

ENVIRONMENTAL IMPACT ASSESSMENT

ASBESTOS CEMENT SHEET PLANT:50000 TPA

PROPONENT:

JUMBO ROOFINGS & TILES

Factory

SILA KATAMUR-VILLAGE
CHANGSARI-P.O.
NORTH GUWAHATI CIRCLE
KAMRUP RURAL DISTRICT
Assam

Office

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PREFACE

Jumbo Roofings & Tiles (JRT) has proposed to setup an Asbestos Cement Corrugated sheets, plain sheets, Roofing accessories and Non-Asbestos sheets manufacturing Unit. The proposed capacity of the company is 50,000 MT Per Annum (TPA). The Unit location is proposed at Katamur village, North Guwahathi Revenue Circle, Kamrup Rural District of Assam state. The unit operates in the manufacture of Asbestos cement sheets. The process involves fibre milling, opening, raw material slurry preparation & mixing, sheet making, moulding, curing and storing.

In order to assess the likely impacts arising out of the proposed project, JRT had appointed PARYAVARAN LABS (INDIA) LTD., HYDERABAD to undertake the Rapid Environmental Impact Assessment (REIA) study for the various environmental components which may be affected, to assess the impact arising out of the proposed project and to prepare a detailed environmental management plan (EMP) to minimize those adverse impacts. It also examines the possible impact on the people, their home land or their livelihoods, or to other nearby developments.

The cooperation and assistance rendered by JRT in the preparation of this report is gratefully acknowledged.

HYDERABAD

DIRECTOR (Labs)

1.0 GENERAL

1.1 PREAMBLE

Jumbo Roofings & Tiles (JRT) has proposed to setup an Asbestos Cement Corrugated sheets, plain sheets, Roofing accessories and Non-Asbestos sheets manufacturing Unit. The proposed capacity of the company is 50,000 MT Per Annum (TPA). The Unit location is proposed at Katamur village, North Guwahathi Revenue Circle, Kamrup Rural District of Assam state. The unit operates in the manufacture of Asbestos cement sheets. The process involves fibre milling, opening, raw material slurry preparation & mixing, sheet making, moulding, curing and storing.

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Baseline Data have been collected for the various environmental component such as air environment, water environment, land environment, noise environment and socio-economic environment during Post monsoon and are presented in this report along with prediction and evaluation of impacts of the proposed project activities. After predicting potential problems, the EIA identifies measures to minimize the problems (adverse impacts) that may arise due to project and outlines ways to improve the project's suitability for its proposed environment.

1.2. UTILITIES

1.2.1 POWER

The total connected load is 550 kw which is under HT limits. Proposed power shall be obtained from ASEB. However, D.G sets of 550 KVA, and 125KVA is also proposed to be installed in the scheme as a stand by to the ASEB connection

1.2.2 WATER

Total water requirement will be around 50 KLD (per day) for process + administrative purposes. It will be met by Existing bore wells within the project site of JRL.

WATER BALANCE

REQUIREMENT	CU.M/DAY
1. Process (make up)	45.0
2. Curing	2.0
3. Domestic	3.0
Total	50.0

WASTE WATER	CU.M/DAY
1. process (absorption)	45.0
2. Losses	3.0
3. Sewage/effluent	2.0
Total	50.0

1.2.3 MANPOWER

The regular manpower required for administration, and production purposes will be around 50.

1.3 SITE

1.3.1 SITE SELECTION

The Project site is located at Katamur Village and 5 Kms from Changsari Town, 5 km Changsari Rly. Station, and 2 kms from National Highway No.31. Guwahati is 27 km away from the project site. The land falls under Katamur village, North Guwahati Revenue Circle, Kamrup Rural District of Assam state. The company has acquired 26800 M² of land and further proposed acquire 30000 M².

As for transportation of goods, there is already existing black topped roads to the project site. This is quite adequate for the possible truck movement envisaged. Total trucks required will be for RM – 13 Nos, & for FG – 17. Total 30 per day.

1.3.2 SITE JUSTIFICATION

The present site was selected based on environmental consideration and other factors, e.g.

1. Demand of the product
2. Easy to receive imported RM
3. Transport accessibility for RM & FG
4. Where environment impact should be low.
5. The AC sheets are in demand in the North eastern India.
6. The site has a connecting road and easy approachability.
7. It is connected with ASEB power and hence there is no need of captive generation.
8. We will also be utilizing more Fly ash from the nearby Thermal Power Station as a major part of the raw material.

1.4 DESCRIPTION OF ENVIRONMENT

Katamur Village is a geographical part of North Guwahathi Revenue Circle, Kamrup Rural District of Assam state bounded by 26° -15' North Latitude 91° - 10" East Longitude. The average annual rainfall is 2634.8 mm. Predominant wind direction is NNE. Calm conditions are prevalent more. The minimum to maximum temperatures and Relative humidities of the region during the winter season are 11°C to 30°C and 52% to 95% respectively.

The area of interest for the EIA study is 10 KM radius with Katamur as its centre. The study area overlaps mainly Kamalapur and North Guawahati Revenue Circles with Changsari town urban area on North Western side in Kamrup Rural district. The Project site is about 150 M above mean sea level. The land around the proposed site is rural background. Base- line data on the socio-economic conditions of the villages within 10 KM radius indicates availability of basic amenities like hospitals, educational institutions public transport. Changsari Railway station is about 5 KM and on North West side from the proposed JRT site. Location map of the project area is Not available.

1.5 SCOPE OF REIA

The scope of REIA study includes a detailed characterisation of present environment in an area of 10 KM. radius of project site for environmental components viz. air, noise, water, land, biological and socio-economic. Under the scope of REIA it is envisaged: To assess the present status of air, noise, water, land, biological and socio-economic components of environment. To identify and quantify significant impacts of JRT operations on environmental components. To evaluate the proposed pollution control measures To prepare Environmental Management plan (EMP) outlining additional control technologies to be adopted for mitigation of adverse impacts To delineate post-construction environmental quality monitoring program to be pursued by the JRT.

1.6 METHODOLOGY FOR RAPID ENVIRONMENTAL IMPACT ASSESSMENT

Keeping in view the nature and size of the JRT and based on guidelines of Ministry of Environment and Forests, Government of India, and past experience of carrying out similar studies it was decided to cover an area of 10 Km. radius, from the centre of the JRT compound. This region has been exhaustively covered for the purpose of environmental impact assessment studies. The work carried out is briefly reported below and is described in detail in the subsequent sections.

1.6.1 AIR ENVIRONMENT

The existing ambient air quality (AAQ) status within the study region has been assessed through a monitoring network of 6 AAQ sampling stations during winter season. The monitoring network has been designed based on the available climatic normals of predominant wind directions and wind speed of the study region for winter season. The baseline ambient air quality status of the study region was monitored for Suspended Particulate Matter (SPM), and various gaseous pollutants like Sulphur dioxide (SO₂) and Oxides of Nitrogen (NO_x). Eight hourly sampling was carried out for SPM. All gaseous pollutants were sampled on four hourly basis. High Volume Samplers have been used for monitoring all air pollution parameters. Micro-meteorological data was also recorded on hourly basis using a manual weather station. Weather station for this purpose was installed project site.

1.6.2 NOISE ENVIRONMENT

Noise Environment may cause an adverse effect on human being and associated environment including land, structures, domestic animals, wild life and natural ecological systems. Hence, noise survey was carried in and around the project site. Equivalent noise levels were measured using a precision noise level meter, at residential areas, schools, hospitals, bus-stands and

commercial centers etc. A total of 10 locations were covered within the 10 Km radial distance.

1.6.3 WATER ENVIRONMENT

Information on water resources was collected during the study period. 6 water samples were collected from various locations within the 10 Km radial distance. The parameters of prime importance were selected under physical, chemical (inorganic and organic) and heavy metal groups. As the process does not generate any effluents waste water characterization has not been done.

1.6.4 LAND ENVIRONMENT

Soil samples were collected from 5 villages, in order to assess the field infiltration rates and limitations of the soil for growth of appropriate plant species around the site. Plant species for development of green belt were identified taking into consideration the attenuation factors for air pollutants.

1.6.5 SOCIO-ECONOMIC ENVIRONMENT

Baseline data for socio-economic and cultural environment is important in conducting EIA studies. Any developmental activity will bring about changes in socio-economic pattern. Data on demographic pattern, population characteristics, employment, income, mortality rate, health status, land use pattern, energy and fuel consumption, transport and recreation facilities were collected from neighboring villages. All the afore said environmental parameters will be used for identification, prediction and evaluation of significant impacts. Using the baseline data prediction of impacts of the project have been undertaken.

1.7 PROCESS DESCRIPTION: 1.7.1. RAW MATERIALS

Raw Material	Quantity/Day	Source
Cement	56.25 MT	Nearby sources
Fly ash	40.63 MT	Nearby Power station
Fibre	11.25 MT	Fully Imported from Canada, Brazil, Russia
Pulp	0.88 MT	Local
Water	28.67 MT	Existing Bore wells of JRT

1.7.2 MANUFACTURING PROCESS OF A.C. PRODUCT

Asbestos Fiber of different grades are imported, mainly from Canada, Russia, Zimbabwe etc, and received in pressure packed condition in impermeable bags in palletized form. The fibre pallets are transported to the factory in closed containers through the trailer trucks. These palletized fiber bags are unloaded in fiber go-downs with the help of fork lifts. Fiber bag pallets are conveyed to the fiber feeding section by means of fork lifts. The fiber bags shall be slit open in closed automatic bag opening device. The empty bags shall be lifted by a hooking device attached within the bag opening device and carried to the attached bag shredder unit and the fiber after passing through the lump breaker shall be collected in the attached blender where some water shall be added to maintain the process in wet condition.. When all the bags in one charge empties the fiber on to the blender, the fiber in wet form shall be taken to the Edge Runner Mill via a screw conveyor and elevator which is also joined by the shredded bag pieces from the shredder unit. Here at ERM some more water is further added to the fibre for milling operation. The bag opening device & the edge runner mill shall be kept under negative pressure by tapping it on to a Bag Filter Type Dust Collector with pulse jet which again is connected to a Hydro-static Precipitator, connected to a blower (capacity _ 6000 m³/hr) driven by a 15 Hp motor. The delivery point of the blower is connected to the Air Wet Washer and through to a 18 m tall

stack. The Hydro-static Precipitator works on the principle of tidal wave generation. Particles collected in hydro-static precipitator shall be periodically recycled in wet form.

From this point onwards the total process operations involving fibre are carried out in wet condition with no possibility of dust generation during manufacturing process. The milled fiber is weighed in weigh hopper. The pre-requisite quantity of fiber which is about 8% of the product is mixed with required quantity of water in Wet Opener or fibre cone where it is re-circulated for about 3 to 4 minutes. The above slurry along with other fibers, if any, a small quantity (around less than 1%) of pulp and small quantities of homogenized solid waste + process sludge in slurry form (from sludge recycling tank/Wet Ball Mill) is taken to Beater tank. Cement is received and stored in go-down., from where it is conveyed to the Cement + Fly ash Mixing Tank via screw conveyor. Next, Fly ash is received and stored in closed go-down. Fly ash shall be pneumatically conveyed Pre-requisite quantity of Special binders - Fly ash (around 26 to 28 % of the product) is mixed with water, converted into slurry and sent to Storage tanks. A measured quantity of Fly ash slurry is taken to the Batch Hopper and then to the Cement + Fly ash Mixing Tank. The cement + FA slurry thus prepared in the Mixing tank is sent to Wet Rotary Sieve & thence to the Beater Tank, thus joining fiber slurry.

