

**DPR**

for

**Establishment of SWM  
Facility in APSEZ  
Visakhapatnam**

**Submitted by**

**Southern Ecologics & Services Pvt Ltd.**

**Southern Ecologics & Services Pvt Ltd.**

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# **Pre-processing Facility (PPF) is a “Preparatory” or Pre-treatment Unit”**

## **For Final Treatment called “Co-Processing”**

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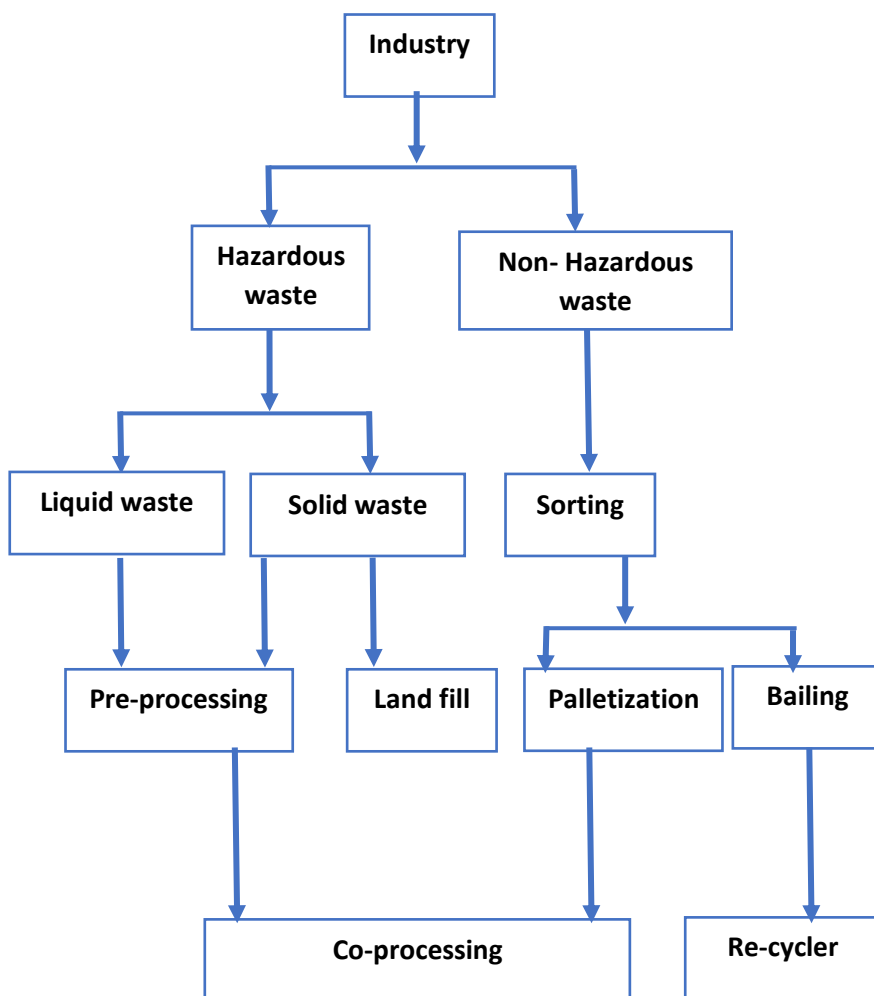
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## 1.0 Introduction to Pre-Processing:

### 1.1 Waste management in IZ:

General solid waste cycle of industrial waste is as mentioned below.



### 1.2 BENEFITS OF PRE-PROCESSING FACILITY

- Most wastes are not suitable for direct utilization in cement kiln.
- Cement plants need consistent supply of uniform quality of “Wastes Materials” as

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fuel.

- Ensures consistency in waste quality, consistence in emission and uniform operation.
- Technical and Safety considerations.
- Procedural matters.

## 1.3 Alternative Fuel Recovery Facility

### INTRODUCTION:

The disposal of hazardous wastes creates major economic and environmental problems. One productive use of hazardous wastes is to blend them into fuel, which mitigates damage to the environment by recycling waste into fuel and reducing fossil-fuel consumption. Operations personnel face a daunting task of efficiently blending hazardous waste into fuel, while simultaneously maintaining environmental regulatory requirements.

There are three types of waste which can be considered

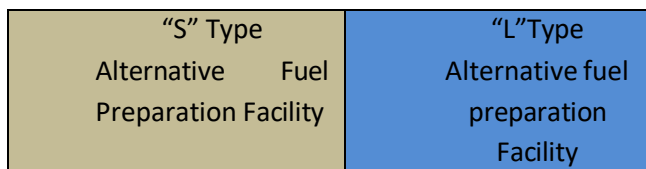
1. Solid
2. Semi-Solid/ Free Flowing Tarry Waste
3. Liquid

Choice of Wastes: Waste need to be segregated and prepared based on calorific values only

**Note:** Compatibility Criteria has to be considered in all stages at Alternative Fuel Preparation Points.

### Developing Alternative Fuel Preparation Facility:

Alternative fuel platforms will be developed as below:



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➤ **L' Type Alternative Fuels Area:**

'L' Type Alternative Fuels are basically Liquid Type Incinerable Waste which are more than 2500 Kcal.

- Common Neutralization Tank to maintain pH level 7
- 25 KL Mixing Tank with Cooling Coil and External Jacket to control the heat for Exothermic Liquid Waste
- 25 KL Mixing Tank for the Non-Exothermic Liquid Waste
- Agitator set up made by Stainless Steel
- Pump

➤ **'S' Type Alternative Fuels Area:**

'S' Type Alternative Fuels are basically Solid Type Incinerable Waste which are more than 2500 Kcal

- Common Neutralization Tank to maintain pH level 7
- Mixing pit of 5 x 5 m
- Jaw mixer for premixing of the solid and semisolid Waste.
- Blender

Solid blend is prepared through mixing in an appropriate quantity of solid/ semi solid waste with binders. The first step of preparing solid blend is to selection of waste. The segregation of waste according to their pH & calorific value helps in it. Source materials for solid substitute fuel include Paint Sludge, Oily Filter Cake, Spent Carbon, Organic waste, Tarry waste, Biomass, Resin, Distillation Residues, Grease, ETP sludge, and alumina sludge etc. Assortment of waste is done according blending norms. A general waste selection criteria for high calorific value fuel is Low moisture content, High LOI & TOC, High calorific value, Good compressibility, Less ash content, Non toxic, Less pollutant, Sustainable combustion.

After selection, waste is mixed with binders. Some common binders which can be used for blending are rice husk, press mud, bagasse, saw dust, scrape of coconut, coal dust, lime, silicates, epoxy resins, fly ash etc. Binders should have following properties are Easily available, Cheap in cost, Produce strong final agglomerates, permanently bond particles, withstand the rigors of storage, handling, packaging & shipping.

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The addition of strength increasing additives such as latex, pulp from the pulp & paper industries, paper, cardboard, acrylic copolymers, starch, starch derivatives, vinyl derivatives, cellulose, cellulose derivatives, peat moss etc.; plasticizers to improve the adherence & plasticity; inorganic components like bentonite or other types of clay, and cement are optional components to provide different characteristics to the blended product.

**Final Solid Waste Mix must contain 90% of Waste and 10% Binders**

- Belt Conveyer
- 25 Kg's of Double Lined HDPE Bags for packing the solid waste mix
- **'SS' Type Alternative Fuels Area:**

'SS' (Semi Solid) Type Alternative Fuels are basically mix of Solid, Liquid and Tarry Waste Types of Incinerable Waste which are more than 2500 Kcal.

Any type of Incinerable Waste can be mixed based on the compatibility.

- Mixing Pit of 3 x 3 m
- 

**1.4 Laboratory Infrastructure for the facility:**

S. No	Parameters	Instruments Required for Testing
1	Ph	pH meter-Ion selective electrode
2	VOC & PCB/PCT	Gas Chromatograph
4	CaO, SiO <sub>2</sub> , Al <sub>2</sub> O <sub>3</sub> , Fe <sub>2</sub> O <sub>3</sub> , SO <sub>3</sub> (in Ash) & Heavy Metals	Inductive Couple Plasma Spectrophotometer Spectro photo meter
7	Br, I	Titrometric Method
8	CV	Bomb calorimeter
9	Ash	Gravimetric Method
10	Viscosity	Viscometer
11	Flash Point	Flash Point Analyser

**1.5 Pro's & Cons:**

Emissions could be reduced when burning waste fuel versus coal. Blending waste into fuel is the only option that produces a positive effect for society; that is, it turns a nonproductive form of waste disposal into a productive form of waste

