

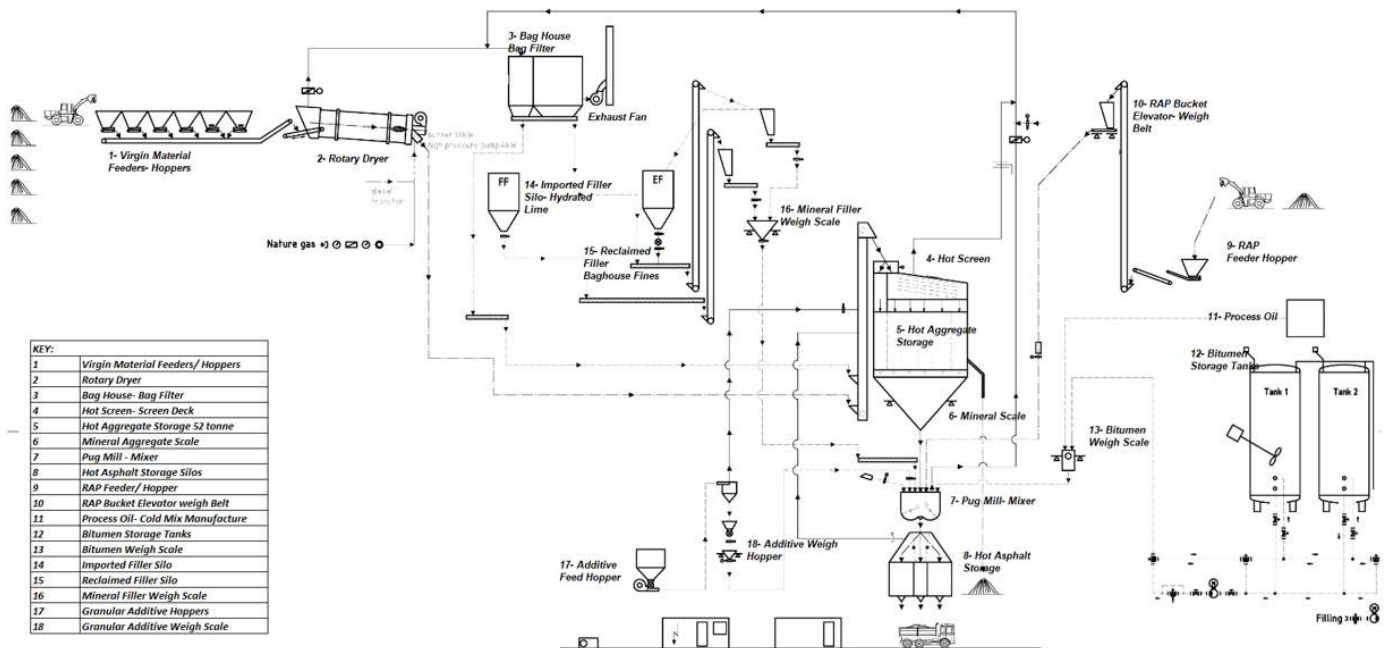
# Air and Sound Emissions

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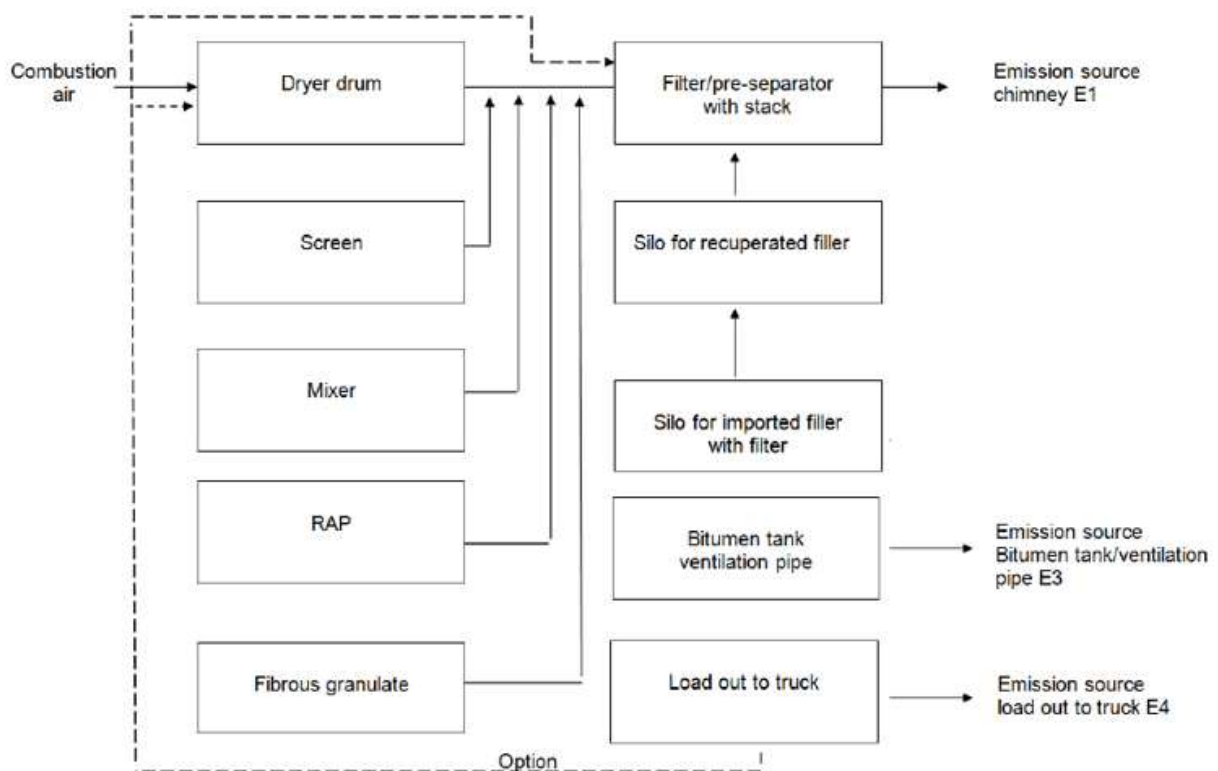