The RM slurry thus prepared is transferred to Storage Tank where it is under constant agitation. From here slurry is taken to the Dilution Tank(or Distribution Tank) and diluted further using recycled process water. Slurry from the Dilution Tank is taken to the sheet forming machine consisting of an assembly of 5 vats placed in series and with rotating sieve cylinders placed one in each of 5 vats. The sieve cylinders are fitted at its periphery, with the wire mesh of specific size (mostly 40 mesh on top surface and 5 mesh on bottom surface). An end-less felt made of synthetic woven fabric runs tangentially atop the sieve cylinders. The slurry through the sieve cylinders gets filtered out. The differential hydrostatic

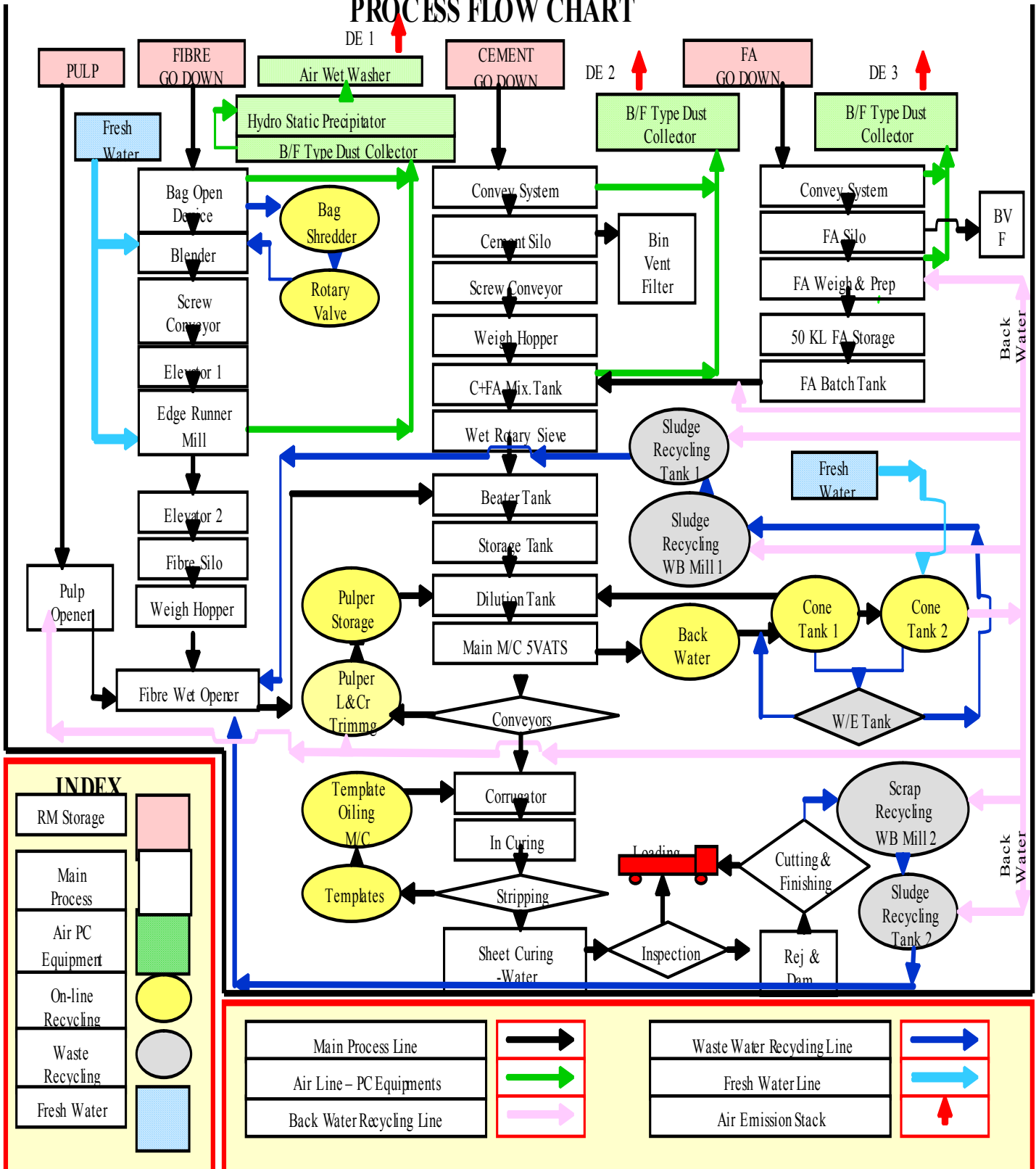
pressure thus created between the sieve cylinder and Vat causes an asbestos cement film to be formed and picked up by the sieve cylinder which in turn gets transferred to the moving felt. The gradually thickening slurry due to filtration is constantly diluted in the vats. The excess water in film is dehydrated by vacuum system. The wet film from the felt is then transferred on to the rotating sheet forming drum.

After the required thickness is achieved the wet sheet is cut by automatic cutter fixed on the sheet forming drum. The formed sheet is then trimmed widthwise with long cutters to the required width. The length of the sheet varies as per the market requirement from 1.5 M to 3 M. after cutting to the required length the sheet is transferred on to the profiling machine (Corrugator) by vacuum sucking.

The formed sheets are stacked in between the steel moulds (templates) which will be air cured for about 12 hrs in a closed chamber. After the air curing the sheets are separated out from the templates in destacker machine. The templates are cleaned and lubricated and sent back to profiling machine. The sheets then are inspected on-line, stacked on steel pallets and water cured for a minimum of 12 days before being finally inspected and then dispatched.

Process flow chart is shown in fig 1.3. Material balance is shown in Table 1.1.

PROCESS FLOW CHART



1.8 EMISSION DETAILS

1.8.1 EMISSION SOURCES

The major sources of emission from the proposed activity are

1. Fibre Handling Area (ERM Section) - Total dust with fibre content
2. Cement handling Area (Cement feeding) - Total dust or Suspended particulate matter
3. Fly Ash handling Area (Fly Ash feeding) - Total dust or Suspended particulate matter.
4. Standby Power Supply System - DG sets - Suspended Particulate matter, SO₂ and NO_x.

1.8.2 EMISSIONS CONTROL MEASURES

In the proposed A.C. Sheet plant suitable pollution control equipments for item no. 1, 2 and 3 of 1.8.1 shall be selected which will ensure that the emission levels are maintained below the prescribed units. Specifications and sectional views are addressed in EMP.

1.8.3 STANDBY POWER SUPPLY SYSTEM - DG SETS

In the proposed DG Sets, high speed diesel (HSD) oil will be used. Hence negligible quantity of SPM, SO₂ & NO_x will be generated during the combustion process. So there is no need of any pollution control equipment. But The stack shall be provided as per the standard stack height calculations. DG Set shall be installed in an acoustic enclosure as per Assam State Pollution Control Board norms.

1.8.4 STACK HEIGHTS

The following formula, recommended by Central Pollution Control Board has been used to compute the stack height.

STACK HEIGHTS

Based on Suspended Particulate matter emission rate	Based on KVA rate
$H = 74 (Q_s)^{0.27}$	$H = ht + \text{sqrt}(kva)$
H = Theoretical height of Proposed stack in mts.	H = Theoretical height of proposed stack in mts.
Q_s = Emission rate of Particulate Matter in T/hr	ht =Roof height in mts.

CEMENT FEEDING

Based on the above formula, the height of the chimney has been estimated as 8.18 m but considering outlet emission of the Cement feeding, but it is proposed to install a tall stack of 18 m height to exhaust the emissions.

$$Q_s = 2500 \times 150 / 1000 \times 1000 \times 1000$$

$$= 0.000375 \text{ T/Hr}$$

$$(Q_s)^{0.27} = 0.119$$

$$\text{Stack height} = 8.79 \text{ m}$$

$$\text{Provided height} = 18 \text{ m}$$

FLY ASH FEEDING

Based on the above formula, the height of the chimney has been estimated as 8.18 m but considering outlet emission of the Cement feeding, but it is proposed to install a tall stack of 18 m height to exhaust the emissions.

$$Q_s = 2500 \times 150 / 1000 \times 1000 \times 1000$$

$$= 0.000375 \text{ T/Hr}$$

$$(Q_s)^{0.27} = 0.119$$

$$\text{Stack height} = 8.79 \text{ m}$$

$$\text{Provided height} = 18 \text{ m}$$

FIBRE HANDLING FEEDING

Based on the above formula, the height of the chimney has been estimated as 3.472 m but considering outlet emission of the Cement feeding, but it is proposed to install a tall stack of 18 m height to exhaust the emissions.

$$Q_s = 6000 \times 2 / 1000 \times 1000 \times 1000$$

$$= 0.000012 \text{ T/Hr}$$

$$Q_s(\text{to the power } 0.27) = 0.0469$$

$$\text{Stack height} = 3.472 \text{ m}$$

$$\text{Provided height} = 18 \text{ m}$$

STANDBY POWER SUPPLY SYSTEM - DG SETS

The Stack height is determined based on the KVA of the DG set. The following formula, recommended by Central Pollution Control Board has been used to compute the stack height.

$$H = ht + 0.2 (\text{root KVA})$$

H = Theoretical height of proposed stack in mts

ht = Roof height in mts

Based on the above formula, the stack height works out to be 10.66 m. However, JRT will install a tall stack of 11 m height from the ground level for each DG Set.

Stack Height Calculation

Minimum Stack Height (H) in meters for different emission rates

Sulphur dioxide	H	14((Q)to the power 0.3)	Q in kg/Hr
Particulate matter	H	74((Q)to the power 0.27)	Q in MT/Hr
DG Set SPM	H	ht + 0.2(RT(KVA)) (ht = Roof ht)	5 M

Particulate matter	UOM	Area			DG Set 800-1 nos.
		B/F Type Fibre Milling	B/F Type Cement Feeding	B/F Type Fly ash Feeding	
Type of Dust Collector					
Stack at					
CPCB Standard	mg/NM3	2	150	150	150
Discharge Rate	NM3/Hr	6000	2500	2500	
Qs	MT/Hr	0.000012	0.000375	0.000375	
H	M	3.472	8.79	8.79	10.66
Proposed Height	M	18	18	18	11

2.0 PRESENT ENVIRONMENTAL STATUS

2.1 AIR ENVIRONMENT

The ambient air quality status with respect to the specific (identified) pollutants across the study zone of 10 km radial distance from the plant site during pre-project conditions will form the base line information over which the predicted impacts due to the proposed project can be superimposed to find out the net (final) impacts (post-project scenario) on air environment. If the final impacts due to the proposed project are known at the planning stage of the project, a viable Environmental Management Plan (EMP) can be prepared based on impact assessment for the air environment. The baseline status of the ambient air quality can be assessed through a scientifically designed ambient air quality monitoring network. The design of monitoring network in the air quality surveillance programme has to be based on the following considerations:

1. Meteorological conditions on synoptic scale
2. Topography of the study area
3. Representation of regional background levels
4. Representation of core zone
5. Representation of cross sectional distribution in the upwind and downwind directions
6. Influence of the existing sources, if any, are to be kept at minimum.

2.1.1 RECONNAISSANCE

The proposed Project of JRT is located at Katamur village, North Guwahati Revenue Circle, Kamrup Rural District of Assam state. A circular area of 10 km radius was identified as study zone for base line data collection based on previous experience of carrying out EIA studies. The area represents mostly rural environment. Different air pollution parameters like Suspended

Particulate Matter (SPM), Sulphur dioxide (SO₂) and Oxides of Nitrogen (NO_x) have been identified for assessment of existing air quality status.

