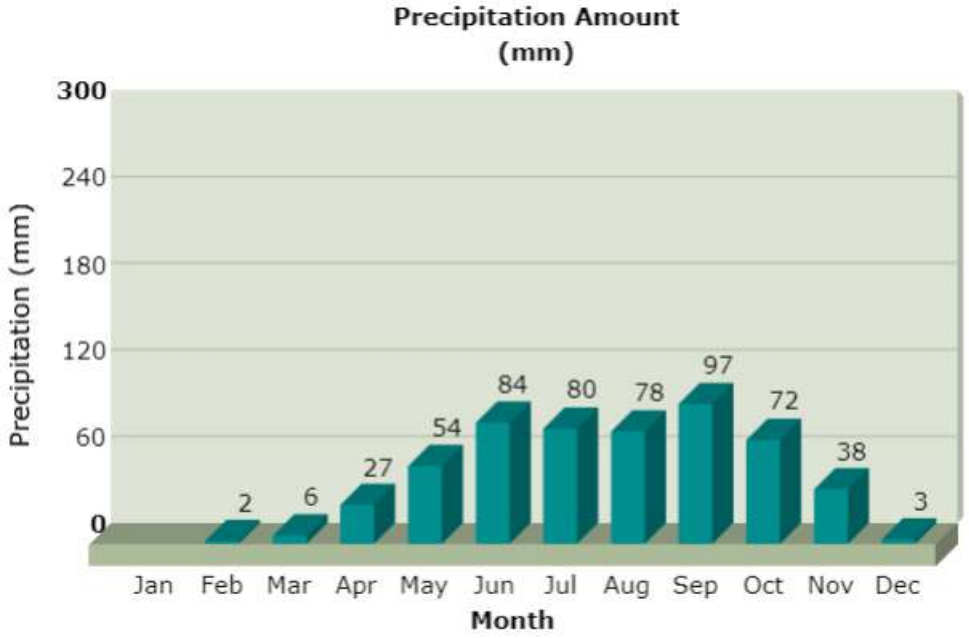
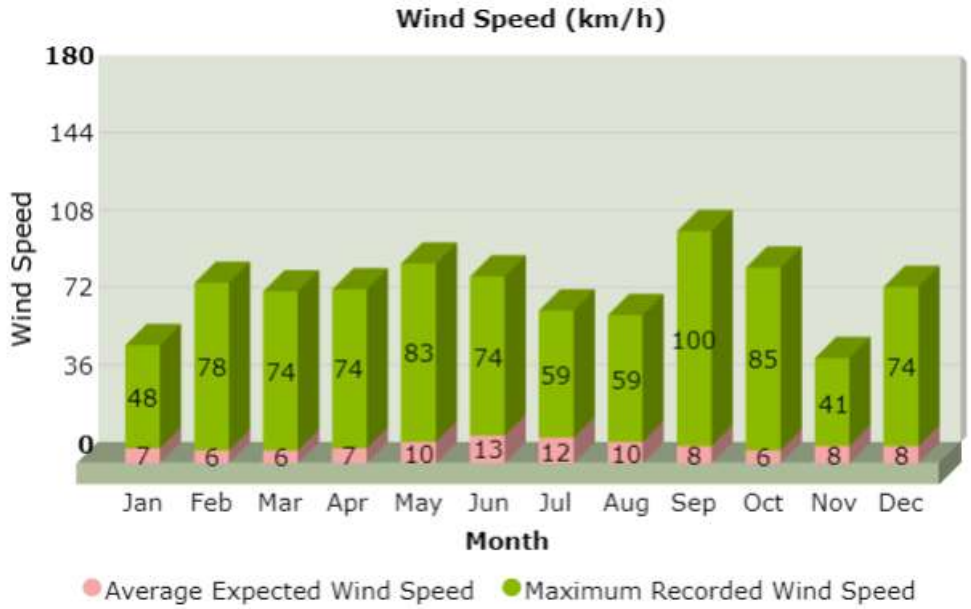


Fig 4.4: Wind Speed Graph of Gadag during JAN 2016 – DEC 2016



Source: http://www.myweather2.com/

4(viii) Social infrastructure available

Infrastructure is the basic physical and organizational structures needed for the operation of a society or enterprise or the services and facilities necessary for an economy to function.

The term typically refers to the technical structures that support a society, such as roads, water supply, sewers, electrical grids, telecommunications and so forth and can be defined as "the physical components of interrelated systems providing commodities and services essential to enable, sustain, or enhance societal living conditions.

Social infrastructure facilities such as schools, hospitals, community halls, markets, collages, railway station and religious building are located with 10 Km radius from the site. There is no necessity for the proponent to create additional social infrastructure facility.

CHAPTER-5

PLANNING BRIEF

5. PLANNING BRIEF

5(i) Planning concept (Types of industries, facilities, transportation etc.,) town & country planning/ development authority classification.