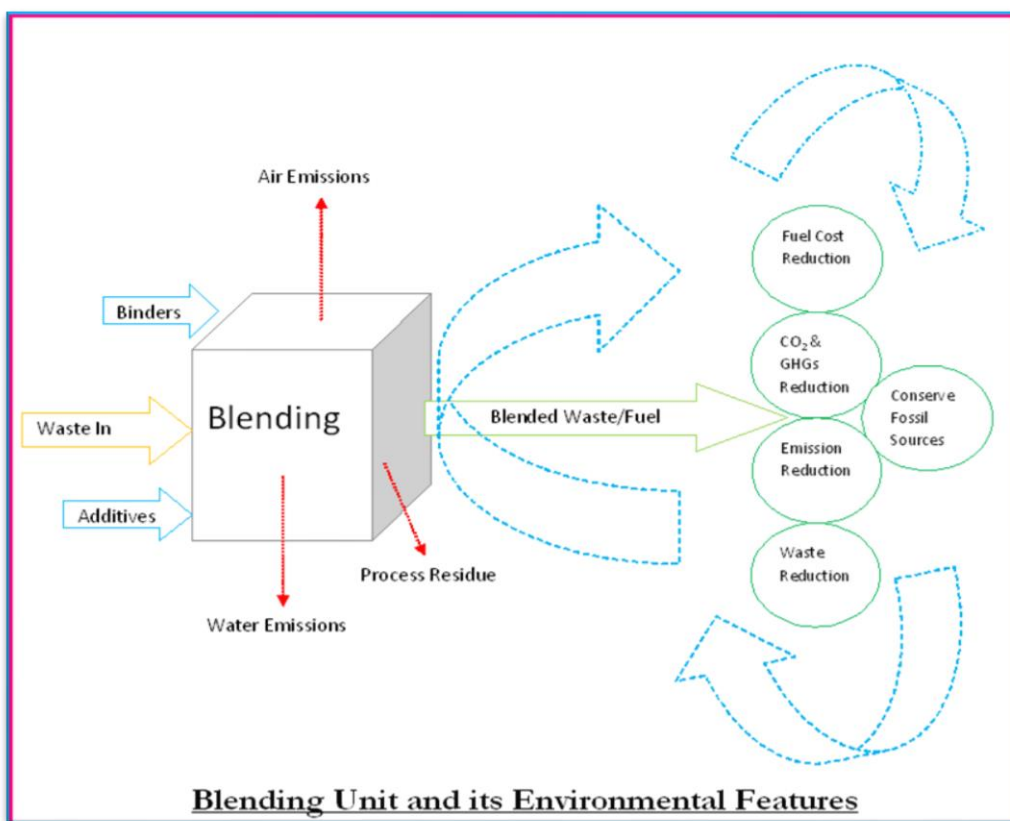
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disposal. This approach has the added benefit of avoiding fossil-fuel consumption. The waste professionals seek to blend wastes into fuel as efficiently as possible without violating regulatory body's guidelines. Waste fuel burns cleaner than coal; higher emissions are allowed when burning fossil fuel. Strong oxidizers generally are considered to be incompatible with many organic substances because of the potential for dangerous reactions. Chlorates, perchlorates, and other strong oxidizers are potentially incompatible with alcohols, halogenated hydrocarbons, other reactive organic compounds and solvents, and other flammable and combustible wastes. The potential consequences of mixing such incompatible materials are fire, explosion, or violent reaction. Volatile Organic Carbons are easily made to escape to atmosphere.

## Environmental Aspects of Fuel blending process:



### Common Impact on Environment:

- Under the requirement of Kyoto Protocol GHGs can be reduced; replacement of conventional fuel may be one option to reduce GHGs.

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- Minerals also can be recovered and re-used.

## **Environmental Issues:**

- There are large number of contaminants and components in waste that might be present in waste. There are few common emissions from waste blending operations.

## **Air Emission:**

- 
- It is common to identify organic substances during blending operation, create some kind of particulate emission simply thru' handling various wastes. Issues such as Particulate Matter, Odour, VOCs, NOx, SOx, HCl, H2S, NH3, Amine and Cyanide. PAHs are relatively difficult to break down, but when they are separated epoxides are formed which attack DNA and which may cause the development of cancer.

## **Water Emissions:**

- Blending Unit create declare an emission of Total Nitrogen, TOC, Total Phosphorous, and Chloride to Water and an emission of CO<sub>2</sub>, NH<sub>3</sub> and Particulate Matter into Air. The next most common emissions are probably copper and zinc which also factors in Plant and Animal Metabolism. Nickel and other Toxic metals are also present in the effluent. The principal organic contaminant BTEX (Benzene, Toluene, Ethyl Benzene, Xylenes) and Dichloromethane also appear in aqueous wash water of blending unit.

## **Waste and Contamination of Land**

- Contamination of land has caused major problems in the blending of waste which led severe contamination of land and in some cases with persistent organic pollutants.

## **Fugitive Emissions**

- Fugitive Emissions are also arising from blending area.

## **Particulate Emission**

- Blending Unit handling powders and wastes giving rise to dusts often have particulate emission to atmosphere.

## **Noise Emission**

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- Noise and/or Vibration typically detectable beyond the Blending Shed.

## Paddle Mixer –



A Paddle Mixer shown below is used for Blending of assorted waste material to convert them into homogeneous material suitable for disposal into cement kilns directly.

### 1.6 Facility requirement:

An integrated solid waste management (ISWM) plant is proposed to be constructed in APSEZ, Atchutapuram for pre-treatment and disposal of industrial wastes from the industries located in IZ.

Based on survey of 80 industries, 70 industries are generating hazardous and non-hazardous waste. Approximate quantity of waste generation from these facilities with 100% occupancy is mentioned in below table.

S.No	Category of waste	Proposed disposal	Quantity generation as per CFE (TPD)
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1	Hazardous waste	Co-Processing	177.83
2	Hazardous waste	Land Fill	232.29
3	Non- Hazardous waste	Recycling	640.02
4	Hazardous waste	Recovery	632.46
5	Hazardous waste	E-waste	0.07
		Total Qty (TPD)	<b>1682.66</b>

Concept plan is all the industries located in IZ should send both hazardous & non-hazardous to the ISMW plant. In ISMW plant we propose following facilities for each category waste.

Hazardous waste pre-treatment systems:

- Collection
- Blending
- Re-packing

Non-Hazardous waste pre-treatment systems:

- Collection
- Sorting
- De-contamination
- Crushing
- Bailing/ packing.
- vermicomposting

With this centralized facility we can bring the single point monitoring system for waste disposal. This brings more transparency in the waste disposal.

## 1.7 Pre-processing of wastes for co-processing:

Due to the heterogeneity of wastes, pre-processing is required to produce a relatively uniform waste stream for co-processing in cement kilns. This waste stream should comply with the technical and administrative requirements of cement manufacture and guarantee that emission standards and product quality are met. The proposal in this regard shall be submitted to SPCB by the cement plant or stand alone pre-processing facility or TSDF. Waste mix having Uniform characteristics needs to be prepared from different wastes streams for trouble free co-processing in a cement kiln.

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The characteristics of the waste mix that need to be uniform pertain to particle size, chemical composition and heat content. For optimum operation, kilns require very uniform waste mix flows in terms of quality and quantity. Uniform quality of waste mix can be achieved by pre-processing different types of wastes by different physical processes using a pre-processing facility.

Pre-Processing is defined as pre-treatment of waste streams coming from different sectors and industries to make it suitable/ homogenized for feeding into the kiln system to avoid process fluctuations. Pre-processing involves only physical transformations like size reduction (By Shredding and cutting), separation of foreign/ undesirable materials (magnetic materials separation by Magnetic separator, use of metal detectors to remove metallic particles), impregnation (introducing and proper mixing of biomass/ saw dust in semisolid streams to soak extra flowing liquids & maintaining good flow ability) and desired size selection (Size selection by screening operation, manual size selection by hand picking of large material size on very low speed Belt conveyors).

Pre-processing produces a homogenized Alternative Fuel mix from different incoming waste streams from various industrial sectors and reduces the possibilities of process fluctuations during Co-Processing the pre-processed fuels.

Various types of equipment are utilized during pre-processing operations like Shredder, Grinder, Cutter, Hammer, Jaw Crusher, Chipper and Hydro pulp machines for size reduction. Mixers for homogenizing the waste mix in to large vessels/ pits. Moving machinery like trucks, Bobcat, Forklifts, loaders, dumpers, Arm handlers, Wheel loaders, Crawler loaders, Telescopic handlers for material movement from one to another place and loading/unloading of the material. Metal detectors, Electro-Magnetic separators, metal sorting equipments are utilized to remove small metallic traces which may be present in the incoming hazardous and other wastes from various sources. Different types of screens like Disc screen, Rotary screen, Trammel screen, Oscillating/ vibrating screens are used to separate the differently sized portions of the processed waste and choosing the right fraction for feeding into the system. Various types of Belt conveyors like flat belt conveyors, Inclined Belt conveyors, Cleared belt conveyors, chain conveyors, bucket conveyors, closed conveyors, pipe conveyors etc are utilized to transport the material from one to another place, usually pre-processed waste from the processing area to feeding area.

The pre-processing facility must have appropriate design to ensure that the waste homogenization operation is carried out in an environmentally sound manner and has equipment & facilities that are designed to handle the required hazardous wastes.

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The rejects produced from the pre-processing facility, if any, may be sent to the TSDF, the authorization for which may be obtained from concerned SPCB.

The pre-processing area must have impervious concrete floor and should be adequately covered to avoid exposure of rain to the material being stored and handled while pre-processing or co-processing.

Fume extraction systems with vacuum ducts and fume hoods should be installed at receiving pits/ tanks, mixing units, blending units, shredders, transfer points, dryers, impregnation units, granulators, pelletizers, crushers, grinders, blenders etc. where there is source of such emissions. Such fume extraction systems should be connected to scrubbers / bag filters / VOC emission control through carbon adsorption, thermal or biological treatment etc. depending on type of emissions. The cleaned gases should be vented through ID fan and stack.

A fire protection system of approved design should be in place in the storage and pre-processing area.

The storage, handling and pre-processing facility should have appropriate spillage / leachate collection and storage system with impervious liners to avoid contamination of the ground water and soil.

The storm water and spillage/ leachate drainage systems should be so designed that there should be no contamination of the storm water with the spillage or leachate from the storage, handling and pre-processing area.

The electrical and instrumentation fitting should be conforming to the standards.

The facility must have appropriate odor control facility to deal with the odor nuisance.

Emergency showers and eye wash stations should be provided within the storage, handling and pre-processing work area for immediate emergency use following exposure to the wastes.

Abatement techniques should be in place for control of noise to required levels.

## **1.8 Suitability of Substances for co-processing:**

The decision on what type of substances can be used is based on the clinker production processes, the raw material and fuel compositions, the feeding points, the air pollution control devices and the given waste management problems. The Accept - Refuse Chart could be used by plant operators to help them in considering, which type of substance is suitable for co processing.

As a basic rule, waste accepted for co-processing must be safe enough to handle in the given facility and shall contribute to recovery of material or energy value present in it or provide its safe disposal.

Sometimes, some wastes streams are not suitable in large volumes but can be co-processed in small volumes with controlled feed rate in to the system.