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# 1. Air Emissions

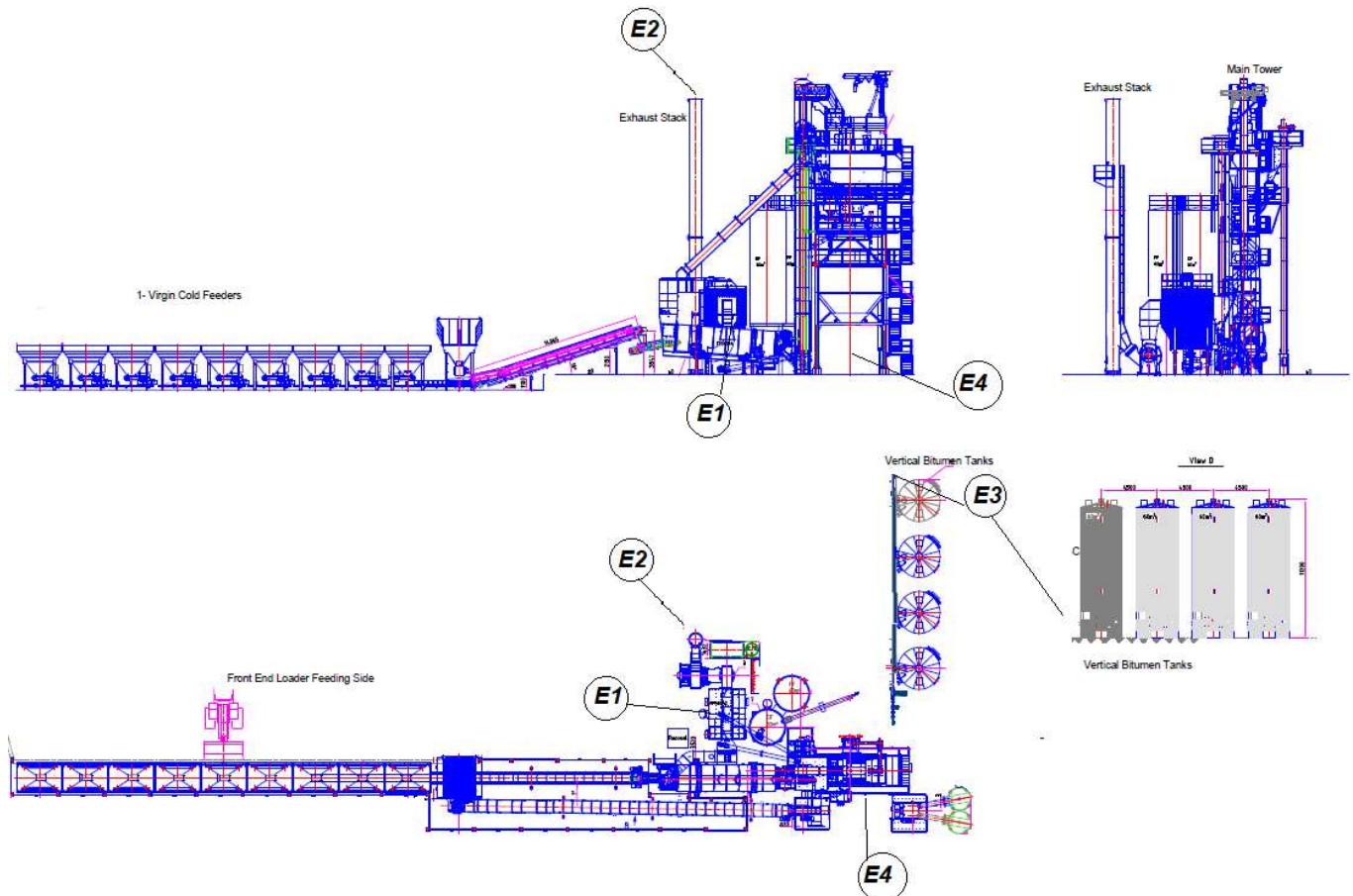
## 1.1 Flow Diagram of Asphalt Mixing Batch Plant