2.1.2 . METEOROLOGY

Meteorology of the study zone plays an important role in air pollution studies. The prevailing micrometeorological conditions at the proposed project site will regulate the dispersion and dilution of air pollutants in the atmosphere. The predominant wind directions and wind speed at the core zone will decide the direction and distance of the mostly affected zone from proposed activity. The meteorological station was set up in a open place free from obstructions at about 2.5 m above ground level to study the wind pattern. The twenty four hourly duration was from 10 hours to 10 hours (next day) during Post monsoon.

WIND PATTERN DURING 10-10 HOURS (FINAL AVERAGE)

The predominant wind directions was NNE with percentage frequencies of 23.5% of the total time. The other wind directions were N, and NE with percentage frequencies of 9.0% and 4.0%.of the total time respectively . The most dominant wind direction was NNE in which wind speeds of 0-5 km/hr, 5-10 km/hr and 10-15 km/hr were recorded for 4.7%, 15.2% and 3.6%. of the total time respectively. During the study period More percentage of Calm conditions prevailed for 63.5% of the total time.

The maximum and minimum temperatures recorded during the study period were 08 deg. C and 30 deg. C respectively. The relative humidity recorded during the study period ranged between 52% and 95% .

The twenty four hourly wind rose data is given in Table 2.1.1.

Table 2.1.1

WIND ROSE DATA

Direction	0 - 5 kmph	5 - 10 kmph	10 - 15 kmph	>15 kmph	Total
N	5.6%	3.4%			9.0%
NNE	4.7%	15.2%	3.6%		23.5%
NE	2.5%	1.5%			4.0%
Calm	63.5%				63.5%
					100.0%

2.1.3. DESCRIPTION OF SAMPLING LOCATIONS

PROJECT SITE: The Station was selected to determine present air quality at the project. The sampler was fixed at 3.0 M height.

KATAMUR: This location is about 1.0 KM from the core zone in the SE direction. The station was selected to determine ambient air quality levels in the NEAREST SITE. The sampler was fixed at a height 3 M above the ground level and free from obstructions.

HALGURI Village: This location is 1.0 KM from the core zone in the N direction. The Station was selected to determine present air quality at the Nearest point. The sampler was fixed at 3.0 M height.

SILASINDHURI GHOPA: This location is about 2.5 KM from the core zone in the SW direction. The station was selected to know one of the nearest downwind villages concentrations in the area.

JALAH: This location is about 2.0 KM from the core zone in the NW direction. The station was selected to know one of the nearest Upwind village concentrations in the area.

CHANGSARI : This location is about 5 KM from the core zone in the NW direction. The station was selected to determine the distribution of ambient air quality levels at the another nearest site. The sampler was fixed at a height 3 M above the ground level and free from obstructions.

Locations with their distance and direction from the project site is shown in table 2.1.2..

2.1.4. EXISTING AMBIENT AIR QUALITY

At Project site, SPM values ranged between 109 and 155 ug/cu.m. SO₂ and NO_x values did not exceed 8 and 14 ug/cu.m respectively. . At the site Katamur SPM values ranged between 95 and 158 ug/cu.m. SO₂ and NO_x values at this site did not exceed 8 and 18 mg/cu.m respectively.

At Halguri, SPM values ranged between 92 and 145 ug/cu.m. SO₂ and NO_x values did not exceed 9 and 15 ug/cu.m respectively. At Silasindhuri Ghopa site SPM values were between 91 and 150 ug/cu.m. SO₂ and NO_x values at this site did not exceed 8 and 16 Ug/cu.m respectively. At site Jalah SPM values ranged between 105 and 153 ug/cu.m. SO₂ and NO_x values at this site did not exceed 9 and 16 Ug/cu.m respectively. At the site Changsari SPM values ranged between 88 and 156 ug/cu.m. SO₂ and NO_x values at this site did not exceed 8 and 17 Ug/cu.m respectively. SPM, SO₂ and NO_x values at the various sites in the study zone are given in Tables 2.1.2 - 2.1.5

TABLE 2.1.2

EXISTING AMBIENT SPM LEVELS WITHIN THE STUDY ZONE

The following values are expressed in Ug/cu.m

Sampling Location	Minimum observ- -ation	Maximum observ- -ation
1. Project Site	109	155
2. Katamur	95	158
3. Halguri	92	145
4. Silasindhurighopa	91	150
5. Jalah	105	153
6. Changsari	88	156

TABLE 2.1.3

EXISTING AMBIENT RSPM LEVELS WITHIN THE STUDY ZONE

The following values are expressed in Ug/cu.m

Sampling Location	Minimum observ- -ation	Maximum observ- -ation
1. Project Site	25	43
2. Katamur	31	50
3. Halguri	23	41
4. Silasindhurighopa	41	52
5. Jalah	27	46
6. Changsari	43	62

TABLE 2.1.4**EXISTING AMBIENT SO₂ LEVELS WITHIN THE STUDY ZONE**

The following values are expressed in Ug/cu.m

Sampling Location	Minimum observ- -ation	Maximum observ- -ation
1. Project Site	07	08
2. Katamur	06	08
3. Halguri	07	09
4. Silasindhurighopa	07	08
5. Jalah	07	09
6. Changsari	06	08

TABLE 2.1.5**EXISTING AMBIENT NO_x LEVELS WITHIN THE STUDY ZONE**

The following values are expressed in Ug/cu.m

Sampling Location	Minimum observ- -ation	Maximum observ- -ation
1. Project Site	11	14
2. Katamur	14	18
3. Halguri	10	15
4. Silasindhurighopa	12	16
5. Jalah	11	16
6. Changsari	13	17

2.2 NOISE ENVIRONMENT

The physical description of sound concerns its loudness as a function of frequency. Noise in general is sound which is composed of many frequency components of various loudness distributed over the audible frequency range. Various noise scales have been introduced to describe, in a single number, the response of an average human being to a complex sound made up of various frequencies at different loudness levels. The most common and heavily favored of these scale is the weighted decibel (dBA). This scale has been designed to weigh the various components of noise according to the response of the human ear.

The impact of noise sources on surrounding community depends on: Characteristics of the noise sources (instantaneous, intermittent or continuous in nature). It is well known that a steady noise is not as annoying as one, that is continuously varying in loudness.

The time of day at which noise occurs, for example loud noise levels at night in residential areas are not acceptable because of sleep disturbance. The location of the noise source, with respect to noise sensitive land use, which determines the loudness and period of noise exposure. The environmental impact of noise can have several effects varying from Noise Induced Hearing Loss (NIHL) to annoyance depending on loudness of noise levels. The existing status of noise levels within the study zone, a primary requirement of impact assessment studies, has been undertaken through reconnaissance, identification of existing noise sources, land use pattern and monitoring of baseline noise levels.

2.2.1 RECONNAISSANCE

The project site is situated about 5.0 km from Changsari Town. The nearest railway line is at Changsari, 5 km away from the project site. National highway no. 31 leading Rangia - Guwahati passes about 2 km away from the proposed project site on the SW direction. More Trucks and cars are expected to add to the main noise generated by process operations and machinery of the proposed plant.

2.2.2. COMMUNITY NOISE

The ambient noise level is characterised by significant variations above a base or a residual noise level. The residual noise level is that level below which the ambient noise does not seem to drop during a given time interval and is generally caused by unidentified distant sources. It is approximately 44 dBA. It differs in rural and urban areas. At night its level is low due to fewer noise events. The annoyance that people experience depends upon the number of noise events that occur during a time interval. A noise rating developed by United States Environmental protection Agency (USEPA) for specification of community noise from all sources is the day night sound level, Ldn it is similar to a 24 hours equivalent sound level except that during the night time period, which extends from 10.00 p.m. to 7.00a.m., a 10 dBA weighting penalty is added to account for the fact that noise at night when people are trying to sleep is judged more annoying than the same noise during the day time. The Ldn for a given location in a community is calculated from an hourly equivalent sound level during day time (Ld) and during night time (Ln).

2.2.3. EXISTING NOISE LEVELS

An assessment of equivalent day-night levels in and around 10km radius from the core zone reveal that noise levels range from 41 to 60 dBA which can be assumed to be the existing baseline status. After commissioning of the JRT plant may also not have any impact on either present noise level status. These results indicate that the existing status of the study zone are within the community acceptable noise levels (Ldn of 50-60 dBA). A normalized outdoor Ldn of about 50 to 60 dBA with a mean of 55 dBA would result in no community reaction. The data shown in Fig 2.2.1 suggests that wide spread complaint can be expected when the normalized Ldn reaches about 65 dBA. The sampling locations for noise monitoring in Table 2.2.1.

The equivalent day-night noise sources are given in Table 2.2.2.

FIGURE 2.2.1

Trend of public reaction to peak noise near residences

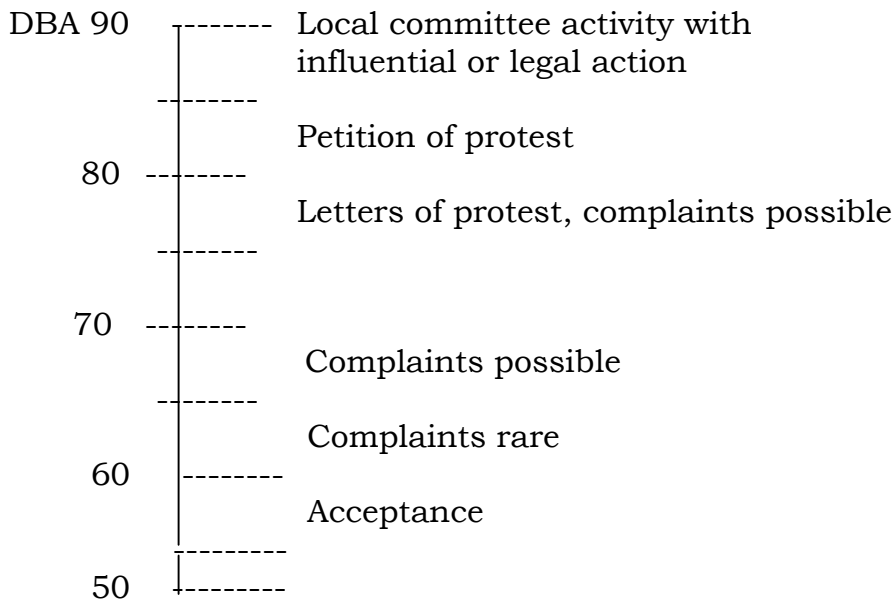


TABLE 2.2.1

Details of Noise monitoring locations

Location	Direction	Distance from core zone (Km)
1. Project Site	--	
2. Katamur	SE	1.0 km
3. Halguri	N	1.0 km
4. Koraibari	S	2.0 km
5. Gouripura	SW	3.5 km
6. Jalah	NW	2.0 km
7. Silasindhurighopa	SW	2.5 km
8. Dhopataribazar	W	2.5 km
9. Changsari	NW	5.0 km
10. Paikhan	N	6.0 km

TABLE 2.2.2

EQUIVALENT DAY-NIGHT NOISE LEVELS IN THE STUDY AREA

Location	Equivalent levels		
	Day	Night	Day-Night
1. Project Site	48	40	49
2. Katamur	56	45	55
3. Halguri	53	43	53
4. Koraibari	52	40	51
5. Gouripura	46	36	46
6. Jalah	52	44	53
7. Silasindhurighopa	48	38	48
8. Dhopataribazar	58	46	57
9. Changsari	51	41	51
10. Paikhan	45	35	45

2.3 WATER ENVIRONMENT

Studies on Water Environment aspects of ecosystem is important for Environmental Impact Assessment to identify sensitive issues and take appropriate action by maintaining ecological homeostatis in the early stages of development of the project. The objective of this report is to define the present environment in which the proposed action is to occur, to evaluate all possible eventualities, to ensure that all the negative impacts are minimized, and to demonstrate that the proposed project has been appropriately announced to all interested parties to give due consideration to their concerns.