The wastes listed below are normally not recommended till otherwise proved /

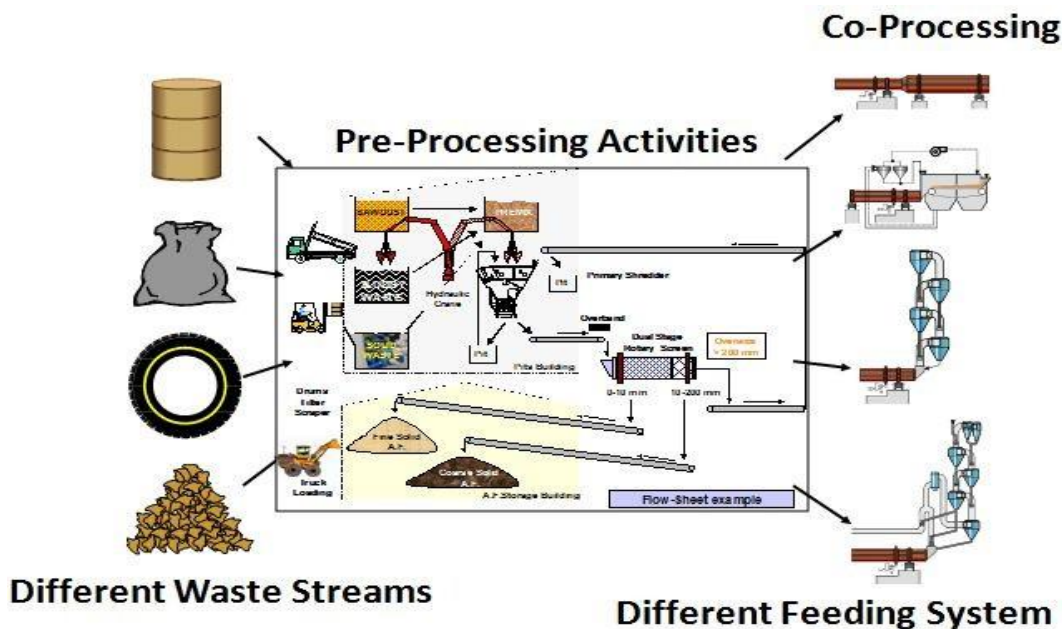
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evidenced for and hence need not be considered for pre and co-processing.

- Biomedical waste
- Asbestos containing waste.
- Electronic scrap.
- Entire batteries.
- Explosives.
- Corrosives.
- Mineral acid wastes.
- Radioactive Wastes.
- Unsorted municipal garbage.



## 2.0 Survey Report:

We have surveyed the industries located in IZ based on their CFE's (Consent for establishment), also through telecom & personal meetings. Based on our survey the details are as mentioned below.

### 2.1 List industries targeted to collect the waste:

S.No	Company Names
1	M/s. NETMATRIX LIMITED
2	M/s. ABHIJEET FERRO TECH LTD
3	M/s. PORUS LABORATORIES PRIVATED LIMITED

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4	M/s. POKARNA LTD
5	M/s. UNIPARTS INDIA LTD.
6	M/s. TOYOTSU RARE EARTH ORISA PVT LTD
7	M/s. LAURUS LABS PVT LIMITED U-4
8	M/s. LAURUS LABS PVT LIMITED U-6
9	M/s. ESCIENTIA ADVANCED SCIENCES PVT LTD
10	M/s. ALBUS INDIA LTD to TUF INDIA.
11	M/s. RAIN CII CARBON (VIZAG) LIMITED
12	M/s. SUNDARAM ALLOYS LTD
13	M/s. SAAI VISHNU LABORATORIES
14	M/s. ASSURGEN PHARMA PRIVATE LIMITED
15	M/s. GMFC LABS
16	M/s. LEE PHARMA LIMITED
17	M/s. INNOVARE LABS PVT.LTD
18	M/s. MAHALAXMI CHEMICALS
19	M/s. SANPRA SYNTHESIS PRIVATE LIMITED
20	M/s. RUSHIL DECOR LIMITED
21	M/s. ATCHUTA LABORATORIES PVT LTD
22	M/s. STEREO KEM PHARMACEUTICALS PRIVATE LIMITED
23	M/s. GENOTECH HEALTH AND LIFE SCIENCES PVT. LTD
24	M/s.SRM Laboratories Private Limited
25	M/s. MAHALAXMI CONSTRUCTIONS
26	M/s. RUI LABORATORIES PRIVATE LIMITED
27	M/s. YENOVUS PHARMA PVT LTD
28	M/s. CPR LABS
29	M/s. PEARL BEVERAGES LTD
30	M/s. POSH CHEMICALS PVT LTD
31	M/s. PIDILITE INDUSTRIES LTD
32	M/s. LAURUS LABS PVT LIMITED U-2
33	M/s. SWAASA PHARMA LIMITED
34	M/s. SRI BALAJI INDUSTRIES
35	M/s. SOUTHERN PHARMA
36	M/s. MYOGEN PHARMA PRIVATE LIMITED
37	M/s. S.V.DRUGS & INTERMEDIATES
38	M/s. JAYANSREE PHARMA (P) LIMITED
39	M/s. AVARA SYNTHESIS PRIVATE LIMITED
40	M/s. AVEREX DRUGS PRIVATE LIMITED
41	M/s. ASTER INDUSTRIES
42	M/s. SPAN LIFESCIENCES PRIVATE LIMITED
43	M/s. VASUDHA PHARMA CHEM LTD
44	M/s. GODAAVARI LABORATORIES PRIVATE LIMITED
45	M/s. INDIAN OIL CORPORATION LIMITED
46	M/s. VASANT CHEMICALS PVT LTD

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47	M/s. Ceyone Life Sciences Private Limited
48	M/s. Ransh Pharma Pvt Ltd
49	M/s. SalviasPharma Pvt Ltd
50	M/s. Crystal Pharma
51	M/s. SSV Pharma
52	M/s. Rachem
53	M/s. Saint Gobain
54	M/s. Solara Active Pharma
55	M/s. Styrax life science
56	M/s. Vasista Parma Chem
57	M/s. Manne Labs
58	M/s. Ritvis Labs
59	M/s. Haraeon Solar
60	M/s. Kekule
61	M/s. SSVFire Chem
62	M/s. AR Life sciences Pvt Ltd
63	M/s. Connex Pharma Pvt Ltd
64	M/s. Valens Molecules Pvt Ltd
65	M/s. Vijaya Sri pharma
66	M/s. Saint Gobain
67	M/s. Sainor Laboratories pvt ltd
68	M/s. AETL

## 2.2 Expected waste generation from listed industries (68 no's) category wise:

We have segregated the waste based on their category and mentioned the final disposal in below table;

TYPE OF THE WASTE	METHODE OF FINAL DISPOSAL
Organic Solid Waste (Kg/Month)	co-processing
Organic Residue (Kg/Month)	co-processing
Spent Carbon (Kg/Month)	co-processing
MEE Salt (Kg/Month)	Land fill

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Inorganic Solid Waste (Kg/Month)	Land fill
ETP Sludge (Kg/Month)	Land fill
Spent Solvent (KL/Month)	Recovery
Mixed Spent Solvent (KL/Month)	Recovery/ co-processing
Spent Acid (KL/Month)	Recovery
Spent Salt(KL/Month)	Recovery
Detoxified Containers & Container Liners (No'/Month)	Recycle
Used oil (Ltrs/Month)	Recovery
Waste Oil &Grease (Ltrs/Month)	Recovery
Used lead acid batteries (No's/Month)	Recovery/ Recycle
Discarded Personal Protective equipment(PPE's) (Kg/Month)	Recycle
Boiler Ash (Tons/Month)	Recycle
LDPE liners (Kg/Month)	Recycle
Glass bottles (Kg/Month)	Recycle
HDPE Bags&Polythin Bags (Kg/Month)	Recycle
HDPE Carboys (No's/Month)	Recycle
Insulation waste (Kg/Month)	Recycle
E-Waste (Kg/Month)	E-waste
Thermocol waste(Kg/Month)	Recovery
PPFRP Waste(Kg/Month)	Land fill
Gypsum TPM (Kg/Month)	Land fill
Absorbent material(Filter, Pape contaminated by solvent(Kg/Month)	Land fill
Non catalyzed Polyester Resin (Kg/Month)	Land fill
Rubber sheets from moulding (Kg/Month)	Recycle
Abrasives from moulding (Kg/Month)	Recycle
Iron powder (Kg/Month)	Recycle
Recycleble polythylene (Kg/Month)	Recycle
Catalyzed compound (Kg/Month)	Land fill/ recovery
Engineering scrap (Kg/Month)	Recycle
Centifugal Calcium Bags (Kg/Month)	Recycle
Papers (Kg/Month)	Recycle
Wooden scrap(Kg/Month)	Recycle
Sodium Dicromate solution waste (Kg/Month)	Recycle

### 2. 3 Summary of all 68 industries as per the CFE is

S.No	Category of waste	Proposed disposal	Quantity generation as per CFE (TPD)
1	Hazardous waste	Co-Processing	177.83
2	Hazardous waste	Land Fill	232.29
3	Non- Hazardous	Recycling	640.02

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	waste		
4	Hazardous waste	Recovery	632.46
5	Hazardous waste	E-waste	0.07
Total Qty (TPD)			<b>1682.66</b>

## 2.4 Proposed facility with capacity in pre-processing area

S.No	Type of waste	Facilities required to handle in phase 1	Capacity in phase 1 (TPD)
1	Hazardous waste pre-treatment systems:	<ul style="list-style-type: none"> <li>• Collection</li> <li>• Blending</li> <li>• Re-packing</li> </ul>	50 TPD
2	Non-Hazardous waste pre-treatment systems:	<ul style="list-style-type: none"> <li>• Collection</li> <li>• Sorting</li> <li>• De-contamination</li> <li>• Crushing</li> <li>• Bailing/ packing.</li> </ul>	20 TPD

## 2.5 Expected waste water generation and source details:

S.No	Source of waste water generation	Expected quantity in Lit/day	Proposed disposal method
1	Storm water		
2	Tanker & container wash water	2000	To CETP as LTDS
3	Landfill leachate	500	To CETP as HTDS

## 2.6 Characteristics of Solid Wastes Generated:

The characteristics of the industrial waste generated in IZ would vary for different products and their respective manufacturing processes. Major Hazardous waste generators are bulk drug industries in this sector. The variation of quality in this sector would occur due to the following specified reasons:

- i. A specific bulk drug production involves several process reactions and associated process operations. However, not all the process reactions are employed by all the industries i.e. some may procure intermediates and employ only remaining reactions.