## 1.2 Exhaust gas flow of an asphalt mixing plant with emission sources



## Plant Emission Points



### 1.3 Emission Reduction Measures

The electrically heated bitumen tank system is especially environmentally friendly because no thermal oil heater is installed and the insulation is also far superior with 200mm thickness of rockwool applied to that of standard bitumen tanks, where 50-100mm of insulation is normally used.

Therefore, the emissions of a thermal oil heater do not occur.

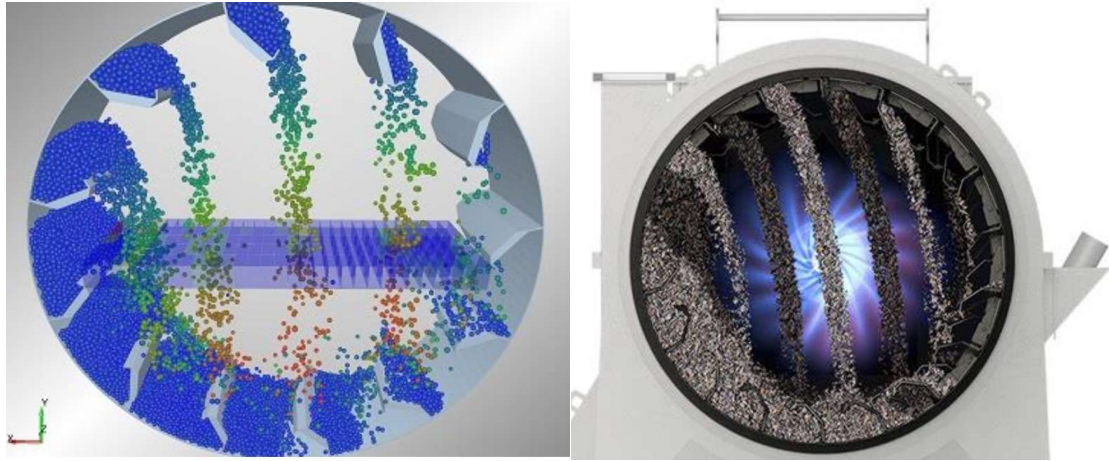
The vertical nature of the tanks also provides greater electrical efficiency having a smaller element footprint at the base of the tanks, using the heat rises principal- where older horizontal tanks have large in-efficient elements.