The project site is located in the KIADB industrial area of Gadag district. The site is at a distance 300 mts from Gadag – Bagalkot State Highway, SH – 6 towards East. Power and water requirements for the project is provided by KIADB. Good transportation and communication facilities are available in the site. The types of industries in Gadag are Agro Based, Cotton Textile Industries, Wood Based Furniture Industries, Metal and Mineral Based Industries Etc.

GADAG DISTRICT AT A GALANCE

Sl No	Items	Statistics
1.	**GENERAL INFORMATION**	
	i) Geographical area (Sq.km)	4656
	ii) Administrative Divisions	
	a) Number of Taluk	5
	b) Number of panchayat/S	106
	iii) Population (As on 2011Census)	1,72,612
	iv) Average Annual Rainfall (mm)	612.3
2.	**GEOMORPHOLOGY**	
	Major physiographic units	02
3.	**LAND USE (Ha)**	
	a) Forest area	32614
	b) Net area sown hect	3866
4.	**AREA UNDER PRINCIPAL CROPS (Ha)**	Jowar 93659 Tur dal and other pulses 2874 Ground nut 57846

		Cotton: 59813 Paddy: 1543 Wheat: 36348 maize: 22621
5.	**IRRIGATION BY DIFFERENT SOURCES (Ha)**	
	Dug wells	2008
	Bore wells	26856
	Tanks	1246-
	Canals	20016
	Other sources	5246
	Lifts	1309
	Gross irrigation area	62766

5(ii) Population Projection

An official Census of 2011 states the population of Gadag is 1,72,612 of which 85,920 are males and 86,692 Nos are females.

Table 5.1: Census Details

Description	**Year 2011**
Actual Population	1,72,612
Male	85,920
Female	86,692
Sex ratio	1,009
Area Sq. Km	4,656
Average Literacy	85.39 %
Male Literacy	90.97 %
Female Literacy	79.89 %
Total Child Population (0-6 Age)	19,549

Source: http://www.census2011.co.in/

5(iii) Land use planning (breakup along with green belt etc)

The project is designed envisaging adequate area for Incinerator facilities, storage areas for hazardous waste, area for mixing of HW and stabilization vehicle cleaning facility, green belt area and internal movement of vehicles. The land use planning is in the table 5.2

Table 5.2: Land use planning:

Sl. No.	Particulars	Area (m^2)	In %
1	Total Plot Area	4,047	100
2	Ground coverage area (total built up area)	2,023.5	50
3	Green belt	1,214.1	33
4	Hard paved area	809.4	17

5(iv) Amenities/Facilities

Basic amenities/facilities is available as road, power supply, communication, water supply, medical and health checkup of workers and staff of the facility will be provided with the necessary Personal Protective Equipments and periodical medical checkups will be provided.

CHAPTER 6

PROPOSED INFRASTRUCTURE

6. PROPOSED INFRASTRUCTURE

6(i) Industrial area (processing area)

The details of infrastructure include Office Building, Hazardous waste Storage shed, and Area for mixing of hazardous waste, Incinerator area with scrubber and effluent treatment facility, security shed and toilet.

6(ii) Residential area (Non- processing area)

No residential facility is proposed in the factory premises.

6(iii) Green Belt

Green belt will be developed according to prescribed guidelines. Three rows of Plants of the various species predominant in the district will be planted in the site and peripheral areas.

6(iv) Social Infrastructure

Schools, colleges, hospitals & healthcare centers, shops & bazaars, community centers, etc. are all available in nearby town.

6(v) Drinking water management (source and supply of water)

Drinking water will be supplied from KIADB Water Sources.

6(vi) Sewerage Management

The domestic sewage will be treated in septic tank and discharged through soak pits.

6(vii) Industrial Waste Management

The proposed project is Hazardous Waste Incineration Facility.

6(viii) Solid Waste Management

The Domestic Solid Wastes generated during operation phase will be collected, composted in compost pits and the product will be used as manure for landscape development. Inert solids will be disposed to landfill.

6(ix) Hazardous Waste Management

The hazardous waste from the project is incinerated ash and used oil from the DG set. The same will be stored in a secured shed and disposed as per the Hazardous waste rules.

6(x) Power requirement & supply/source

The power requirement of about 50 HP for the project is augmented from KIADB. Further one diesel generator of 63 kVA capacity is proposed to be installed to serve as an alternative source of power supply to this unit.

CHAPTER 7

REHABILITATION & RESETTLEMENT PLAN(R&R)

7. REHABILITATION & RESETTLEMENT PLAN (R&R)

7(i) Policy to adopted (central/state) in respect of the project affected person including home ousters, land ouster and landless labor (a brief outline to be given).

Rehabilitation and Resettlement (R & R) Plan is not applicable since the project is in KIADB Industrial Area, Gadag District, Karnataka State.