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- ii. Bulk drug industry involves batch processes and corresponding operations. Therefore, the waste quantity and quality varies with respect to each unit process and unit operation.
- iii. A huge diversity exists in the product mix which varies from one industry to other, and is largely driven by the corresponding market demand. As the process specific variations in waste generation are significantly high, generalization of waste on qualitative and quantitative grounds vary, hence demanding at least product specific (if not unit process specific) waste generation factors.
- iv. Number of industries manufacturing specific products are limited due to patent issues
- v. Many products include multiple unit processes, for getting the desired final product drug.  
Waste management costs influence the decision of manufacturing location such as adjacent to coast, land-locked area.
- vi. Solid waste from CETP's of APSEZ also will be catered and they are rich in inorganic & few are organic.

### **3.0 Site Selection criteria:**

We have visited four sites in the IZ, which were proposed for utilities in master plan. And the details are as below

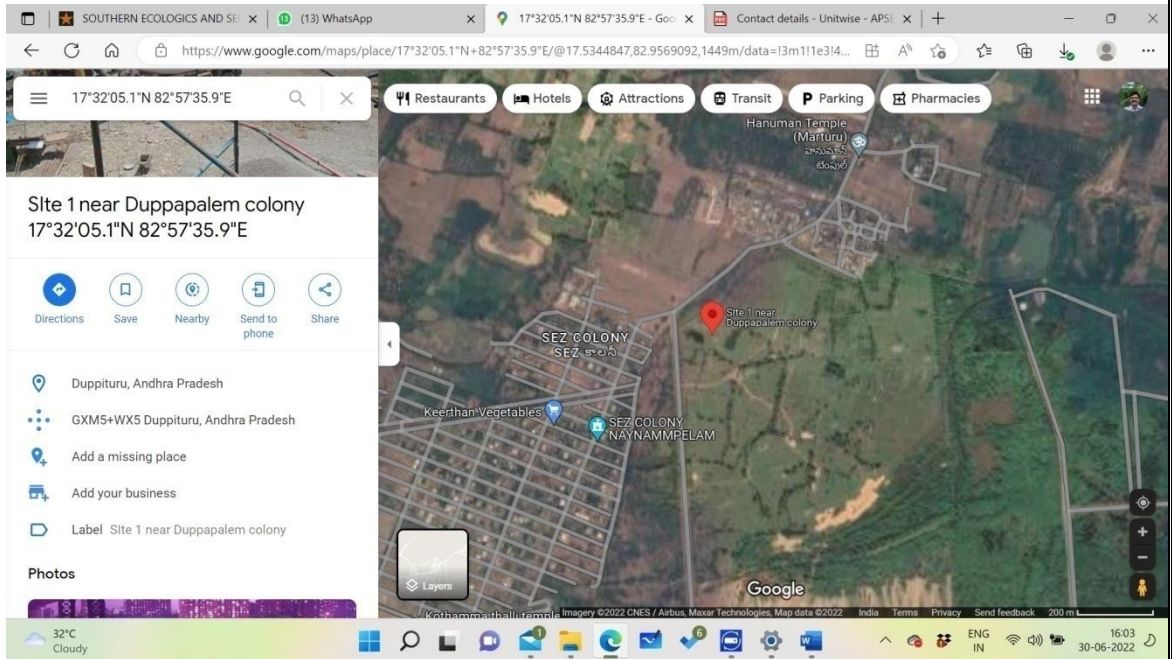
### **3.1 List of the sites identified:**

**Site no: 1**

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**Google Co-ordinates:** [17°32'05.1\"N 82°57'35.9\"E - Google Maps](https://www.google.com/maps/place/17°32'05.1\)

**Link to Google map:**

[https://www.google.com/maps/place/17°32'05.1\"N+82°57'35.9\"E/@17.5344847,82.9569092,1449m/data=!3m1!1e3!4m5!3m4!1s0x0:0x469ccff48064dcec!8m2!3d17.5347366!4d82.9599615?hl=en](https://www.google.com/maps/place/17°32'05.1\)

**Observations:**

The site is near Duppapalem village and Our major observations are, this site is near to habitation and it is at the boundary of IZ. So that we don't prefer this site for our operation.

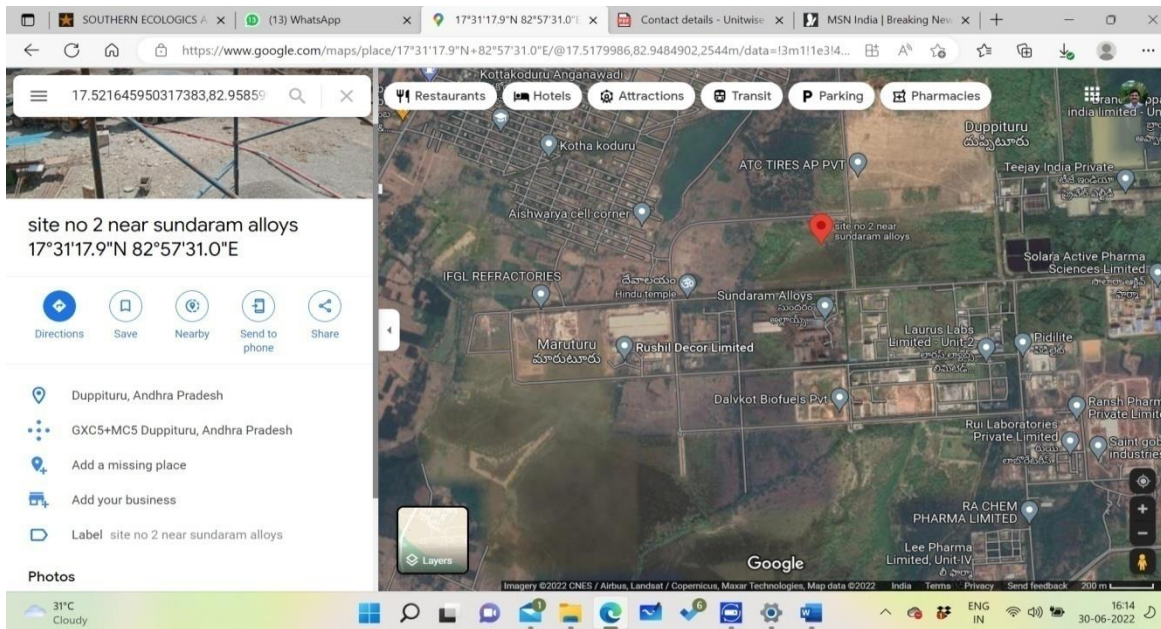
**Site no 2:**

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# Establishment of SWM Facility in APSEZ, Visakhapatnam.



## Google map link:

<https://www.google.com/maps/place/17%C2%B031'17.9%22N+82%C2%B057'31.0%22E/@17.5179986,82.9484902,2544m/data=!3m1!1e3!4m5!3m4!1s0x0:0x2b70f84a4a1c3cc6!8m2!3d17.521646!4d82.9585999?hl=en>

## Observations:

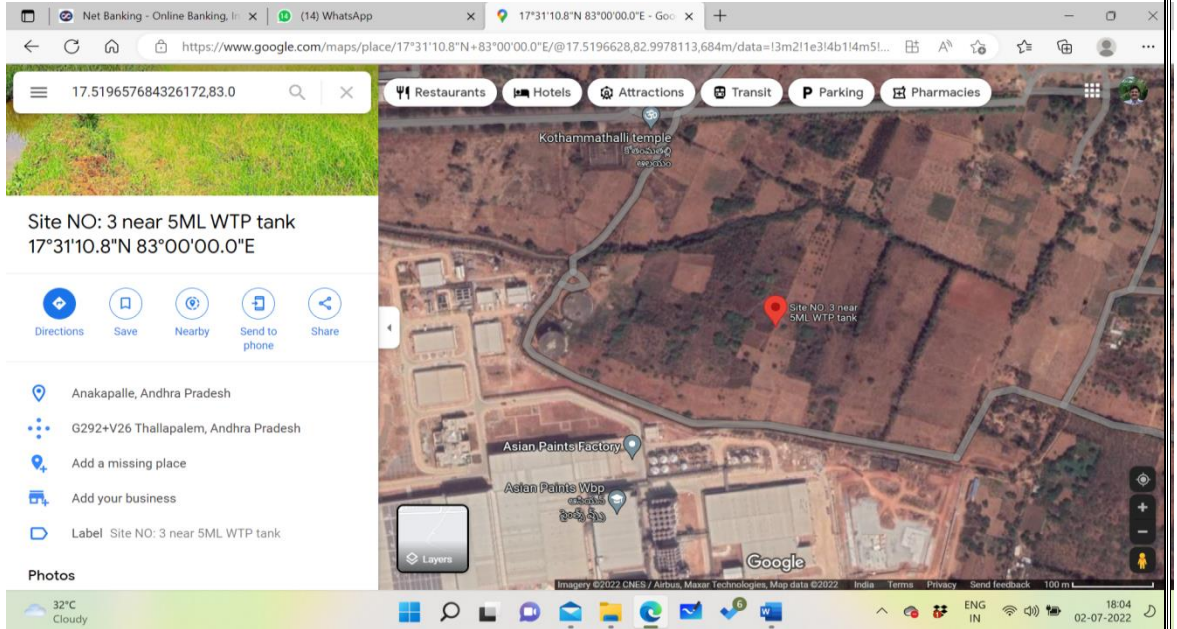
The site is in middle of IZ. Our major observations are, this site is surrounded by no-chemical industries. Otherwise site is suitable for operations. But area availability is 10Acr.