The aggregate temperatures are controlled with an infrared sensor on the exit of the dryer. This avoids over-temperature or under temperature of the aggregate and therefore, reduces the energy consumption respectively waste of heated aggregates and wasted burner fuel.

The microprocessor-controlled burner on the rotary dryer ensures that the mineral aggregate temperature stays at the set temperature even if the plant capacity or mineral humidity is changing. The electronic burner control ensures optimal fuel combustion and the fuel consumption is minimised.

The rotary dryer is also fitted with a VFD- Variable frequency drive, which allows the plant operator to change the rotational speed of the dryer drum, where dependant on the tonnes per hour, mix type and size being produced and moisture of the material- by changing the rotational speed the operator can fine tune the veiling of aggregate within the dryer to achieve an optimal veil of material- which creates a curtain of evenly spaced falling particles within the dryer – where the radiate heated airflow from the burner passes through the veiling curtain of material- allowing super-efficient drying of material

## Example Aggregate veil (curtain) inside rotary dryer



The Imported Filler Storage Silo is equipped with its own fabric pulsing bag filter which ensures lowest dust emissions (< 50mg pro m<sup>3</sup>) during filling from the pneumatic road tanker- the filter allows the silo to breath and disperse clean air during the filling process.

The Exhaust gas of the dryer and the mixing tower are cleaned in a bag house filter which is equipped with Nomex high temperature fabric bags to also ensure lowest dust emissions (<20mg prom<sup>3</sup>).

The bag house filter has a filter media area of 482m<sup>2</sup> and is specifically engineered and designed for optimal performance and efficiency of the batch plant.

Under the temperature gradient, warm bitumen steams from the mixing tower and RAP condensation which is collected in the dust collection system on the main tower, these emissions settle on dust particles on the filter bags. These dust particles are then reclaimed as part of the bag filter reverse air cleaning process where the dust particulates fall of the filter bags as the bags are pulsed, where the particulates then collect in the base section of the baghouse and are auger fed into an enclosed bucket elevator system where they are conveyed up and into the reclaimed filler storage silo and then are metered back and into the asphalt recipe.

### 1.4 Emission Capture Measures

The flow of the material completely encapsulated, is kept confined from the entrance of the dryer, into the elevator, the mixing tower and the asphalt silos.

As the mixing tower has dust aspiration system connected to the baghouse filter. This is used to create a slight under pressure (or vacuum pressure) in the mixing tower that ensures that no material escapes free to air. This vacuum pressure also known as negative pressure is provided by the main exhaust fan on the bag house filter. Which automatically controls and maintains a negative pressure within the plant system. For complete efficiency the exhaust fan is run via a VFD Variable frequency drive which speeds up and slows down in parallel with demand dependant on plant output, moisture and burner under over pressure as required.

## 1.5 Emission Source Location

### ***E1- Chimney- Exhaust Stack***

### ***E2- Bag house Filter/ Filler Silo***

### ***E3- Bitumen Tanks / Ventilation Pipe***

This exhaust air is generally diffuse emission which is transferred through a water bath and Activated Carbon Filter before air is released free to atmosphere. Where the carbon molecules will condensate and any odour will reduce.

*Activated Carbon Filter*



*Activated Carbon*



### ***E4- Asphalt Load out to Truck***

The fumes escaping during the asphalt load out process from the finished asphalt storage silos to the truck are considered as diffuse emissions.

The Asphalt mixing temperature can play a part in the amount of emissions that are present- where by the computer-controlled burner manages these emissions by removing the over temperature spikes that would normally be present in an older manually controlled burner system. Therefore, keeping the finished asphalt temperature to a consistent minimum temperature, to minimise these emissions.

## 1.6 Operation and Emission

### 1.6.1 Emission Source E1- Chimney / Exhaust Stack

With the plant running at its maximum capacity, the following emissions are created and cleaned via the bag house filter system.