2.3.1 BASELINE DATA

LOCATION:

The study area encompasses 10 km radial distance with project site as its centre. The study area mainly falls under of Kamrup Rural District of Assam state.

RAIN FALL

The principle source of water, whether surface or ground water, is precipitation. Rainfall thus assumes more significance and is the single most important factor which controls the water availability of the area. The area where the JRT unit is receives rainfall mainly from NE. The average rainfall in the area is to 2634.8 mm (2003).

RECONNAISSANCE SURVEY

The water resources in the study area may be classified into two major categories.

1. Surface water resource
2. Ground water resource

Both surface and ground water resources are ample in the study area. The state authorities have also provided tap water system and tube wells fitted with hand pump for the drinking water. 6 Ground water samples were analyzed to understand the factors governing the terrestrial and aquatic flora and fauna.

SURFACE WATER RESOURCE

The project area covers has no streams. Brahmaputra River about 10.0 km from the project site flows from West to East across Below the study area. There are few ponds which cater to the need of the villages. It has been observed that these ponds are rich in aquatic growth and are generally used for washing of cattle and clothes.

GROUND WATER RESOURCES

Ground Water resources is ample in the study area. Every village has a few of the bore wells . The state authorities have also provided tube wells fitted with hand pump for the drinking water requirements of villages in the study area. Presently the drinking water needs are met from the protected water supply schemes.

2.3.2 WATER QUALITY ASSESSMENT

The water quality assessment of the ground water (tube wells) sources was carried out to assess the water quality impacts. Sampling locations for assessment of water quality and the details of the sampling points are given in Table 2.3.1

2.3.2.1 PHYSICO - CHEMICAL CHARACTERISTICS

Selected Physico-chemical and biological parameters have been studied for projecting the pre-project water quality status in and around the core zone. To determine the water quality individual samples were collected from each station and analysed for parameters such as Hardness, Alkalinity, Conductivity, nutrient demand, inorganic substance, heavy metals etc. The water quality data are given in Tables 2.3.2 -2.3.3

2.3.3. BIOLOGICAL COMPONENTS - GENERAL OBSERVATION

AQUATIC VASCULAR PLANTS

Vascular plants which are partially or totally submerged in water all the year round are rooted in or affixed to the substratum. Aquatic vascular plants in the study area are restricted to only lentic system. Members of Hydrocharitaceae, potamogetaceae and Nymphaeaceae are the important phanerogams located in the area. Among cryptogams azolla and marsillia are common.

PHYTOPLANKTON

Planktons are those which are freely suspended in water and are possibly aided in this by limited ability to move. Having suitable temperature and light regime in the region phytoplanktons are flourishing. Among the phytoplanktons members of chlorophyceae are dominating in all the samples. Algae which can utilize the nitrogen dissolved in water as starting material for their photosynthesis are Blue green algae. Some algae species have the capacity to

produce and eventually release toxic metabolites. The species *Microcystis* is one of such alga however not located in the sample.

2.3.4. OTHER AQUATIC ANIMALS

Among the orthopodes mayfly larvae, caddis larvae, and culex larvae are very common. Similarly among annelids, leaches and earthworms among reptiles water snakes, among vertebrates frogs and fishes are also common.

2.3.5 ENUMERATION OF FLORA AND FAUNA

MACROPHYTES:

Fam : Potamogetaceae

Perfoliates

Fam : Ceratophyllaceae

Ceratophyllum

Fam : Nymphaeaceae

Nelumbia nucifera

Fam : Hydrocharitaceae

Vallisneria spiralis and Hydrilla verticillata

Fam : Naidaceae

Nais minor

PTERIDOPHYTES

Azolla and Marcelia

MICROPHYTES

A). Phytoplankton

Fam : Cyanophyceae

Pharmedium and Oscillatoria

Fam : Euglenophyceae

Euglena

Fam : Chlorophyceae

Hydrodictyon, Cosmarium, Pediastrum and Scenedesmis.

Fam : Bacillariophyceae

Cyclotella and Melocira

B) ZOOPLANKTON

Phylum : Protozoa

Paramacium and Holotrichia

Phylum : Porifera

Carvospongilla lapidosa and Radiospongilla hemiphydatis.

Phylum : Coelentrata Not seen

Phylum : Oligochaeta

Anlophorus and Nais

Rotifera: Filina longiseta, Branchionus angularis and

B.rubens

Cladocera: Moina micrura, Mophonosoma sarsi, Copepoda and Mesocyclops sp.

InsectaNepa and Gerris

Mollusca Melonoides scarba and Viripara bengalensis.

2.3.6 WATER BALANCE

The Water requirement will be 50 cu.m/day. This water requirement will be met by bore wells. The major water consumption is in the cooling and domestic. The process does not generate any effluent and mainly of the waste water is from the sanitation units. The water balance is given in Table 2.3.4

TABLE 2.3.1.

WATER SAMPLING LOCATIONS

Location	Direction	Distance from core zone (Km)
1. Project Site	--	
2. Katamur	SE	1.0 km
3. Halguri	N	1.0 km
4. Changsari	NW	5.0 km
5. Jalah	NW	2.0 km
6. Silasindhurighopa	SW	2.5 km

TABLE 2.3.2**WATER QUALITY DATA(Ground water)**

Parameters	Project Site Halguri	Katamur	
1. pH	7.04	7.12	7.21
2. Temperature (C)	29	28	28
3. Turbidity (NTU)	11	9	13
4. Specific conductance (micromho/cm)	571	546	611

The following results are expressed in mg/l

5. Total Solids	134	125	116
6. Total Dissolved Solids	123	115	98
7. Total Alkalinity as CaCO ₃	76	57	73
8. Total Hardness as CaCO ₃	65	52	65
9. Calcium as CaCO ₃	45	31	43
10. Magnesium as CaCO ₃	20	21	22
11. Chlorides as Cl	15	10	14
12. Sulphates as SO ₄	24	25	27
13. Nitrates as NO ₂	0.6	0.5	0.8
14. Sodium as Na	18	11	15
15. Potassium as K	03	03	03
16. Fluoride as F	0.05	0.05	0.06
17. Arsenic as As	<0.002	<0.002	<0.002
18. Selenium as Se	<0.005	<0.005	<0.005
19. Cadmium as Cd	<0.002	<0.002	<0.002
20. Copper as Cu	<0.020	<0.020	<0.020
22. Lead as Pb	<0.03	<0.03	<0.03
23. Zinc as Zn	0.021	0.021	0.025
24. Mercury as Hg	<0.005	<0.005	<0.005
25. Chromium as Cr	<0.005	<0.005	<0.005
26. Total Nitrogen	0.03	0.06	0.03
27. Total phosphorous	1.2	1.1	1.15
28. Manganese as Mn	<0.005	<0.005	<0.005
29. Cyanide as CN	Nil	Nil	Nil
30. Free Residual Chlorine	Nil	Nil	Nil
31. Dissolved Oxygen	5.8	5.9	5.9

TABLE 2.3.3**WATER QUALITY DATA(Ground water)**

Parameters	Silasinduri Ghopa	Jalah	Changsari
1. pH	7.1	7.05	7.1
2. Temperature (C)	27	28	27
3. Turbidity (NTU)	13	12	09
4. Specific conductance (micromho/cm)	551	523	549

The following results are expressed in mg/l

5. Total Solids	126	118	118
6. Total Dissolved Solids	109	99	107
7. Total Alkalinity as CaCO ₃	76	64	78
8. Total Hardness as CaCO ₃	77	55	49
9. Calcium as CaCO ₃	51	32	26
10. Magnesium as CaCO ₃	26	23	23
11. Chlorides as Cl	15	12	07
12. Sulphates as SO ₄	29	25	26
13. Nitrates as NO ₂	0.5	0.3	0.4
14. Sodium as Na	22	14	15
15. Potassium as K	04	02	03
16. Fluoride as F	0.02	0.01	0.03
17. Arsenic as As	<0.002	<0.002	<0.002
18. Selenium as Se	<0.005	<0.005	<0.005
19. Cadmium as Cd	<0.002	<0.002	<0.002
20. Copper as Cu	<0.020	<0.020	<0.020
22. Lead as Pb	<0.03	<0.03	<0.03
23. Zinc as Zn	0.024	0.020	0.022
24. Mercury as Hg	<0.005	<0.005	<0.005
25. Chromium as Cr	<0.005	<0.005	<0.005
26. Total Nitrogen	0.02	0.04	0.05
27. Total phosphorous	1.24	1.15	1.21
28. Manganese as Mn	<0.005	<0.005	<0.005
29. Cyanide as CN	Nil	Nil	Nil
30. Free Residual Chlorine	Nil	Nil	Nil
31. Dissolved Oxygen	6.0	5.9	6.0

TABLE 2.3.4

WATER BALANCE

REQUIREMENT	CU.M/DAY
1. Process (make up)	45.0
2. Curing	2.0
3. Domestic	3.0
Total	50.0

WASTE WATER	CU.M/DAY
1. process (absorption)	45.0
2. Losses	3.0
3. Sewage/effluent	2.0
Total	50.0

2.4 LAND ENVIRONMENT

2.4.1 INTRODUCTION

Studies on land and biological aspects of ecosystem is important for environment impact assessment to identify sensitive issues and take appropriate action by maintaining ecological homeostasis in the early stages of development of the increased productive capacity of project. The objective of this report is to define the present environment in which the proposed action is to occur to evaluate all possible eventualities, to ensure that the proposed increased productive capacity has been appropriately announced to all interested parties so that their concerns can be considered.

2.4.2 BASELINE DATA

LOCATION :

The study area encompasses 10 KM radial distance with Project Site as its centre. The project area of interest covers mainly Kamrup Rural District of Assam state.

PHYSICAL SETTING:

The climate, geology, soil and irrigation have been described since they have direct or indirect effects on vegetation.

2.4.3 METHODOLOGY

For Land Environment studies 5 villages were selected for physico_chemical and biological parameters of soil. Location of selected sampling sites at different villages and their distance from Katamur core zone is given in Table 2.4.1 and Fig 2.4.1 Meticulous attention was paid to collect adequate amount of

composite soil samples for analysis and packing samples in dependable, water proof containers and marking the samples accurately and distinctly and brought to the laboratory for chemical analysis. Soil fertility information was obtained by counting the number of earthworms in a 25 cm X 25 cm quadrant. A preliminary reconnaissance was made to get a general picture of the flora and fauna. Fresh plant species were collected from field by trained biologists and later identified. Tentative fauna is noted with the help of local information and personal assessment. At times professional judgment was used to overcome the field deficiency.