**Site No: 3**

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## Google map link:

<https://www.google.com/maps/place/17%C2%B031'10.8%22N+83%C2%B000'00.0%22E/@17.5196628,82.9978113,684m/data=!3m2!1e3!4b1!4m5!3m4!1s0x0:0x93c00076714d9d43!8m2!3d17.5196577!4d83?hl=en>

## Observations:

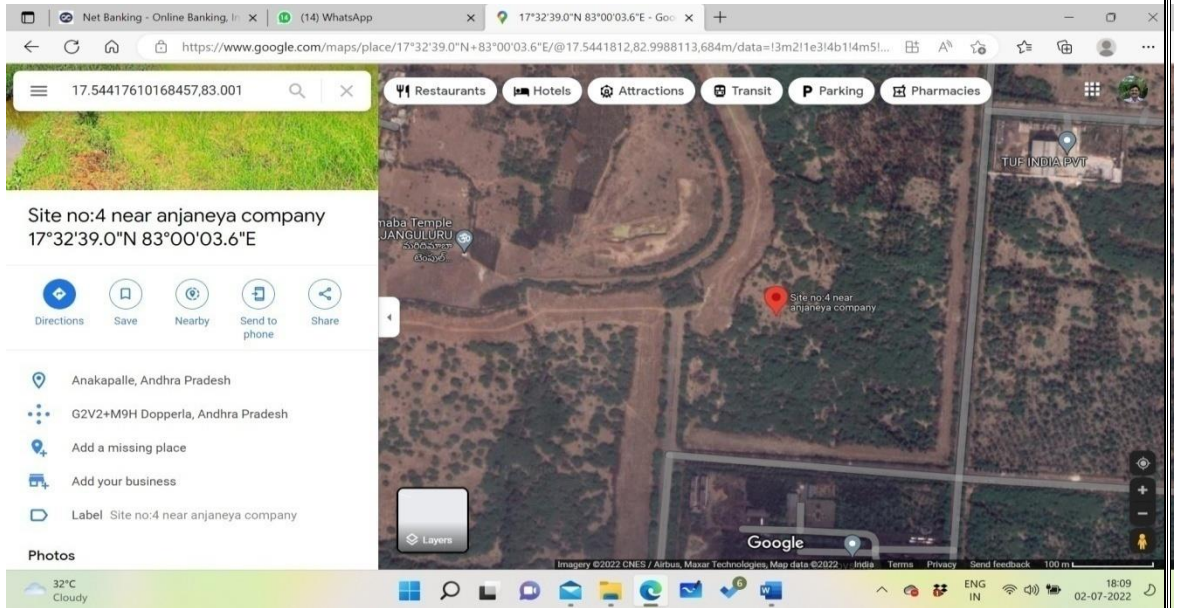
The site is in middle of IZ. Our major observations are, this site is surrounded by chemical industries. But area availability is 50Acr.

**Site No:4**

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## Google map link:

<https://www.google.com/maps/place/17%C2%B032'39.0%22N+83%C2%B000'03.6%22E/@17.5441812,82.9988113,684m/data=!3m2!1e3!4b1!4m5!3m4!1s0x0:0x4f23fba2773e9f4e!8m2!3d17.5441761!4d83.001?hl=en>

## Observations:

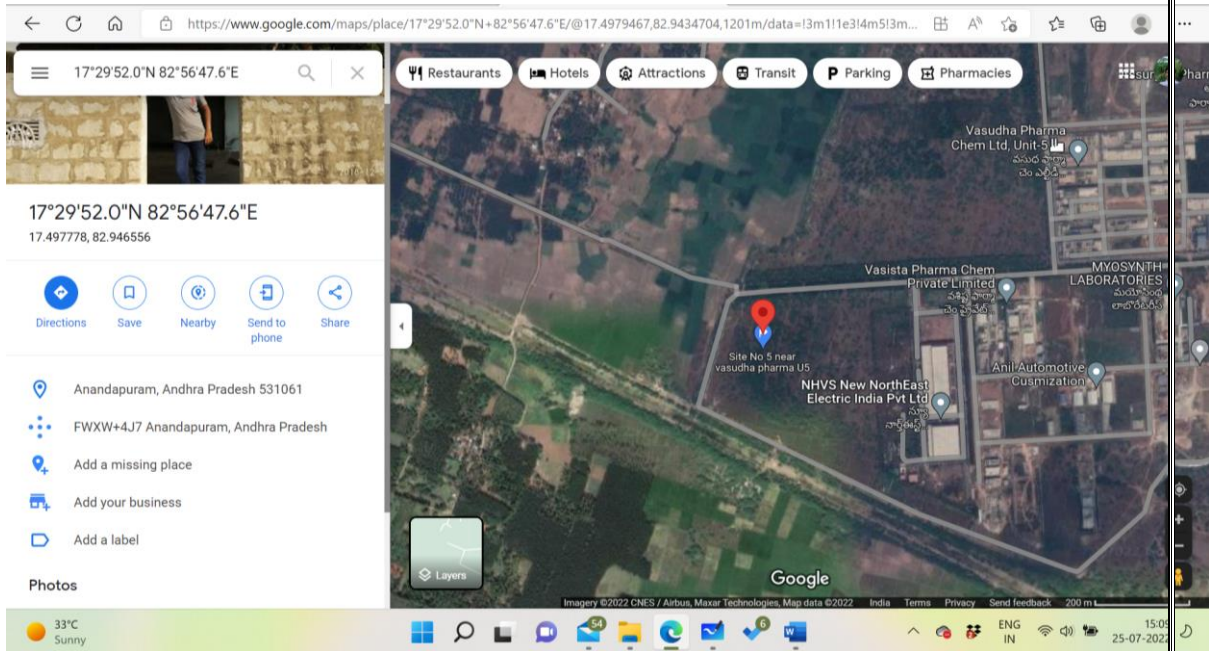
The site is in middle of IZ. Our major observations are, this site is near jangulur village and beside the tank.

## Site No:5

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[17°29'52.0"N 82°56'47.6"E - Google Maps](https://www.google.com/maps/place/17°29'52.0)

### 3.2 Site selection matrix

S No	Criteria	Name of the Site				
		Site no 1	Site no 2	Site no 3	Site no 4	Site no 5
1	Land mark	Duppituru, Andhra Pradesh	Near Sundaram Alloys	Near 5ML Sump	Near Mythan Alloys, Anjaneya company.	Near Vasudha pharma U5
2	Area	10Acr	10Acr	27Acr (Common facility area)	10Acr (Common facility area)	19Acr

The guide lines of Central Pollution Control Board for **selection of site** of solid waste treatment plant are as below Table No-02

	Site No 1	Site No 2	Site No 3	Site No 4	Site No 5
i) Preferred Location -Low Population, Low Alternate Land use, Low Ground Water Contamination Potential, Low	Not meeting (Adjucent to village)	Not meeting (village and water	Located in SEZ area	Beside the rain water channel	Best alternative site

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# Establishment of SWM Facility in APSEZ, Visakhapatnam.



Permeable Soil, Proximity to industry, Minimum Rainfall, Non sensitive area		body is in 200m only)			
ii) Airports – As per Aviation Authority > 10 Kms	>10 Kms	>10 Kms	>10 Kms	>10 Kms	>10 Kms
iii) Flood Plains– Should not be built	✓	Beside water body	✓	Beside the rain water channel	✓
iv) Wet Lands– Should not be built	✓	Beside water body	✓	✓	✓
v) Fault areas, Seismic Impact Areas	✓	✓	✓	✓	✓
vi) Location criteria	Near IZ Border	✓	✓	Near IZ Border	✓
vii) Lake or Pond > 200 m	✓	Around 300m from the border of the site	✓	✓	✓
viii) River > 100 m	✓	✓	✓	✓	✓
ix) Highway > 500 m from SH/ NH	✓	✓	✓	✓	✓
x) Habitation > 500 m – Notified Habitation	Not meeting	✓	✓	Not meeting	✓
xi) Public Parks > 500 m	✓	✓	✓	✓	✓
xii) Critical Habitat – Should not be built – Endangered Species	✓	✓	✓	✓	✓
xiii) Water Supply Well > 500 m	<b>Not meeting</b>	Not meeting	<b>Not meeting</b>	✓	✓
xiv) Coastal Regulation Zone –	✓	✓	✓	✓	✓

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Should not be built (Note: CRZ between NTPC and Pudimadaka village.)					
xv) Groundwater Level > 2m from base of landfill	✓	✓	✓	✓	✓

**Conclusion:** Out of the five sites, site number five is best suitable for establishment of integrated waste management facility based on guidelines prescribed by CPCB. In Table No 2.0 detailed comparison of sites is mentioned.

#### 4.0 Legal Background and Procedures:

##### 4.1 CPCB guide line:

The rules notified in the year 2016 on management of Hazardous and Other Wastes, outlines the hierarchy of wastes management, wherein, prevention, minimization, reuse, recycling, recovery, utilization including pre-processing and co-processing was envisaged prior to considering the option of disposal through incineration or secured land filling.

Substantial fractions of the industrial, commercial, domestic and other wastes contain materials that have the potential for use as an alternative raw material or as a supplementary fuel for energy recovery. The current waste generation scenario in India is as follows.

- About 7.4 Million tons of hazardous wastes is annually generated in India, out of which around **3.98** Million tons is recyclable and can be used for resource or energy recovery.
- About 65 Million TPA of MSW is generated in the country which contains about 15-20 % of non-recyclable Segregated Combustible Fraction (SCF) which can be utilized or energy recovery.
- About 200 million tons of non-hazardous wastes of industrial origin also gets generated in the country such as fly-ash, pyro-metallurgical lags, sludge from WTPs, dried sewage sludge, Plastic & other packaging materials, date expired and off-specification FMCG materials and food & kindred products, used pneumatic tires, etc. having potential for resource or energy recovery.
- Large quantity of agro-wastes that do not have potential to be used as cattle feed etc.

Environmentally sound utilization of wastes for resource or energy recovery can be practiced in various industrial processes. However, utilization by co-processing in cement Kiln is considered as an effective and sustainable option. There is dual

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benefit in co-processing of wastes in cement kilns, in terms of utilizing the waste as a supplementary fuel as well as an alternative raw material

The production of cement in India is about 300 Million Tons per annum, for which estimated coal and raw material (Lime stone, Iron ore, Clay, Bauxite etc.) requirement are 50 Million Tons per annum and 450 Million Tons per annum, respectively. The country, therefore, has vast potential to utilize large quantum of wastes such as non-recyclable hazardous & other wastes, segregated combustible fractions from MSW or Municipal Solid Wastes (MSW) based Refuse Derived Fuel (RDF), non-hazardous industrial wastes, plastics wastes, tire wastes, non-usable bio-mass etc. as an alternative fuel and raw material (AFR) in cement kilns. Such utilization would help in recovering energy and material value present in them thereby reducing the consumption of primary fossil fuels and raw materials. Utilizing these materials as AFRs will also reduce large quantity of GHG emissions of the country which is in line with our commitment made in the agreement.