Type of operation:	Normal production
Frequency and duration of the operation:	Daily during production
Time Frame:	January – December

#### Exhaust Gas Volumes

TBA Nm<sup>3</sup>/h

TBA Nm<sup>3</sup>/h dry

#### Composition

	min-max		min-max
CO (gas)	TBA	mg/m <sup>3</sup>	TBA kg/h
NO <sub>x</sub> (gas)	TBA	mg/m <sup>3</sup>	TBA kg/h
SO <sub>x</sub> (gas)	TBA	mg/m <sup>3</sup>	TBA kg/h
VOC (gas)	TBA	mg/m <sup>3</sup>	TBA kg/h
Dust (Particles 0-10 µm)	TBA	mg/m <sup>3</sup>	TBA kg/h

Capacity of the Filter	TBA Nm <sup>3</sup> /h
Exhaust Gas Temperature (clean gas)	Approx. 110°C
Diameter of Chimney	TBA mm
Surface of the chimney on the exhaust	TBA m <sup>2</sup>
Height of Chimney	TBA mm
Velocity of the exhaust gas on the exit of the chimney	Approx. TBA m/sec

### 1.6.2 Emission Source E1/E2- Bag house filter / Filler Silo

The Filler silo for imported filler is intergrated in the filtering tower and utilizes the bag house filter to purify the air of charging operations.

Type of operation:	Filler silo filling operation	
Frequency and duration of the operation:	One to two times per month	
Timeframe:	January – December	
Capacity of Imported Filler Silo:	60m <sup>3</sup> Imported Filler Silo	
	60m <sup>3</sup> Reclaimed Filler Silo	
Composition:	min-max	min-max
Dust (particles 0-10µm)	TBA mg/m <sup>3</sup>	TBA kg/h

### 1.6.3 Emission Source E3- Bitumen tank/ Ventilation Pipe

Bitumen Tank Ventilation Pipe – Diffuse air during the filling process of the bitumen tanks

Type of Operation:	Filling of the bitumen tanks from bulk road tanker
Frequency and duration of the operation:	30 min 2-3 times per week, as needed
Timeframe:	January – December
Exhaust air during the operation	58m <sup>3</sup> /h
Exhaust air temperature	50°C

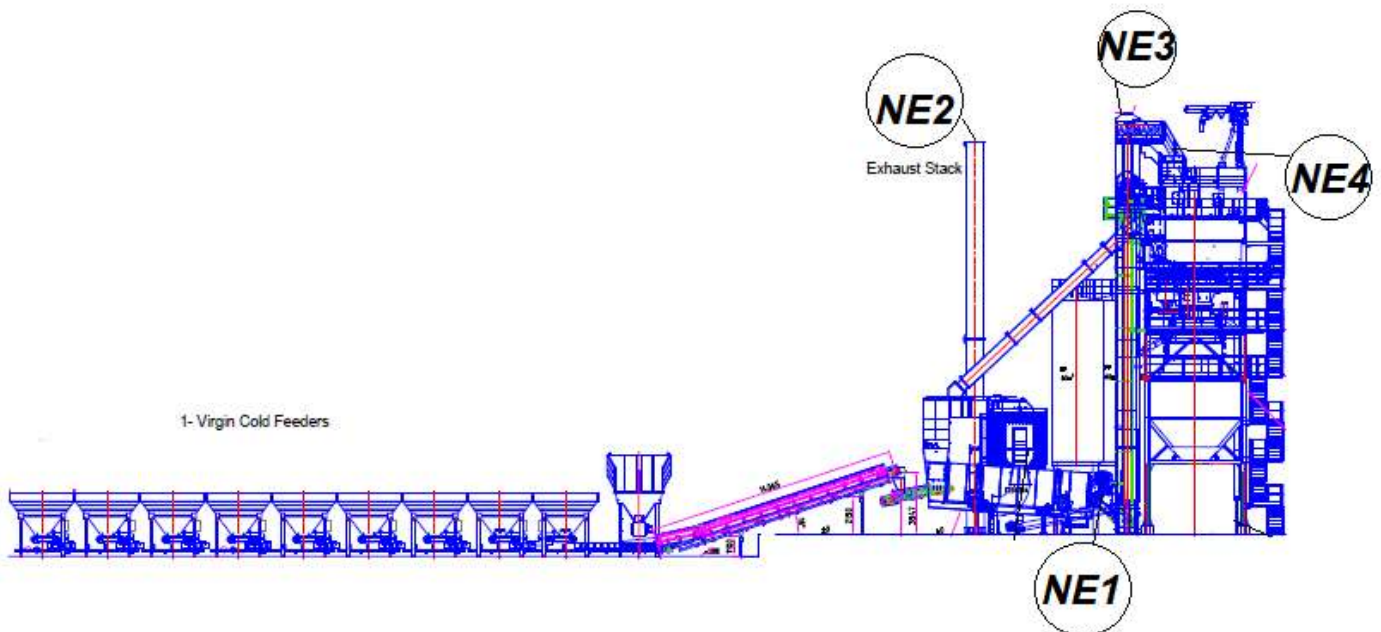
### 1.6.4 Emission Source E4- Asphalt Load Out to Truck