CHAPTER 8

PROJECT SCHEDULE & COST ESTIMATES

8(i) Likely date to start construction and likely date of completion (Time schedule for the project to be given)

Table 8.1: Time schedule of the project:

Time schedule	Date
Site clearance	Nov – 2018
Equipment procurement and erection	Jan – 2019
Operation of facility	Feb - 2019

8(ii) Estimated project cost along with analysis on terms of Economic Viability of the Project

Table 8.2: Total cost of the project:

Sl No.	Description	Amount in Lakhs
1	Land	15
2	Construction	40
3	Plant and Machinery	195
TOTAL		**250**

CHAPTER 9

ANALYSIS OF PROPOSAL (FINAL RECOMMENDATIONS)

9(i) Financial and Social benefits with special emphases on the benefit to the local people including tribal population, if any, in the area.

The project is Common Hazardous Waste Incineration Facility to dispose the Incinerable Hazardous waste generated from industry predominately located in Northern Part of Karnataka. The project has following sustainable Impact.

- Helps is scientific secured disposal of the Hazardous waste in Karnataka supplementing already operating facilities in the Southern Karnataka.
- Helps in transportation of Incinerable waste upto Northern Part of Karnataka there by saving the Carbon foot print.
- Helps industries for timely disposal of the Hazardous waste in a common facility.
- Avoids industries to have their own captive TSDF's. There by risk and impact on environment is eliminated.
- Improvement of social health and sanitation level.
- Generation of organized employment.

The Common Hazardous Waste Incineration Facility will improve overall environmental conditions in the industries as the hazardous wastes generated by the industries will be timely disposed of in an environmentally acceptable secure manner.

CHAPTER 10

PROPOSED TERMS OF REFERENCE

1. Justification for selecting the proposed capacity of the incineration facility
2. Land requirement for the facility including its break up for various purposes, its availability and optimization
3. Details of proposed layout clearly demarcating various activities such as security, weighbridge, laboratory facility, temporary hazardous waste storage areas, mixing of feeding wastes for consistency in calorific values, incinerator facility, bleed management area, ash storage/disposal area, vehicle tyre wash areas, and others such as admin building, vehicle cleaning areas/maintenance areas, greenbelt, etc.
4. Details on hazardous inventory, segregation at source for compatibility with transportation system and subsequent treatment.
5. Details on proposed protocol for waste acceptance (verifying the waste quantity through weigh bridge, frequency of calibration of weighing machine, system for sampling, testing parameters, analysis methods, time lags, criteria for identifying the wastes which require stabilization prior to the incineration, number of people, qualifications, manifestation systems, etc)
6. Design details of incinerable waste storage facilities (capacities, protocol for storing the segregated hazardous waste, compliance to the statutory requirements and proposed safety precautions).
7. Details on waste type, characteristics, handling, storage, segregation and waste blending/processing/feeds organization at the facility
8. Details of the arrangement for carrying out mixing of hazardous waste to feed into rotary kiln for optimizing the designed capacity (step by step procedure, proposed structures, equipments, operations, general list of chemicals/material use, handling, personal protective equipments, occupational health and safety measures, emergency preparedness etc.,)
9. Design details of the complete incineration system – a statement on the compliance to the CPCB guidelines for common hazardous waste incinerators in respect of waste feed cutoffs, operating parameters of combustion chambers, flue gas cleaning, ash handling, scrubber bleed management and continuous emission monitoring systems, etc.,
10. Details on fuel requirement for incineration
11. Details on control and monitoring systems during combustion process
12. Details on flue gas emission discharge through stack and proposed pollution control technologies
13. Details on wastewater management

14. Details on online monitoring equipments attached with incinerators and periodic calibration of the equipments
15. Details of proposed overall safety and health protection measures during project design, construction and operations
16. Details on source of water and power to the facility
17. Details of the existing access roads/walkways to the designed operations in the sire and its layout
18. Details of vehicular traffic management within and outside the project area due to waste transportation
19. Surface water quality of nearby water sources and other surface drains
20. Details on pollution control technologies and monitoring equipments
21. Details of residue/ash generation, reuse and management
22. Details of the proposed process monitoring protocol in tune with CPCB guidelines
23. The study area shall be upto a distance of 5 km from the boundary of the proposed project site
24. Location of the incineration facility and nearest habitats with distances from the facility to be demarcated on a topo sheet
25. Land use map based on satellite imagery including location specific sensitivities such as national parks/ wildlife sanctuary, villages, industries, etc for the study area
26. Demography details of all the villages falling within the study area
27. Topography details
28. Baseline data to be collected from the study area w.r.t different components of environment viz. air, noise, water, land, and biology and socio economics. Actual monitoring of baseline environmental components shall be strictly according to the parameters prescribed in ToR after considering the proposed coverage of parameters by the proponent in draft ToR and shall commence after finalization of ToR by the competent Authority
29. Geological features and geo hydrological status of the facility
30. Details on ground water monitoring wells, locations, frequency of monitoring, parameters, etc
31. One season site specific meteorological data excluding monsoon
32. Existing ambient air quality, expected emissions and evaluation of the adequacy of the proposed pollution control devices to meet standards for point sources and to meet AAQ standards

ANNEXURE A

PLANT LAYOUT PLANT