#### 4.2 Authorization for pre-processing and/or co-processing:

As per HOWM Rules, 2016, utilization of hazardous and other wastes for co-processing or for any other use shall be carried out only after obtaining authorization from the State Pollution Control Board in respect of waste on the basis of standard operating procedures or guidelines provided by the Central Pollution Control Board.

As per CPCB guidelines, Every TSDF or standalone pre-processing facility or cement plant who is engaged in pre-processing of wastes for co-processing shall have minimal requisite infrastructure facilities & operational controls as mentioned below;

Type of operations	Check-list
Type of packaging	May use liners, Bags Small/ Jumbo, Drums, Containers, Bulklers, Tankers, etc. suitable for handling of hazardous wastes As per CPCB guidelines.
Reception	Weighing bridge
Waste characterization / Qualification	Laboratory
Storage	Shall install covered sheds with Impervious flooring. Waste shall be stored in storage tanks/ Containers/ bins. Bulky wastes may be handled on impervious lined flooring under shed.
Equipment for Size reduction	Shredder, Grinder, mixers, Cutter, Hammer, Jaw Crusher, Chipper, Hydro-pulpier machines, etc.
Feed material	Impregnation, Drying, Screening, Crushing,

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preparation Equipment	Pelletization, Granulation, Others
Moving machinery	Shall use machinery like trucks, Bobcat, Forklifts, loaders, dumpers, Arm handlers, Wheel loaders, Crawler loaders, Telescopic etc.
Sorting equipment	Shall use equipment like Metal detectors, Electro-Magnetic separators, etc.
Screening material	Shall use equipment such as disc screen, Rotary screen, Trammel screen, Oscillating screens etc.
Conveyers to transport the material from one to another place	Shall use belt conveyors, Inclined Belt conveyors, Cleared belt conveyors, chain conveyors, bucket conveyors, closed conveyors, pipe conveyors etc
Feeding arrangements (applicable to cement plants alone)	Weigh feeders (Volumetric and Gravimetric feeding), Apron and Gottwaldov feeders etc .for liquid, solid and semi-solid waste feeding, including facilities for impregnation of wastes.
Safety equipment (applicable to cement plants alone)	Rotary Air Lock, Safety shut off gate, Double slide gates are utilized into the feeding mechanism to avoid any back fire due to any pressure build-up in to the kiln.
Fugitive Emission Control Systems	Fume extraction systems with vacuum ducts connected to Scrubbers / bag filters VOC emission control systems Biological treatment etc. ID fan and stack.
Fire protection	Approved by fire safety auditor / fire department should be provided.
Spillage/ leachate collection/ containment measures.	Shall install collection pits, impervious liners, segregation of storm water drainage Systems
Electrical fittings/ Equipment	Systems shall be designed to handling flammable / explosive materials ( If relevant)
Odour control	The facility must have appropriate odor control facility to deal with the odor nuisance.
Safety Equipment	There shall be provision of emergency showers and eye wash stations. Use of PPE gear-plug etc.
Facility has implemented Monitoring plan for checking the health of the operating personnel	Medical surveillance of the operating personnel as per HOWM Rules 2016

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as per the statutory requirement	
Emergency Response Plan	Emergency Response Plan to deal with spills, fires and emergencies as per CPCB guidelines
CEMS	Shall install CEMS for PM, NOx & SO2 and connected to SPCB / CPCB for online data transmission (applicable to cement plants alone)

### 4.3 Standard Operating Procedures:

#### 4.3.1 Handling of Hazardous & other wastes:

The hazardous wastes need to be handled in an environmentally safe manner avoiding the possibilities of contaminating the environment and eliminate the chances of accidents leading to environmental damage. The requirements of handling, including labeling, packaging, transport and storage applicable to the hazardous & other wastes have been described in following sub-sections.

#### 4.3.2 Responsibilities of occupier for handling of hazardous & other wastes:

“Occupier” in relation to any factory or premises, means a person who has control over the affairs of the factory or the premises and includes in relation to any hazardous waste the person in possession of the hazardous waste.

The occupier shall take all adequate steps while handling hazardous wastes to:

- (a) Contain contaminants and prevent accidents and limit the inconsequence’s on human being sand the environment; and
- (b) Provide persons working on the site with the training, equipment and information necessary to ensure their safety.

#### 4.3.3 Packaging of Hazardous & other wastes:

The containers utilized for storing and handling Hazardous and other wastes for the purpose of co-processing must be able to withstand normal handling and retain integrity for a minimum period of six months. In general, packaging of hazardous substances must meet the following requirements:

- (i) All packaging materials including containers shall be of such strength, construction and type as not to break open or become defective during transportation.
- (ii) All packaging materials including containers shall be so packed and sealed that spillages of hazardous wastes / substances are prevented during transportation due to jerks and vibrations caused by uneven road surface.

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- (iii) Re-packing materials including that used for fastening must not be affected by the contents or form dangerous combination with them.
- (iv) Packaging material should be such that there will be no significant chemical or galvanic action among any of them at aerial in the package.
- (v) Bulk transportation of hazardous wastes in trucks without suitable packaging or containers shall not be allowed.
- (vi) The containers when used for packaging of the hazardous & other wastes shall meet the following requirements:

Container shall be of mild steel with suitable corrosion-resistant coating and roll-on roll-off cover, which may either be handled by articulated crane or by a hook lift system comfortably for a large variety of wastes. Other modes of packaging, like collection in 22-liter plastic or steel drums, PP and HDPE/LDPE containers, HDPE liner bags etc., also work for variety of waste. However, all such container should be amenable to mechanical handling.

  - It should be leak proof.
  - In general, the containers for liquid hazardous waste should be completely closed/ sealed. There should be no gas generation due to any chemical reaction within the container, and thus should be devoid of air vents.
  - Container should be covered with a solid lid or a canvas to avoid emissions of any sort including spillage, dust etc. and to minimize dour generation both at the point of loading as well as during transportation.
  - Container used for transportation of waste should be able to with stand the shock loads due to vibration effect/undulations of pavements etc.
  - Container should be easy to handle during transportation and emptying.
  - As far as possible, manual handling of containers should be minimized. Appropriate material handling equipment is to be used to load, transport and unload the containers. Drums should not be rolled on or off vehicles. Preferably, equipment such as fork lift & pallets shall be used.
  - Where a two-tier or three-tier storage is envisaged the frame should have adequate strength to hold the containers. Palletised drums may be stacked not more than 2 layers high in the transport vehicle.
  - One-way containers (especially 16-liter drums) are also allowed. The multi-use container should be re-useable provided it should be cleaned and free from deterioration or defects.
  - Loads are to be properly placed on vehicles. Hazardous & other waste containers are not to overhang, perch lean or be placed in other unstable base. Load should be secured with straps, clamps, braces or other measures to prevent movement and loss. Design of the container should be such that it can be safely accommodated on the transport vehicle.
  - Non-compatible wastes shall not be collected in the same container. These wastes shall be segregated & packed separately. Non-compatible wastes shall not be transported together under any circumstance.

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#### 4.3.4 Labeling of Hazardous & other wastes:

There are two types of labeling requirements:

- (i) Labeling of individual transport containers (ranging from a pint-size to a tank)
- (ii) Labeling of transport vehicles.

All hazardous & other waste containers must be clearly marked with the contents. The marking must be irremovable, waterproof and firmly attached. Previous content labels shall be obliterated when the contents are different. Proper marking of containers is essential.

Containers that contain hazardous waste shall be labeled with the words "HAZARDOUS WASTE" in Vernacular language, Hindi/ English. The information on the label must include the code number of the waste, the waste type, the origin (name, address, telephone number of generator), hazardous property (e.g. flammable), and the symbol for the hazardous property (e.g. the red square with flame symbol).

The label must withstand the effects of rain and sun. Labeling of containers is important for tracking the wastes from the point of generation up to the final point of disposal. The following are the requirements for labeling:

- The label should contain the name and address of the occupier and facility where it is being sent for pre-processing or co-processing i.e. labeling of container shall be provided with a general label as per Form 8 of the HWM Rules, 2016.
- Emergency contact phone numbers shall be prominently displayed viz; the phone number of concerned officer of the sender and receiver, Regional Officer of the SPCB / PCC, Fire Station, Police Station and other agencies concerned.

Explanation: As a general rule, the label has to state the origin/ generator of the waste. He/she and only he/she is responsible and shall know, in case of any accident / spillage etc. what kind of wastes it is, what hazard may occur and which measures should be taken. The second in the line is the collector/ transporter / disposer /co-processor / pre-processor, who has to know the risk and what to do to minimize risk and hazards.

#### 4.3.5 Collection and transportation of Hazardous & other wastes:

The transportation of the Hazardous wastes has to be undertaken by the transporter who is engaged by either authorized sender or receiver. The responsibility of safe transportation of hazardous & other waste to the site for pre-processing or co-processing shall rest with either waste generator or the occupier of the pre-processing /co-processing facility that engages the transporter for the waste transportation. The detailed guidelines for collection and transportation of hazardous and other wastes have been provided.

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The occupier of the hazardous waste shall ensure that wastes are packaged in a manner suitable for safe handling, storage and transport as specified in section 5.2 of these guidelines. Labeling on packaging is readily visible and material used for packaging shall withstand physical conditions and climatic factors .