SOIL ANALYSIS

For land environment studies 5 villages were selected to understand the physico-chemicals and biological properties of the soil. The major soils of this area may be categorized into Red soils comprising heavy loams. Physico-chemical properties of soils (Texture, infiltration, Cation Exchange Capacity, organic matter and moisture), soil biological parameters studied for impact Identification. In this area, soil is predominantly Red Soil in nature. The moisture content is generally higher in all areas. The porosity (water holding capacity in soil) is generally high. On the basis of chemical properties, soil is slightly alkaline in nature with pH ranging between 7.1. to 7.5 (Table 2.4.2).

Infiltration rate (Table 2.4.3) ranges between 1.5cm/hr to 2.0 cm/hr. The number of earthworms present in the quadrant is also a measure of soil fertility status (Table 2.4.4.).

2.4.4. ECOSYSTEM (BIOTIC COMPONENTS:)

It is an integrated unit that contains both animals and plants whose survival is dependent on biotic and abiotic distribution of organisms and its physical setting the study area can be classified into crop land, terrestrial and aquatic ecosystems. However, in the present chapter 'Land Environment' deals with

crop and terrestrial ecosystems, while aquatic ecosystem have been described in the earlier chapter 'Water Environment'. In order to understand the factors governing the system both abiotic (physical setting) and biotic factors (flora and fauna) have been described.

Crop Land ecosystem:

This is also known as man made ecosystem or artificial ecosystem because man tries to control biotic community and physical environment. The most important of these is an artificial force from man to maintain an uniformity in the species composition of the produces, in addition to maintain a moisture level of the soil and replenishing nutrients at times. In such an ecosystem the animals also tend to be limited in diversity. In this ecosystem a particular animal species finds enough food and multiplies and becomes a pest. Here usually single species dynamics assumes a great prominence. The area is having two main crop seasons namely, Kharif season and Rabi. The following are the common crops cultivated in the study area.

RICE

MAIZE

WHEAT

PULSES

OTHER CROPS:

TEA

SUGARCANE

POTATO

JUTE

RAPE & MUSTARD

COCONUT

CASTOR

BANANA

PINEAPPLE

ORANGE
PAPAYA
ONION
ARECANUT
CHILLIES
TURMERIC
SWEET POTATO
JACK FRUIT

Terrestrial ecosystem Flora

The study area is covers industrial, urban, and agriculture oriented.

TABLE 2.4.1

SAMPLING LOCATIONS FOR SOIL QUALITY

Location	Direction	Distance from core zone (Km)
1. Project Site	--	
2. Katamur	SE	1.0 km
3. Halguri	N	1.0 km
4. Changsari	NW	5.0 km
5. Silasindhurighopa	SW	2.5 km

**Table 2.4.2
Data of Soil Sampling Analysis**

Sl.	Parameter	Project site	Halguri	Katamur	Silasundari ghopa	Changsa ri
1.	PH	7.12	7.10	7.3	7.10	7.12
2.	Electrical Conductivity (µmho/cm)	445	454	452	468	432
3.	Texture	Red Loam	Red Loam	Red Loam	Red Loam	Red Loam
4.	Gravel (%)	9.9	10.1	9.8	9.5	9.2
5.	Sand (%)	22.3	21.7	23.1	22.3	21
6.	Silt (%)	67.8	68.2	67.1	68.2	69.8
7.	Available Nitrogen(mg/100gm)	26.5	22.8	21.4	25.4	26.3
8.	Available Potassium(mg/100gm)	5.3	5.8	5.4	4.9	5.3
9.	Available Phosphorus(mg/100gm)	6.2	6.5	6.9	6.6	6.4
10.	Exchangeable Calcium (mg/100gm)	21.4	19.9	21.2	20.9	21.7
11.	Exchangeable Magnesium (mg/100gm)	11.5	11.7	12.2	11.4	10.5
12.	Exchangeable Sodium (mg/100gm)	4.6	5.1	4.6	5.5	4.3

TABLE 2.4.3

INFILTRATION RATE OF SOIL

Sl.No.	Name of the site	Infiltration rate cm/hr
1.	Project Site	1.7
2.	Katamur	1.5
3.	Halguri	1.8
4.	Changsari	1.3
5.	Silasindhurighopa	1.5

TABLE 2.4.4

NUMBER OF EARTHWORMS IN 0.25 SQ.M QUADRANT

Quad. no.	Project Site	Katamur
1	5	6
2	6	4
3	4	6
4	4	5
5	5	5
Density =	4.8	5.2

2.5.SOCIO ECONOMIC ENVIRONMENT

2.5.1. INTRODUCTION

Any developmental activity will influence the Socio Economic conditions of the population in the region and thus the Quality Of Life (QOL). Socio Economic survey is necessary in EIA report preparation to predict the changes on the social and economic status. Hence base line data for demographic characteristics, occupational status, education, health and amenities existing in the project area have been studied as per MOE&F guidelines.

2.5.2. BASE LINE DATA

Detailed Socio economic survey with in 10 km radius of the JRT site has been carried out to assess the pre project status.

2.5.3. LOCATION

Katamur village, North Guwahathi Revenue Circle, Kamrup Rural District of Assam state. The Project site is about 150 M above mean sea level.

The land around the proposed site is mixed are with main Industrial development. Base- line data on the socio-economic conditions of the villages within 10 KM radius indicates availability of basic amenities like hospitals, educational institutions public transport. Changsari Railway station is about 5 KM from the proposed JRT site.

Following parameters have been selected for socio economic profiles:

POPULATION

Population of only Two Revenue Circles (kamalapur and North Guwahati) in the study area are covered.

OCCUPATION STATUS

Cultivators: The person who is engaged in either as employer, single worker or family worker in cultivation of land owned or institutions for payment in money, kind or share. Agricultural labourers: Person working in others land for wages in money or share have been treated as agricultural labourers. The male and female workers of this category are present in the study area

HEALTH FACILITIES

As per the 2001 Census reports, health facilities in the study area are shows that there are Primary Health Centres and other private dispenseries and first aid centres are existing.

IRRIGATION:

The area is having two main cropping seasons viz,. Kharif.

POWER AND ENERGY

Firewood, and LPG gas are the chief sources of cooking fuel. Firewood is mainly used in rural sector which indicates the rural atmosphere and restricted to lower income groups. All the villages are having electricity connections given for domestic and agricultural.

EDUCATION

The Illiteracy is high among females out of the total illiterates. The coming up of JRT factory in this area will help in increasing literacy as well as educational standards. Educational facilities and Social welfare hostels.

TRANSPORT

National Highway No.31 which passes 2 km away from the project site on the southwestern side. Most of the villages are connected with black top roads.

OTHER INDUSTRIES

Industrial development is observed in the study area. Other industries like cement and Coke oven Factory, steel factories etc are also found in the study area.

EMPLOYMENT

Increase in number of semi and non-skilled employees will boost the local economic structure.

AMENITIES

Existing amenities in the study area are shown in table 2.5.1.

3.0 PREDICTION OF IMPACTS

Many scientific techniques and methodologies are available to predict impact on physico-ecological environment. Mathematical models attempt to qualitatively describe the cause and effect relationship between sources of pollution and different elements of the environment viz. air, noise, water etc.

3.1. PREDICTION OF IMPACT ON AIR ENVIRONMENT

In the expanded JRT unit there are no major stacks Only process vents are present. As there are no boilers air quality simulation models need not be used. Only vents attached to dust collection systems where collected dust is recycled into the process are present. The impact on air quality due to automobile emission has been predicted to be insignificant because the increase in vehicular movement (35 trucks per day) due to the proposed JRT project is marginal. The impact of these emissions will be limited to a very short distance. The roads from the nearby towns to the plant site are tar roads and hence the fugitive emissions due to vehicular traffic will be insignificant.

The use of the generators is very occasional and as such the impact of its emissions on the air quality will be insignificant. The impacts, if any, will be limited to a very short distance and will also be very occasional. Existing ground level concentrations of ambient air quality monitoring and static air volume sampling also was undertaken as a reference.

3.2 PREDICTION OF IMPACT ON NOISE ENVIRONMENT

Prediction of potential impacts on noise environment from the proposed JRT project is as important as other components of the environment. The impacts of noise depends mainly on the characteristic of the noise generating sources, topography and atmospheric conditions.

The main Noise generating sources are Generators and compressors. Both the sources are enclosed with acoustic proof material to cut down the noise levels. So the impact of noise is minimized.

Present Noise levels of the study area are shown in table 2.2.2. Due to the JRT project there will not be any significant increase in Noise levels. Only number of vehicles may increase.

PREDICTION OF IMPACT ON OCCUPATIONAL HEALTH

Equivalent sound level averaged over 8 hours, is used to describe the exposure of noise in work places. The damage risk criteria for hearing as enforced by OSHA (Occupational Safety and Health Administration) and several other organizations to reduce hearing loss, stipulated that noise levels up to 90 dBA are acceptable for 8 hours exposure per day. Exposure to impulses or impact noise should not exceed 140 dBA (Peak acoustic pressure) exposure to 10,000 impulses of 120 dBA are permissible per day.

Taking into account the prominent sources of noise and increase of vehicles, predictions have been made by taking the total of noise levels and considering it as noise levels due to one source at the centre of JRT. Most of the levels at the boundary of the JRT factory is around 55 dBA. So There is no impact of factory/JRT on places more than 150m from centre of the complex.

3.3 PREDICTION OF IMPACT ON WATER ENVIRONMENT

The proposed JRT plant requires water 50cu.m/day. Total required water will be met by bore wells within the factory premises. Process requires 45 (curing) cu.m/day of water will be totally consumed. Domestic washing requires 5 cu.m/day. The process waste water is completely recycled. There is no discharge of effluents and as such no effluent treatment plant is required by the

project authorities. However a septic tank followed by soak pit will be constructed to receive the sewage.

Sufficient ground water is available in and around the project site. Five number of rain water harvesting pits will be provided within the plant area to recharge ground water which will be a positive impact to the water environment. The details of rain water harvesting pits are further addressed in EMP.

3.4 PREDICTION OF IMPACT ON LAND ENVIRONMENT

Solid waste generated will be recycled into the process and no disposal on to the land (Chapter - Environmental management plan). There is no discharge of liquid effluents on to the land.

3.5 PREDICTION OF IMPACT ON SOCIO ECONOMIC ENVIRONMENT

Prediction of the socio-economic impacts of JRT is totally a positive main due to the employment opportunities to the skilled and un-skilled of the local villages. Also Health, educational facilities and communication by roads, has been improved which is positive impact to the socio-economic environment.

The JRT project activities will improve the general environment by planting more number of trees through a planned green belt development which will improve Aesthetic value of the region.

On the whole the project will have a favorable ranking with the local inhabitants and will be looked upon as a blessing for development of the area.

4.0 ENVIRONMENTAL EVALUATION SYSTEM

4.1 INTRODUCTION

For the evaluation of quality of the environment subsequent to the project implementation, value functions for selected parameters have been developed through a weighting scale check list adopting the Battelle Environmental Evaluation System (BEES). The check list consists of parameters identified for this project. Parameters have assigned importance weights by an interdisciplinary team of experts based on usage of the ranked pair wise comparison technique. The resultant importance weight points (Parameters Importance Units PIU) are presented in Fig.4.1 by numbers adjacent to all parameters on right hand side. Higher the number, greater the relative importance.

Because of the JRT project there will be negligible change in the Environmental Evaluation System.

Impact scaling in the BEES has been accomplished through the use of functional relationship of identified factors. Functional relationships refer to graphical means or transforming factor measurements (baseline or predicated value) into subjective evaluations. An index is obtained in Environmental Impact Units (EIU) for each alternative and baseline environmental conditions (i.e. EIU with project and EIU without project). The EIU without project has further been evaluated for with Environmental Management plan (EMP) and without EMP.

$$EIU_j = \sum_i (EQ)_{ij} (PIU)_i$$

where $(EIU)_j$ = Environmental impact units for jth alternative

$(EQ)_{ij}$ = Environmental quality scale for ith factor and jth alternative.