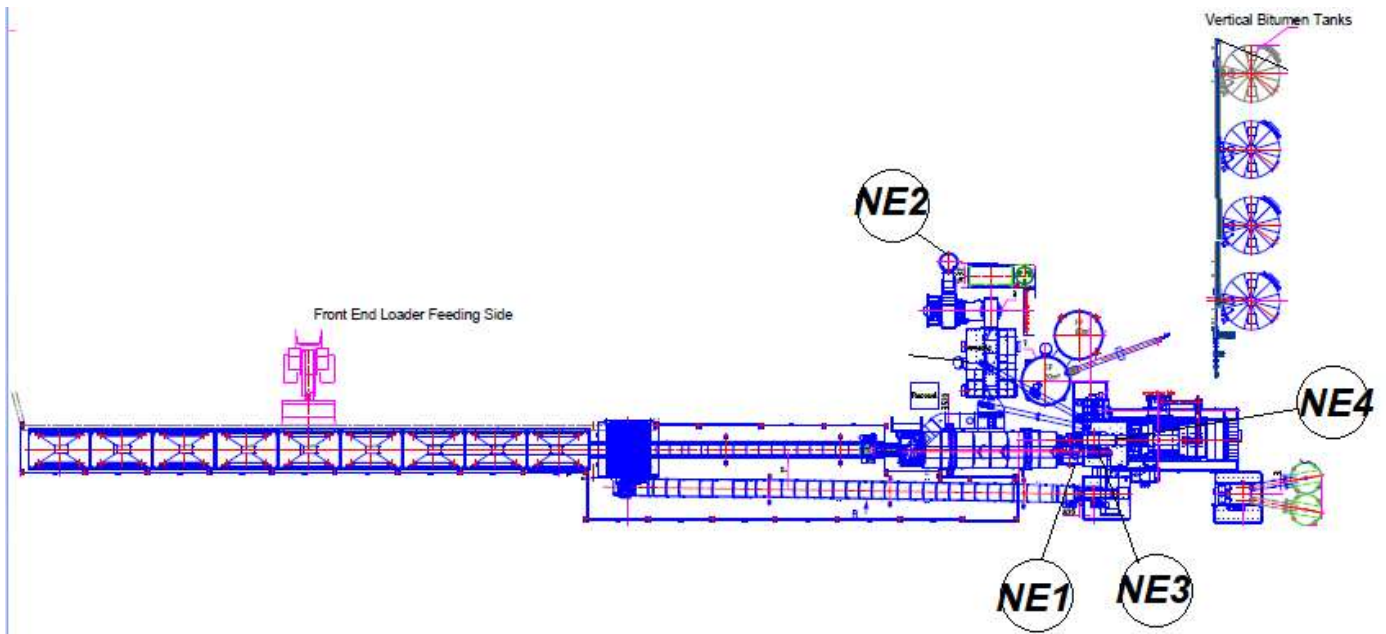
Load Out to Truck- is Diffuse emissions during the load out from the finished asphalt product storage silos to the receiving truck.

Type of Operation:	Asphalt Trucks load from the asphalt storage silo
Frequency and duration:	3 min for 20-60 times per production day
Timeframe:	January - December

## 2.0 Noise Emissions

### 2.1 Noise Emission Sources Locations





## 2.1 Noise Emission Sources Locations

**NE1- Burner Fan- Silencer**

**NE2- Chimney / Exhaust Stack**

**NE3- Bucket Elevator Hot Virgin Minerals**

**NE4- Transfer Chute- Bucket Elevator to Hot Screen**

## 2.2 Noise Emission Reduction Measures

- To be advised by Selected Plant OEM

## 2.3 Sound Emission Prognosis

General data:

- To be advised by Selected Plant OEM