In case of transportation of hazardous and other waste, the responsibility of the safe transport shall be either of the sender or the receiver whosoever arranges the transport and has the necessary authorization for the transport from the concerned State Pollution Control Board. The authorization for the transport shall be obtained either by the sender or the receiver on whose behalf the transport is being arranged. This responsibility should be clearly indicated in the manifest. Thus the occupier involved in transportation of hazardous wastes for co-processing or pre-processing shall comply with the following requirements;

- (a) Ensure that information regarding characteristics of wastes particularly in terms of being corrosive, reactive, Ignitable or toxics provided on the label.
- (b) The transport of hazardous waste containers shall be in accordance with the provisions of the Hazardous and other Wastes (Management and Transboundary Movement) Rules, 2016, (herein after referred as HW (M &TBM) Rules) and the rules made by the Central Government under the Motor Vehicle Act,1988 and other guidelines issued from time to time.
- (c) Provide the relevant information in Form 9 to the transporter, regarding the hazardous nature of the waste and measures to be taken in case of an emergency and shall mark the hazardous waste containers as per Form 8.
- (d) All hazardous waste containers shall be provided with a general label as given in Form 8 of the HW(M&TBM)Rules.
- (e) Intimate both the State Pollution Control Boards before handing over the waste to the transporter. In case of transportation of hazardous through a State other than the State of origin and destination, the sender shall give prior intimation to the concerned State Pollution Control Board of the States of transit before handing over the hazardous wastes to the transporter.
- (f) Manifest System shall be applicable for movement of wastes within the country only
- (h) The sender of the waste shall prepare seven copies of the Manifest in Form 10 comprising of colour code indicated below and all seven copies shall be signed by the sender:

Copy number with color-code	Purpose
Copy1 (White)	To be forwarded by the sender to the State Pollution Control Board or Committee after signing all the seven copies.

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Copy2 (Yellow)	To be retained by the sender after taking signature on it Form the transporter and the rest of the five copies to be Carried by the transporter.
Copy3 (Pink)	To be retained by the receiver (actual user or treatment Storage and disposal facility operator) after receiving the Waste and there meaning four copies are to be duly signed by the receiver.
Copy4 (Orange)	To be handed over to the transporter by the receiver after accepting waste.
Copy5 (Green)	To be sent by the receiver to the State Pollution Control board/ Committee.
Copy6 (Blue)	To be sent by the receiver to the sender.
Copy7 (Grey)	To be sent by the receiver to the State Pollution Control Board of the sender incase the sender is in another State.

**Note:**

- i. *The sender shall forward copy 1 (white) to the State Pollution Control Board, and in case of hazardous waste is likely to be transported through any transit State, the sender shall intimate State Pollution Control Boards of the transit States about the movement of the waste.*
  - ii. *No transporter shall accept waste from the sender for transport unless it is accompanied by signed copies 3to7 of the manifest.*
  - iii. *The transporter shall submit copies 3 to 7 of the manifest duly signed with date to the receiver along with the waste consignment.*
  - iv. *The receiver after acceptance of the waste shall hand over copy 4(orange) to the transporter and send copy 5 (green) to his State Pollution Control Board and send copy 6 (blue) to the sender and thecopy3 (pink) shall be retained by the receiver.*
  - v. *The copy7 (grey) shall only be sent to the State Pollution Control Board of the sender, if the sender in another State.*
- i) The transporter engaged for transportation of hazardous wastes for co-processing meets the following requirements;
    - i) Vehicle used for transportation shall be in accordance with the provisions under the Motor VehicleAct,1988, and rules made the reunder.
    - ii) Transporter shall possess requisite copies of the certificate (valid authorization obtained from the concerned SPCB/PCC for transportation of waste by the waste generator and operator of a facility) for transportation of hazardous waste.
    - iii) Transporter should have valid “Pollution under Control Certificate” (PUCC) during the transportation of hazardous waste and shall be properly displayed.
    - iv) vehicle shall be painted preferably in blue colour with white strip of 15 to30 cm

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width running centrally all over the body. This is to facilitate easy identification.

- v) Vehicle should be fitted with mechanical handling equipment as may be required for safe handling and transportation of the wastes.
- vi) The words “HAZARDOUS WASTE” shall be displayed on all sides of the vehicle in Vernacular Language, Hindi and English.
- vii) Name of the facility operator or the transporter, as the case may be, shall be displayed.
- viii) Emergency phone number sand TREM Card in Form9 of HW(M&TM) Rules,2016.
- ix) Vehicle shall be fitted with roll-on/roll-off covers if the individual containers do not possess the same.
- x) Carrying of passengers is strictly prohibited and those associated with the waste haulers shall be permitted only in the cabin.
- xi) Transporter shall carry documents of manifest for the wastes during transportation as required under Rule19 of the HW (M&TBM) Rules.
- xii) The trucks shall be dedicated for transportation of hazardous wastes and they shall not be used for any other purpose.
- xiii) Each vehicle shall carry first-aid kit, spill control equipment and fire extinguisher.
- xiv) Hazardous Waste transport vehicle shall run only at a speed specified under Motor Vehicle Act in order to avoid any eventuality during the transportation of hazardous waste.
- xv) Educational qualification for the driver shall be minimum of 10<sup>th</sup>pass (SSC). The driver of the transport vehicle shall have valid driving license of heavy vehicles from the State Road Transport Authority and shall have experience in transporting the chemicals.
- xvi) Driver (s) shall be properly trained for handling the emergency situation sand safety aspects involved in the transportation of hazardous wastes. He should aware of procedures outlined in Emergency Response Plan and trained on emergency spill control procedures.
- xvii) The design of the trucks shall be such that there is no spillage during transportation.

#### **4.3.6 Responsibilities of the hazardous waste Transporter:**

The sender or receiver whoever is involved in transportation of hazardous wastes

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shall be responsible for:

#### **4.3.7 Storage of Hazardous & other wastes:**

The storage period of hazardous and other wastes shall be in accordance with the Rule 8 of the Hazardous & Other wastes (Management and Trans boundary Movement) Rules 2016. The minimal requisite facilities for storage of hazardous and other wastes are given below.

#### **4.3.8 Storage And Handling Requirements For Hazardous And Other Wastes:**

The minimum requirements for ensuring safe storage of hazardous and other wastes at TSDFs / Cement Plants / Standalone Pre-processing facilities shall be as below.

##### **a. Storage Sheds:**

- i. Flammable, ignitable, reactive and non-compatible wastes should be stored separately and never should be stored in the same storage shed.
- ii. Storage area may consist of different sheds for storing different kinds of hazardous wastes and these sheds should be provided with suitable openings.
- iii. Adequate storage capacity (i.e. 25% of the annual capacity of the hazardous waste utilization as a supplementary resource or for energy recovery, or after processing) should be provided in the premises.
- iv. Storage area should be designed to withstand the load of material stocked and any damage from the material spillage.
- v. Storage area should be provided with the flameproof electrical fittings and it should be strictly adhered to.
- vi. Automatic smoke, heat detection system should be provided in the sheds. Adequate fire fighting systems should be provided for the storage area, along with the areas in the facility.
- vii. There should be at least 15m distance between the storage sheds.
- viii. Loading and unloading of wastes in storage sheds should only be done under the supervision of the well trained and experienced staff.
- ix. Fire break of at least 04 meter between two blocks of stacked drums should be provided in the storage shed. One block of drum should not exceed 300MT of waste.

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- x. Minimum of 1meter clear space should be left between two adjacent rows of pallets in pair for inspection.
  - xi. The storage and handling should have at least two routes to escape in the event of any fire in the area.
  - xii. Doors and approaches of the storage area should be of suitable sizes for entry of forklift and firefighting equipment;
  - xiii. The exhaust of the vehicles used for the purpose of handling, lifting and transportation within the facility such as forklifts or trucks should be fitted with the approved type of sparker raster.
  - xiv. In order to have appropriate measures to prevent percolation of spills, leaks etc. to the soil and ground water, the storage area should beprovidedwithconcretefloororsteelsheetdependingonthecharacteristics of waste handled and the floor must be structurally sound and chemically compatible with wastes.
  - xv. Measures should be taken to prevent entry of runoff into the storage area. The Storage area shall be designed in such a way that the floor level is at least 150mm above the maximum flood level.
  - xvi. The storage area floor should be provided with secondary containment such as proper slopes as well as collection pit so as to collect wash water and the leakages/spills etc.
  - xvii. All the storage yards should be provided with proper peripheral drainage system connected with the sump so as to collect any accidental spills inroads or within the storage yards as well as accidental flow due to firefighting.
- b. Storage in Drums/Containers:**
- i. The container shall be made or lined with the suitable material, which will not react with, or in other words compatible with the hazardous wastes proposed to be stored.
  - ii. The stacking of drums in the storage area should be restricted to three meters high on pallets (wooden frames). Necessary precautionary measures should be taken so as to avoid stack collapse. However, for waste having flash point less than 65.5°C, the drums should not be stacked more than one height.
  - iii. Stacking of drums may be done on specially rakes designed for holding pallets up to three rows, with height not exceeding 4.5meters.
  - iv. No drums should be opened in the storage sheds for sampling etc. and such activity should be done in designated places outside the storage areas;
  - v. Drums containing wastes stored in the storage area should be labeled properly indicating mainly type, quantity, characteristics, source and date of

storing etc.

**c. Measures for Spillage/ leakage control:**

- i. The storage areas should be inspected daily for detecting any signs of leaks or deterioration if any. Leaking or deteriorated containers should be removed and ensured that such contents are transferred to a sound container.
- ii. In case of spills/leaks/dry adsorbents/cotton should be used for cleaning instead of water.
- iii. Proper slope with collection pits be provided in the storage areas so as to collect the spills/leakages.
- iv. Storage areas should be provided with adequate number of spill kits at suitable locations. The spill kits should be provided with compatibles or bent material in adequate quantity.

**d. Record Keeping and Maintenance:**

Proper records with regard to the industry –wise type of waste received, characteristics as well as the location of the wastes that have been stored in the facility need to be maintained.