$(PIU)_i$ = Parameters importance units for ith factor

The identified parameters have been distributed in four major categories, viz. Ecology, Environmental pollution Aesthetics and Human Interest. The resultant numerical evaluation has been described as under:

4.2 ECOLOGY

The impacts on natural vegetation and species diversity will be not affected as there will not be clearance of site is required because of the JRT project. However proper identification of the project area for the activity is justified, hence a positive effect Table 4.1)

4.3 ENVIRONMENTAL POLLUTION

The existing state of aquatic environment is satisfactory which is not getting any major discharges from other industries. There will be no process disposals from the JRT project and the domestic waste is being disposed into a septic tank. The air quality of the study area will not be affected much. Hence the effects will be slightly on the negative side as shown in Table 4.1. There are no other industrial emission sources in the study area. JRT factory will install dust control systems with recycling arrangement for the process emissions. This facility will be sufficient to control the total dust emissions. So there is no significant effect. Lastly, noise level slightly rise due to increased transportation is found to be negative, however impact of this rise will be minor.

4.4 AESTHETICS

Topographic character of this area will not charged due to the JRT project. The development of green-belt around the JRT compound will enhance diversity of vegetations but slightly effect visual quality. The composite effect of the JRT project has an overall positive impact aesthetically. The "with" and "without" changes aesthetic category is presented in Table 4.1.

4.5 HUMAN INTEREST

The impact on health due to the project is negligible but the health status will improve due to increased income structure by increase in employment opportunities as well as the improvement in medical facilities by private medical practitioners. Employment and transportation facility will improve due to the proposed action. The respective scores for all Human Interest parameters are presented in Table 4.1.

4.6 OVERALL IMPACT EVALUTION

The net environmental impact due to activity of JRT plant as indicated by ecology is positive. It is attributed to green belt development and land use. The net impact on environmental pollution is negative. The negative impact is mainly due to the slight rise in levels of air pollutants. The human interest parameters show encouraging positive impact due to better job opportunity, transportation, medical facilities. Over all impact is therefore positive from the JRT plant. Table 4.1)

TABLE 4.1

OVERALL ENVIRONMENTAL EVALUATION

Parameters	A	B	C	D	C-B	D-B	D-C
Ecology	400	275	270	280	-5	+5	+10
Environmental pollution	200	175	173	180	-2	+5	+7
Aesthetics	200	180	178	181	-2	+1	+3
Socio-economic	200	190	192	195	+2	+5	+3
Total	1000	820	813	826	-7	+16	+23

- A - Weight (PIU)
 B - Without project (EIU)
 C - With project : Without EMP (EIU)
 D - With project : With EMP (EIU)
 C-B - Change without EMP (EIU)
 D-B - Change with EMP (EIU)
 D-C - Net change in EIU due to EMP

PIU - Parameter Importance Units
 EIU - Environmental Impact Units

5.0 ENVIRONMENT MANAGEMENT PLAN

An environmental management plan (EMP) is prepared to minimise those adverse impacts. It also examines the possible impact on the people, their home land or their livelihoods, or to other nearby developments.

5.1 CONSTRUCTION PHASE.

In the present project the potential for environmental pollution during construction phase is more and control of pollution is of considerable importance.

The following factors require control during construction phase.

5.1.1 SITE PREPARATION

Levelling of site will be required as the site has ups and downs within the boundary of the site.

5.1.2 SANITATION

The construction site will be provided with sufficient and suitable toilet facilities for workers to allow proper standards of hygiene. These facilities will preferably be connected to a septic tank and maintained to ensure minimum environmental impact. Another alternative would be to provide pit latrine of pour-flush type.

5.1.3 NOISE

Though the noise effect on the nearest inhabitants due to construction activity will be negligible RCL will adopt noise protection devices like ear muffs for onsite workers using high noise equipment.

5.1.4 CONSTRUCTION EQUIPMENT & WASTE

Both gasoline and diesel powered construction vehicles will properly be maintained to minimise smoke in the exhaust emissions. The vehicle maintenance area will be located in such a manner to prevent contamination of surface and ground water sources by accidental spillage of oil. Unauthorised dumping of waste oil will be prohibited. Wastes will be disposed off at an approved dump.

5.1.5 STORAGE OF HAZARDOUS MATERIAL

The following hazardous materials if used for site preparation and construction activity, they will be stored as per international standards.

i) Painting materials.

5.1.6. SITE SECURITY

Construction site is a potential hazardous environment. To ensure that the local inhabitants and stray cattle are not exposed to these hazards the site will be secured by fencing and manned entry points.

5.2 POST CONSTRUCTION PHASE

5.2.1 AIR POLLUTION

The air pollutants from the JRT will be very minimal. The ambient air quality levels will be within the standards laid down by Central Pollution Control Board (CPCB). The exhaust/ventilation fans will adequately be chosen taking into account the area of the premises.

AIR POLLUTION SOURCES & CONTROL MEASURES

Fiber Bag Opening and Milling

The fiber bags shall be slit open in closed automatic bag opening device. The empty bags shall be lifted by a hooking device attached within the bag opening device and carried to the attached bag shredder unit and the fiber after passing through the lump breaker shall be collected in the attached blender where some water shall be added to maintain the process in wet condition.. When all the bags in one charge empties the fiber on to the blender, the fiber in wet form shall be taken to the Edge Runner Mill via a screw conveyor and elevator which is also joined by the shredded bag pieces from the shredder unit. Here at ERM some more water is further added to the fibre for milling operation. The bag opening device & the edge runner mill shall be kept under negative pressure by tapping it on to a Bag Filter Type Dust Collector with pulse jet which again is connected to a two stage venture scrubber, connected to a blower (capacity _ 6000 m³/hr) driven by a 15 Hp motor. The delivery point of the blower is connected to a 18 m tall stack.

Cement and Fly ash Feeding

- The cement feeding point shall be tapped on to bag filter type dust collector with pulse jet and with a blower (capacity - 2500 m³/hr) driven by a 5HP MOTOR. The let out shall be through a stack of 18 m height.

- The Fly ash feeding point shall be tapped on to bag filter type dust collector with pulse jet and with a blower (capacity - 2500 m³/hr) driven by a 5HP MOTOR. The let out shall be through a stack of 18 m height.

Details of Pollution Control Equipments

Id No	Name of PCE Equipment	Attached to	Stack Id	
DE1	B/F Dust Collector with Pulse Jet	E R Mill & BOD	Stack1	
DE1/1	Two stage Venturi scrubber	DE1		
DE2	B/F Dust Collector with Pulse Jet	Cement Feeding	Stack2	
DE3	B/F Dust Collector with Pulse Jet	Fly Ash Feeding	Stack3	
Specification of Pollution Control Equipments				
Parameters	UOM	PCE Id No		
		DE1	DE2	DE3
Capacity	M3/Hr	6000	2500	2500
Stack Height	M	18	18	18
Stack Diameter	mm	320	320	320
Filtering Area	M2	85	33	33
Nos Filter Bags	Nos	108	42	42
Filter Bag Length	mm	2000	2000	2000
Nos of Solenoids	Nos	12	6	6
Timer	Nos	1	1	1
Dry Comp Air	M3/Hr	12	8	8
Attached to PCE		DE1		
Description		Two stage venture scrubber	9	
Capacity	M3/Hr	6000		
Pressure	mm(WG)	350		
Attached to		Blower	Blower	Blower
Motor	HP	15	5	5
Stack Id		S1	S2	S3

Sectional views / figures of B/F Type Dust Collector, and Two stage venture scrubber are enclosed as Fig 5.2.1, & 5.2.2 respectively.