**e. Miscellaneous:**

- i) Smoking shall be prohibited in and around the storage areas;
- ii) Good house-keeping need to be maintained around the storage areas.
- iii) Signboards showing precautionary measures to be taken, in case of normal and emergency situations should be displayed at appropriate locations.
- iv) To the extent possible, manual operations with in storage area should be avoided. In case of manual operation, proper precautions need to be taken, particularly during loading / unloading of liquid hazardous waste in drums.
- v) A system for inspection of storage area to check the conditions of the containers, spillages, leakages etc. should be established and proper records should be maintained.
- vi) The wastes containing volatile solvents or other low vapor pressure chemicals should be adequately protected from direct exposure to sunlight and adequate ventilation should be provided.
- vii) Tanks for storage of liquids waste should be properly dyked and should be provided with adequate transfer systems.
- viii) Storage sites should have adequate & prompt emergency response equipment systems for the hazardous waste stored on-site. This should include fire fighting arrangement based on the risk assessment, spill

management, evacuation and first aid. For this purpose, on-site and off-site accident/emergency plan should be in place.

- ix) Immediately on receipt of the hazardous waste, it should be analyzed and depending upon its characteristics its storage should be finalized.
- x) Only persons authorized to enter and trained in hazardous waste handling procedures should have access to the storage site.
- xi) Mock drill for onsite emergency should be conducted regularly and records maintained.

#### **4.3.9 Storage Time:**

Normal storage of incinerable hazardous wastes at TSDFs / Cement Plants/ Standalone Pre-processing facilities should be restricted to maximum of 3 months. However State Pollution Control Board/Pollution Control Committee may extend the period up to 6 months in accordance with the Hazardous and other wastes (M&TM) Rules, 2016.

#### **4.3.10 Hazard Analysis and Safety Audit:**

For every pre-processing and co-processing facility, a preliminary hazard analysis should be conducted. Safety Audit internally by the Operator every year & externally once in two years by a reputed expert agency should be carried out and same should be submitted to the SPCB/PCC. The code of practice and reporting shall comply with IS14489.

Such conditions should be stipulated by SPCBs while granting authorization under the HW (M&TBM) Rules to the operators /pre-processing /co-processing facility.

#### **4.3.11 Waste reception:**

Waste Characterization plays an important part in any treatment process of the waste which may be required before pre-processing and ultimately co-processing into the cement kilns. Upon receipt of the waste, it shall be weighed and property logged. It shall then undergo a visual inspection to confirm the physical appearance. A representative sample of the waste shall be collected and send to the onsite laboratory for finger printing analysis. Finger print analysis is performed to confirm that a particular waste stream belongs to an offsite waste generation source or not, based on its characteristics. The results of the finger printing analysis should be compared with the results of earlier analysis. Upon confirmation, this shall then be sent for pre-processing or co-processing.

The operator of the pre-processing facility of the cement plant shall perform following finger print analysis for each of the consignment of waste received or pre-processing or co-processing from generation site;

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- Moisture content,
- Ash content,
- Net Calorific Value(NCV),
- Chloride and Sulphur content.
- Chemical compatibility
- Any other specific parameter, which may be decided on merit of each case keeping the clinker production process in focus.
- In case of liquid samples, viscosity, pH, suspended particle content etc shall also be performed.
- Heavy metal analysis, Reactive Sulphide, Reactive Cyanide or Halide analysis should be performed if sample comes from sector which is suspected to have the seen the waste material.

The results of this finger print analysis confirm that the waste belongs to already tested and verified waste stream which is suitable for co-processing into the kiln and do not have any side effects on clinker and cement quality parameters.

As the main product of the kiln is clinker, there must not be any side effect on its quality while utilizing the waste streams as AFRs. For pre-qualification for co-processing or pre-processing, a representative sample should be collected from the waste generator's site and analyzed in a laboratory for above said parameter which shall form basis for comparing the finger print analysis of the waste consignments.

Quality Control - The quality of the pre-processed wastes (AFRs) largely depends on the quality control process followed during the quality assessment stage. Starting from sampling like collection of a representative sample, its storage in suitable container, avoiding any adulteration during transportation to lab, sample preparation in lab, performing test as per BIS standards for different quality parameters and carefully observing, recording and comparing  
The results for specific waste streams are the key to define and confirm its suitability for pre-processing/co-processing in to the cement kiln.

Samples of wastes received at the pre-processing facility or the cement plant for pre-qualification must be preserved for one year for traceability considerations.

Samples of waste collected from regular consignments for finger print analysis must be preserved for one month for traceability consideration.

Samples that are beyond times as mentioned above must be sent to the TSD For standalone pre-processing facility or to the cement plant for ensuring its disposal through co-processing.

#### **4.3.12 Acceptance process for Hazardous & other wastes:**

Appropriate knowledge of the hazardous and other wastes is necessary to ensure

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that it will not adversely affect the process, safety or environment while handling it during pre-processing or co-processing. Hence, appropriate characterization of the waste for its acceptance and safe handling is an essential requirement.

Characterization of Hazardous and other waste for acceptance comprises two stages: pre-acceptance (or screening) and on-site acceptance. Pre-acceptance involves the provision of assessing the representative samples of the waste to allow operators to determine suitability of the infrastructure to handle the waste before receiving the same in the facility. The second stage concerns procedures when the waste arrives at the facility to confirm previously approved characteristics.

Failure to adequately screen waste samples prior to acceptance and confirmation of its composition on arrival at the installation may lead to subsequent problems, inappropriate storage, mixing of incompatible substances, and accumulation of wastes could occur.

Hence, the pre-processing / co-processing facility must have appropriate laboratory facility for characterizing solid, liquid and sludge wastes with qualified analysts to ensure that proper waste acceptance processes practiced. This laboratory shall be equipped with facilities to test Moisture, Calorific value, Ash, Chlorine, Fluorine, Carbon, Hydrogen, Sulphur, Nitrogen, Phosphorous, alkali and heavy metals, flash point, mixing compatibility, reactive sulphide, reactive Cyanide or halides etc.

In case the waste received at cement plant or standalone pre-processing facility does not meet the required criteria, in such case, the receiver should make arrangement for transfer of such waste to TSDf for final disposal by adopting necessary manifest system.



## 5.0 Financial & Equipment's:

# Chapter Project Budgetary Costing and Equipment

### Project Costing

The costing for each of the plant has been done without land cost and with respective civil, building, plant and machineries.

A. Civil costing includes costing of the following required activities:

- Earthwork
- Jungle clearance
- Construction of Sheds for storage and handling area
- Buildings of each treatment facility with
  - Pre-fab MS framed structure
  - Brick walls plastering
  - AC sheet roofing
  - Painting
- Development of Effluent Convergence system
- Storm water drains
- Administrative Building, Lab and Training centre
- Roads

B. Plant and machineries:

- Design, Supply, Installation and commissioning of Process Plant and machineries based on budgetary quotations with suppliers for each of the recycling plant
- Environment related equipments for Pollution control and measures.
- Safety and Fire Hydrant equipments
- Equipments for Common facilities inclusive of DG, Transformer, cooling tower, weighing bridge, etc.
- Supply, erection and commissioning of common utilities equipments. Electricals:
  - Supply, fabrication, erection and testing of transformer, PCC & MCC panels, cabling and lighting.

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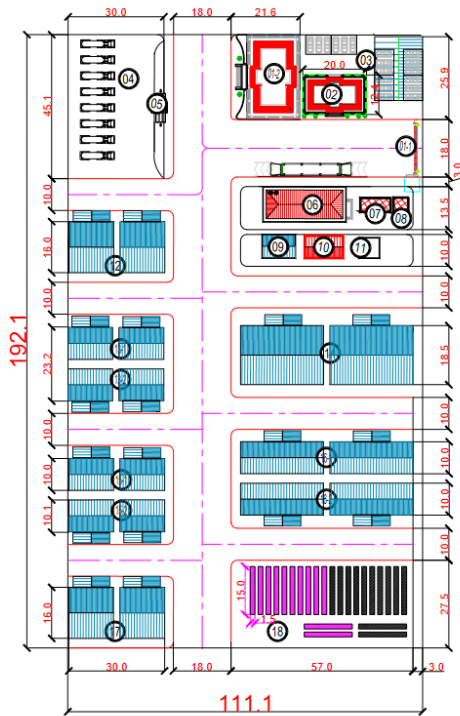
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- The Budgetary Project costing is tabulated below:
- **Table Budgetary Project costing**

Cost estimate of the Project				
SI No.	Description		Amount in Rs. Lacs for Phase-1(50MTPD)	Amount in Rs. Lacs for Phase-2 (Expansion to 100MTPD)
A	Plant sheds – 2483 sqM @ Rs4635/sqm for two faces		115	115
B	Lab Equipment's		60	
C	Plant and Machinery		180	100
D	Office Equipments		15	5
E	Pre operative Expenses		25	15
F	Contingencies		10	10
G	Margin Money for working capital		50	
H	Vermicompost (1000kg/day) (162m3) (325m2)		28	28
	<b>Total</b>		<b>483</b>	<b>273</b>

## 6.0 SWM Facility Layout:

Annexure-1: Same drawing attached as Annexure-1.



### NOTE

S.NO	DETAILS NAME	Area Allocated Per Shed (Sq.mts)	No. OF SHEDS	
			PHASE-1	PHASE-2
1.1	Factory gate & guard house	21.16	1	
1.2	Office building	509.7	1	
2	Lab	252	1	
3	Parking Area	396	1	
4	Truck area	1219.39	1	
5	Truck wash area	133.61	1	
6	Weighing station	286	1	
7	Security Department	41.8	1	
8	Washrooms	21.16	1	
9	Fire hydrant Area	76.96	1	
10	Factory supplies warehouse	84	1	
11	water Tower	40.96	1	
12	Solid Waste receipt Area	271.6	1	1
13.1	Solid Waste Blending Area-1	190.4	1	1
13.2	Solid Waste Blending Area-2	190.4	1	1
14	Blended Solid waste Storage Area	481	1	1
15.1	Non-Hazardous waste Crushing, Sorting & Bailing Area	190.4	1	1
15.2	Non-Hazardous Waste Crushing, Sorting & Bailing Area	190.4	1	1
16.1	Liquid Waste receipt Area	348.4	1	1
16.2	Liquid Waste Stocking Area	348.4	1	1
17	Non-Hazardous waste Receipt & Stoking Area	271.6	1	1
18	Vermi Compost Preparation Area	1567.5	1	1

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