FIG. 5.2.1

BAG FILTER TYPE DUST COLLECTOR

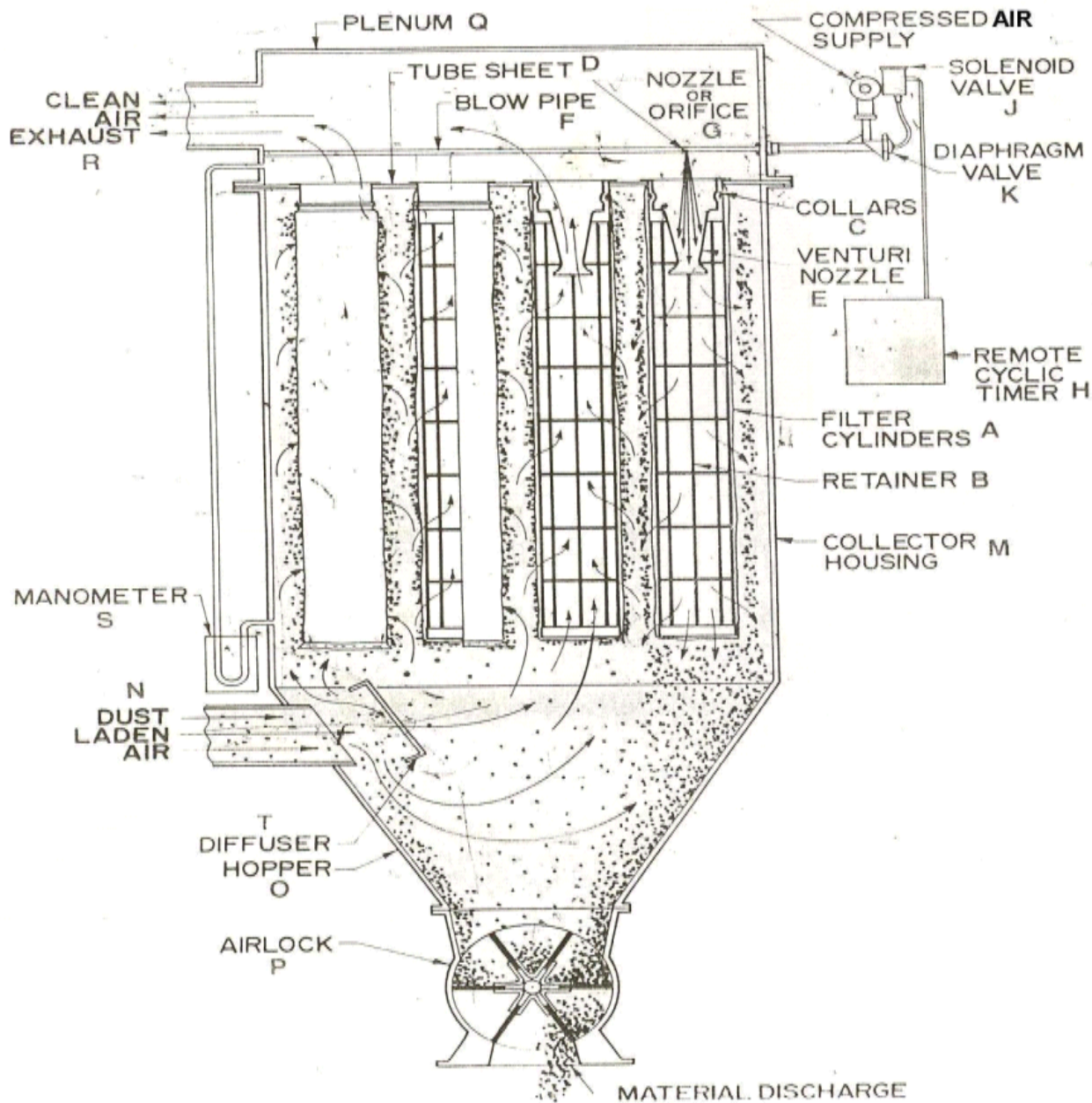
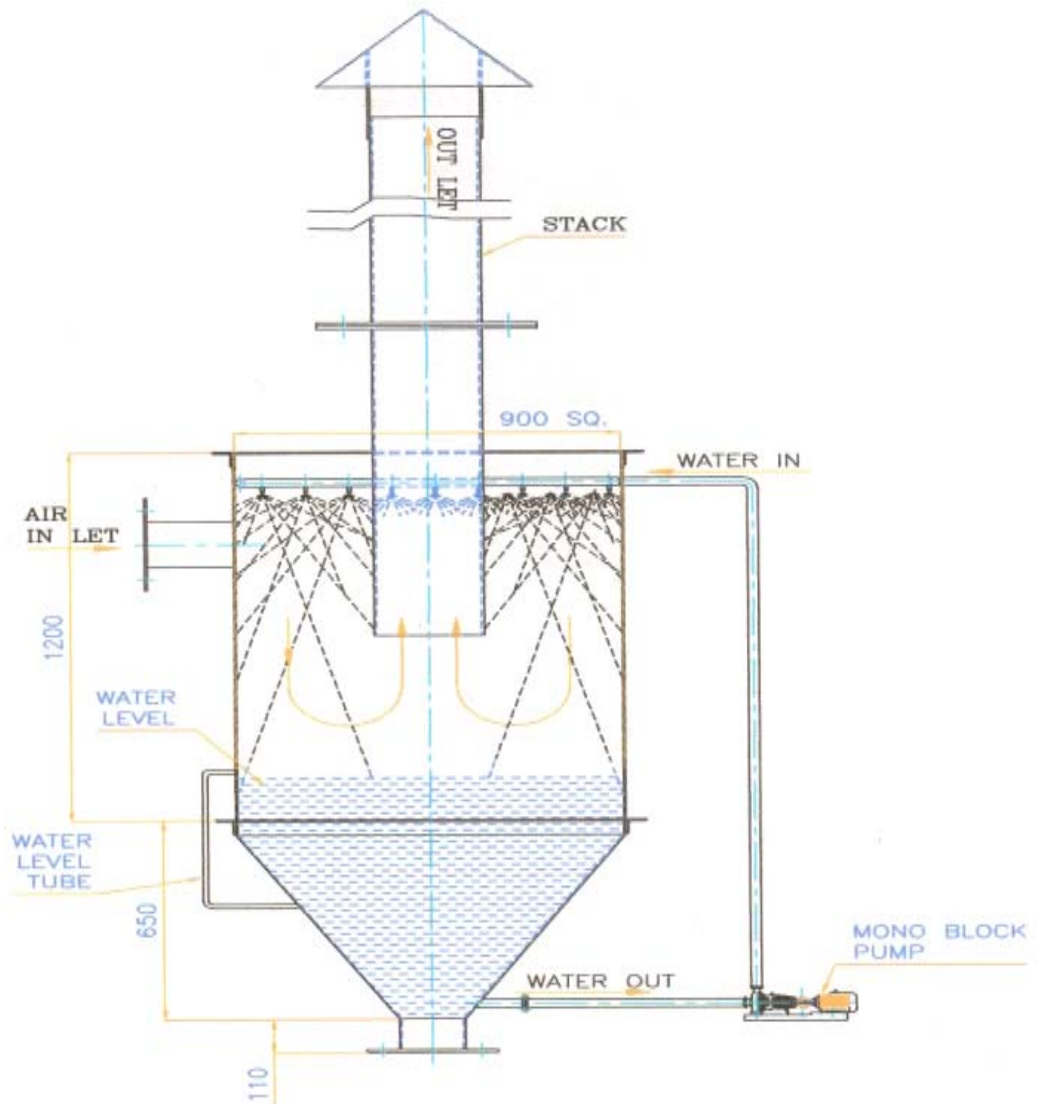


FIG. 5.2.3
AIR WET WASHER



DE1/2

OTHER POLLUTION CONTROL MEASURES

FIBRE RECEIPT

Asbestos fiber (Chrysotile variety) is imported from Canada, Brazil, Zimbabwe, Russia and Greece. It is received in shrink or stretch wrapped HDPE woven bags. Fiber bags are received tightly packed in wooden pallets and transported in closed containers. The bags wear warning symbol "a".

FIBRE HANDLING AND STORAGE:

The bags are handled at site by means of fork lifts. Spillages if any, and container after unloading at site is cleaned using portable vacuum cleaner. Where this is not practicable, wet mopping, collection & recycling method is adopted. Wet mopping shall be carried out with the help of Rubber mat stick. No clothing material shall be used. Torn bags received if any, is stitched and sealed with suitable adhesive tapes. Such cleaning operation is undertaken by the operatives wearing protective clothing and respiratory masks. The fibre bags are stacked in godowns.

Trucks after unloading are subjected to thorough cleaning by vacuum cleaner.

SHEET CUTTING OPERATION:

Sheet cutting operation is carried out with the cutters operating under a steady stream of water jet which shall be kept recycled. The washing is collected and periodically recycled to the process. This technique of dust suppression has been proven to be very effective.

PRODUCT FINISHING:

The filing and finishing operation of moulded asbestos cement goods is carried out in wet stage. The washing is collected and periodically recycled to the process. Green stage trimmings is immediately recycled to the process.

GENERAL HOUSE-KEEP:

Portable vacuum cleaner is used for the cleaning of godowns and raw material section.

Wet mopping /collection/Recycling method wherever applicable is adopted for the spillage cleaning at raw material section. Wet mopping shall be carried out by the Rubber mat sticks without using any clothing material.

SAFETY MEASURES PERSONAL PROTECTIVE EQUIPMENTS

Regular Process Area	
- Fibre bag feeding to BOD	V – 20 – W Masks, as per IS : 9473 – '02 Inhalable Dust - <100 um Thoracic Dust – 2.5 to 30 um Respirable Dust – 0.3 to 2.5 um
- Sheet cutting operation	
- Moulded Goods Finishing area	
- Wet Ball Mill (Waste Recycling)	
Maintenance Activity	
- Bag Filter cleaning	3M – 9004 IN up to 0.1 um
- Dust collector/BOD cleaning	

5.2.2 NOISE

The JRT will procure Compressors and Generators with acoustic enclosures

5.2.3 WATER ENVIRONMENT

5.2.3.1 WASTE WATER

There is no waste water generated due to the process. The sanitary waste is diverted into a septic tank followed by soak pit.

5.2.3.2 RAIN WATER HARVESTING

Based on available data on roof area - 5 nos. rain harvesting pits have been planned, to ensure charging of ground water. Pits will be made with gravel and sand filled in as filtering media. It is shown in site plan fig. 1.1. Floor area with slope will be considered for rainwater calculation in the following narration.

RAIN WATER HARVESTING CALCULATIONS

Rain water yield (litres per year) = Roof area (m²) X annual rainfall (mm) X run-off coefficient X filter efficiency

Roof Area = Width X length of roof

The run-off coefficient = allows for the slope of the roof and water loss through wind, evaporation and the ability of roofing material to hold onto water.

Typical run-off coefficients:

For pitched tiled/AC Sheet roofs - approx.0.75

For flat roofs - approx. 0.5

Filter efficiency =

Down pipe from roof = 90% efficient

Underground filter = 85% efficient

Roof Area = 5000 m²

Annual rain fall = 2600 mm

$5000 \times 0.75 \times 0.9 \times 2600 = 8775000$ litres = 8775 m³

To Calculate the required tank size

A proven and workable rule-of-thumb sizes the tank to store 5% of the annual rainwater yield. This has been shown to give a reliable optimum tank size. For our JRT the storage tank required would be:

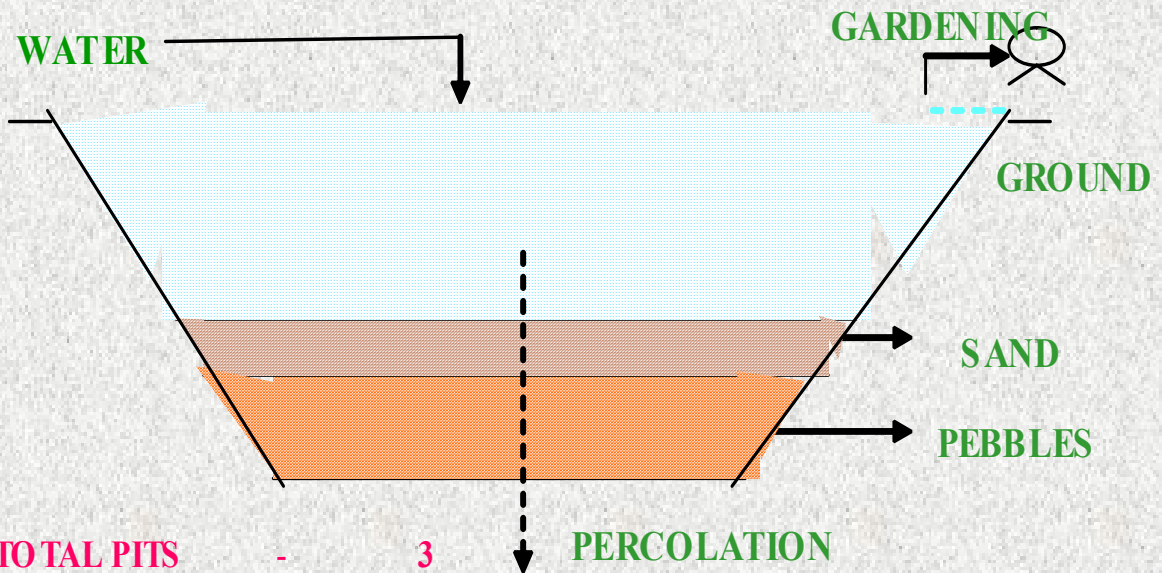
5% of 8775 m³. = 438.75 m³

It is wise to select a tank slightly larger as there is always some dead space at the top of the tank; also the bottom 20 cm or so is never used.

TANK SIZES: 6.0MX5.0MX3.0M(MWD) in 5 nos.

Total Rain water harvesting pits = 5

GROUND WATER RECHARGING PLAN



TOTAL PITS	-	3
<u>DIMENSIONS</u>		
LENGTH	-	5.0 M
UPPER WIDTH	-	5.0 M
LOWER WIDTH	-	4.5 M
DEPTH	-	2.0 M

5.2.4. SOLID WASTE MANAGEMNT

Solid Waste Generation

- | | |
|--|-------------|
| 1. Empty Fibre Bags – From Bag Opening Device (BOD) | = 0.0261 MT |
| 2. Fibre Dust – From Dust Collector at ER Mill & BOD | = 0.0058 MT |
| 3. Process Sludge – From Week-End Tank | = 0.0484 MT |
| 4. Hard Broken Pieces – From Damages/Rejects | = 1.4013 MT |
| 5. Cement Dust – From Dust Collector at Cem Feeding | = 0.0241 MT |
| 6. Fly Ash Dust – From Dust Collector at FA Feeding | = 0.0197 MT |

Disposal (Fully Recycled)

1. Shredded in the Shredder unit attached to the Bag Opening Device and sent along with the opened fibre through the screw conveyor.
2. Periodically recycled after the container containing water and placed beneath the rotary valve of the Dust Collector is adequately filled in.
- 3&4. Continuously recycled though the Wet Ball Mill in slurry form.
- 5&6. Periodically recycled after the containers placed beneath the rotary valve of the respective Dust Collectors are adequately filled in.

5.2.5 Waste Water

1. Process Waste Water – From Week-End Tank

Process waste water – Periodically, during maintenance, a fraction of cone tank water is first let into the sludge recycling tank. Such transferring is continued until the water coming from the cone tank is clean and without suspended solids. Once the solids are collected, the rest of the clean water is diverted to a week end tank. The solids of sludge recycling tanks are immediately recycled to the mfg process along with the water once the plant starts after maintenance. The water from the week end tank is periodically recycled to the cone tank ensuring that the week end tank is made empty before the next maintenance is taken, with any short fall being compensated by the fresh water.

Disposal (Fully Recycled)

Continuously recycled from the Week-end Tank along with the small fraction of Solids in suspension.

5. 3 GREEN BELT DEVELOPMENT

To maintain the ecological balance JRT authorities will develop green belt around the plant. Green belt around the JRT for noise pollution control, balancing eco-environment, soil erosion /protection, economic sustenance and aesthetics. The scenario of planting arrangement is based on the optimum use of available land. Based on the agro-climatic conditions of the region, location of JRT and physico-bio-chemical properties of the soil strata in addition to the nature of pollutants and their rate of dispersion, it is suggested to develop more green belt around the plant. Plants suitable to abate the pollution have been identified to be local plants.

The plant authorities have proposed to plant a green belt in the front portion outside as well as within the boundary of the land acquired. The remaining area around the plant with lawns and other plants. In addition to the green-belt planted around the project, roadside plantation will also be developed within the project. Green belt development plan.

The tree plantation is based on the following principles

- The plant should be fast growing
- It should have thick canopy cover
- It should be perennial and evergreen
- It should have large leaf area index
- It should be indigenous
- It should be efficient in absorbing pollutants without significant effects on plant growth.

5.4 POST PROJECT MONITORING

The project authorities will setup Safety and Environmental cell headed by an expert who reports directly to the Chief of the group. The Safety and Environmental activities of the project will be monitored by this cell.

JRT authorities will adopt ambient air quality monitoring atleast once in a month within the factory premises. A weather station for wind speed, direction, temperature and rainfall will be installed within the premises of JRT. Stack emission monitoring will also be taken monthly once. JRT will also measure indoor air quality and asbestos fibre count as per the Occupational health standards.

5.4.1 AIR MONITORING PLAN

5.4.1.1 Air Monitoring Frequency

Personal/Static Sampling	Monthly
Low Volume Sampler. Fibre count by Phase Contrast Microscope – IS11450 : 86)	(for each location)
Stack Emission (for fibre, cement & fly ash)	Monthly (for each stack)
Ambient Air Monitoring (at 3 equi-angled stations with RM sec as centre point, within the site, using High Volume Sampler)	Monthly (for each station)

5.4.1.2 SAMPLING LOCATIONS AND LIMITS

PERSONNEL FIBRE COUNTS

SAMPLING

LOCATION

(Personal & Static)

- 1) Edge Runner Mill - 1
- 2) Moulding Finish - 1
- 3) Cutting Section - 1
- 4) Waste Recycling - 1
- 5) RM Section - 1
- 6) Fibre Godown - 1

MAX LIMITING VALUES - 1.0 fib/cc

(Personal & Static)

STACK EMISSION

1. FIBRE Milling	-SPM (TOT DUST)	:	2 mg/NM3
	-FIBRE COUNT	:	0.2 Fib/cc
2. FLY ASH FEED	-SPM	:	150 mg/NM3
3. CEMENT FEED	-SPM	:	150 mg/NM3
4. DG SET	-SPM	:	150 mg/NM3
(Stand-by)	-SO2	:	N.S.
	-NOx	:	N.S.

AMBIENT AIR

Once in a month Ambient Air samples shall be drawn from 3 different locations with in the plant premises. The locations shall be at nearly 120° apart with R M Section as central point. Permanent sampling stand shall be erected at these locations.

LABORATORY EQUIPMENT

Air Monitoring

•	Stack Kit	-	1
•	Ambient Air (RDS)	-	3
•	Personal Samplers	-	2
•	Anemo Meter	-	1
•	Wind Direction	-	1
•	Relative Humidity	-	1
•	Noise Meter	-	1
•	Phase Contrast Micro		
	Scope for Fibre Count	-	1
•	Electronic Weighing Balance	-	1

STACK EMISSION MONITORING

Name of Sampler	Stack Monitoring Kit
Make / Model of Sampler	Envirotech, APM 810
Filters used	Cellulose thimble, Glass thimble
Limiting Values Fib stack - SPM	2 mg/NM3
- Fib count	0.2 fib/cc
Cement Stack – SPM	115 mg/NM3
Fly ash Stack – SPM	115 mg/NM3
DG Set - SPM	115 mg/NM3
- SO ₂	800 mg/NM3
- NO _x	N.S.
Sampling Frequency	Once in a month for each stack

AMBIENT AIR SAMPLING

Name of Sampler	Ambient Air Resp Dust Sampler	
Make / Model of Sampler	Envirotech, APM 460 BL	
Flow Rate	1 LPM	
Filter Paper Details	'Whatman' Glass Fibre	
Ref spec	IS 5182-IV, 5182-II, 5182-III – '99	
NAAQ	SPM	500 ug/NM3
	SO2	120 ug/NM3
	NOx	120 ug/NM3
Sampling Frequency	Once in a month at each location. Locations are stationed within the premises at 3 different direction at 120 deg, with RM sec as central point.	

5.4.2 PERSONAL PROTECTIVE EQUIPMENT

POTENTIAL AREAS WITH RELEASE OF FIBRE :

REGULAR PROCESS AREAS

The areas where fibre handling is involved are mentioned below. Personal sampling will be carried out at these places to monitor work zone fibre concentration levels. The workers working in these areas will be provided with Nose masks made of cotton clothing material.

- 1) Edge Runner Mill
- 2) Moulding Finish
- 3) Cutting Section
- 4) Waste Recycling
- 5) RM Section
- 6) Fibre Godown

OTHER OCCASIONAL MAINTENANCE AREAS

In the areas such as Bag Filter cleaning, Dust Collector, BOD maintenance etc, workers will be provided with 3M masks. This activity will be occasional.

PERSONAL / STATIC SAMPLING DETAILS

Name of Sampler	Personal Sampler
Make / Model of Sampler	Envirotech, APM 800
Flow Rate / Sample dur'n	1 LPM / 1 Hr
Filter Paper Details	Millipore, 0.8 u
Sample/Counting ref spec	RTM1, IS 11450 – '86
Fibre counting instrument	'Carl Geiss' Trinocular research microscope for bright field phase contrast application, Model :AXIOS KOP40, Obj Mag 10x
Counting Method	Membrane Filter Method
Max Permissible Value	0.1 fibre / cc

PERSONAL/STATIC SAMPLING LOCATION AND FREQUENCY

Identified Location – Fibre Area	Sampling Frequency
Fibre Godown (P)	1 No – Monthly once
Fibre bag feeding to BOD (P)	1 No – Monthly once
Sheet cutting (P)	1 No – Monthly once
Moulded goods finishing (P)	1 No – Monthly once
Waste recycling (Wet Ball Mill) (P)	1 No – Monthly once
RM Section (S)	1 No – Once in 6 months
Note : (P) – Personal Sample, Sampler is attached to the operative (S) – Static, Sampler is kept fixed in one location.	

SAFETY MEASURES PERSONAL PROTECTIVE EQUIPMENTS

Regular Process Area	
- Fibre bag feeding to BOD	V – 20 – W Masks, as per IS : 9473 – '02 Inhalable Dust - <100 um Thoracic Dust – 2.5 to 30 um Respirable Dust – 0.3 to 2.5 um
- Sheet cutting operation	
- Moulded Goods Finishing area	
- Wet Ball Mill (Waste Recycling)	
Maintenance Activity	
- Bag Filter cleaning	3M – 9004 IN up to 0.1 um
- Dust collector/BOD cleaning	

5.4.3 MEDICAL SURVEILLANCE

A. Pre-employment Surveillance

- * Pulmonary Function Test (Spirometry – FVC & FEV1)
- * Complete Physical Examination
- * Blood Test
- * Urine Test
- * Chest X ray

B. Periodical Medical Surveillance

- * Pulmonary Function Test(– FVC & FEV1)
 - Once in a year
- * Complete Physical Examination
 - Once in a year
- * Blood Test
 - Once in a year
- * Urine Test
 - Once in a year
- * Chest X ray
 - Once in 3 years

C. At Cessation – Medical Surveillance

- * Pulmonary Function Test (FVC & FEV1) }
- * Complete Physical Examination } within 5 years
- * Blood Test } after cessation
- * Urine Test }
- * Chest X ray }

EXPENDITURE ON ENVIRONMENTAL MANAGEMENT PLAN

SL	ITEM	RsinLakhs
CAPITAL EXPENDITURE:		
1	Air Pollution control equipment like ID fans, Bag Filters, s connected to cement, Flyash & Fibre handling systems (main equipment) including stacks.	30.00
3	Sewage Treatment for Doestic waste water.	5.00
4	Emission Monitoring equipment at sources and ambient air quality in the vicinity) and laboratory.	10.00
5	Green belt development.	10.00
6	Establishment of Environment cell and Environmental Monitoring.	10.00
7	Total Capital Expenditure	65.00
RECURRING EXPENDITURE:		
8	Recurring expenditure on environmental management cell and on pollution control systems is about 10% of the Env. Management & Equipment capital.	6.50

BUDGET FOR WELFARE MEASURES

SL	ITEM	INVESTMENT, RS IN Lakhs
1	School & Education	2.00
2	Medical Services	2.00
3	Roads Development	2.00
4	Community Development	2.00
5	Supporting Self-help groups	2.00
	Total	10.00

SUMMARY AND CONCLUSION

I. Production and Process management

1. The technology chosen and machinery selected are energy efficient and environment friendly.
2. Plant designed to meet all the standard norms of State and Central pollution Control Boards and MOE&F .
3. Noise levels designed at less than 90 dBAs as per OHS standard of 90 dBs of 8 hours exposure at work Environment

II. Pollution control equipment

1. Pulse Jet bag filters For all Emission Sources.
2. Stack monitoring of SPM, SOX and NOX
3. Annual maintenance budget provided @ Rs.6.50 Lakhs.

III. Material handling and storage

1. All spillages and deposits on structures will be cleaned up promptly using vacuum cleaners or vacuum system.
2. Automatic devices and control systems will be used.
3. Traffic areas, including roads and areas with regular vehicle movement, will be paved with a suitable road-way covering and be kept clean constantly
4. Boundary of the plant s surrounded with thick plantation.
5. Thick plantation along the unpaved haul road also be provided.

IV. Corporate environment management

1. Corporate environment policy.
2. Utmost importance is given to occupational health and safety.
3. Socio-economic development
4. Encouraging and creating opportunities for self employment
5. Infrastructure strengthening and development
6. Environmental Policy to ensure overall eco-friendly plant
7. Environmental management cell for regular reviews and ensuing correct implementation of policy.

JRT strongly believes in the concept of eco friendly industrialization. Apart from eco -friendly operations, various socio economic development activities will be undertaken to bring about overall socio economic improvements in the areas. Hence the project may be accorded environmental clearance.