

1.0 Background

Ballarpur Industries Limited (BILT), Unit-Bhigwan is located at village Paundhwadi, near Bhigwan, District Pune, Maharashtra. The unit is situated in MIDC Industrial Area, Bhigwan. The company produces superior varieties of paper and paperboard mainly coated papers. The main raw material for the paper manufacturing is bleached pulp imported from Indonesia, Canada and other pulp surplus countries. BILT had been granted clearance from Maharashtra State Pollution Control Board and Ministry of Environment and Forest, New Delhi for manufacture of superior varieties of coated paper and paperboard – for a capacity of 2 lakh ton per annum based on imported bleached pulp. The irrigation authority has also permitted drawing of water from backwater of Ujjani Dam @ 7.57 million cubic meter per annum. MSEB had sanctioned connected load of 40 MW. In conformity with the stated policy of Government of India and the State Government BILT has set up state-of-Art paper mill along with most modern utilities such as 30 MW coal based power plant, water treatment plant and 5 stage effluent treatment plant to manufacture paper and paper board including coated varieties. The unit is termed as most eco-friendly owing to its use of bought out bleached pulp with no pulp manufacturing facilities at the unit.

In a short span of time the unit has set benchmarks both in terms of quality and environment standards in the Indian Paper Industry. The unit boasts of exporting 20-25% of its production to various developed countries like USA, Australia, Canada, Europe, Middle East etc. Some of the milestones and awards achieved by the unit are enumerated as under.

Project Milestones/Awards/Achievements

Milestones:

- 1997: Originally Commissioned by Sinar Mas Pulp and Paper (India) Limited, a Sinar Mas Group, Indonesia.
- 2001: Ballarpur Industries had taken over the unit and named it BILT Graphic Papers Limited.
- 2003: BILT Graphic Papers was merged with Ballarpur Industries Limited.

Awards/Achievements:

- 1999 & 2004: Recognition for Best Environmental Practices and Three Leaves Award by Centre for Science and Environment.
- 2000: Acquired ISO 9001 Quality Certification.
- 2001: Acquired ISO 14001 Environmental Certification.
- 2002 & 2006: National Award for Excellence in Energy Management by Confederation of Indian Industries (CII).
- 2004 to 2006: Greentech Safety Gold Award for consecutive 3 years.

2005:	Acquired ISO 18001 OSHAS Certification.
2005:	“TERI-CSR AWARD-03-04” for CSR activities at BILT.
2005:	Second Prize in Pulp and Paper sector for “National Energy Conservation Award” by Ministry of Power, Govt. of India.
2005:	Best Practiced Company in CSR activities by FICCI-SEDF.
2006:	First Prize in Energy Conservation by MEDA.
2006:	Greentech Environment Excellence Gold Award.
2006:	Indian Manufacturing Excellence Award (IMEA) by Frost and Sullivan.
2007:	Golden Peacock Global Award for Corporate Social Responsibility in Emerging Economics.

The present installed capacity of the unit is 1,15,000 T/year. After expansion with the rationalisation of product mix the high grammage of paper and board would be produced on the existing machine, increasing its production from 9000 to 13,500 T/Month and the low grammages will be produced on the proposed machines to be installed. Considering the market demand and shortage of coated paper, the company has proposed the capacity expansion of the unit.

2.0 Proposed Expansion

The paper production capacity after expansion of the unit will be 3,60,000 T/year (1,60,000 from the existing and 2,00,000 T/year from the proposed). To achieve this capacity it is proposed to install one paper machine with online coating & finishing with the following specifications:

A. Paper Machine specifications

Capacity	643 TPD (2,00,000 TPA)
Drive speed	1100 MPM
Paper Deckle at reel	4810 mm
Grammage	60 to 130 gsm

To cater the future power demand it is also proposed to install additional 30MW extraction steam turbine and a coal fired boiler of 175 TPH capacity along with other associated equipment.

The cost of the proposed capacity expansion will be Rs. 1,000 Cr and the land requirement for the proposed project will be 40 ha which is available in the existing plant premises.

The layout of the plant showing existing and proposed expansion is shown in **Figure-1**.

3.0 Paper Manufacturing Process

The paper mill process based on the Imported bleached Pulp and consists of following unit process:

1. Stock Preparation, 2. Paper Machine with online coating and 3. Finishing and Packing.

Chemicals such as fillers, binders, sizing chemicals, pigments and other additives are added to impart the required properties to the paper.

The flow diagram of the paper manufacturing process is given in **Figure-2**.

4.0 Raw Material Requirement

The present pulp requirement is about 75,000 ADT/annum and after expansion the pulp requirement will be 2,16,000 ADT/annum. Apart from the pulp there will be requirement of calcium carbonate and other wet end & surface sizing chemicals and coating chemicals. A dedicated Calcium Carbonate Plant of capacity 4,490 T/month is in operation at the mill.

5.0 Fuel Requirement

Coal is the main fuel for the existing (175 TPH) as well as proposed (175 TPH) CFBC and (50 TPH) AFBC standby boiler. AFBC Boiler will eventually substitute Oil boiler (also referred as IJT Boiler). Apart from coal, LDO is required for the start up of the Coal fired boilers and Furnace Oil is required for Oil fired Oil boiler, which runs only in case the CFBC boiler is under shutdown. The fuel requirement is given below:

Type	Before expansion	After Expansion
Coal (MT/day)	600	1400
Furnace Oil (MT/day)*	72	0
LDO (KL/year) - only for startup	200	350

*Existing operation: 30 days in year

The coal storage yard of 25000 MT is provided at the plant site.

6.0 Power and Steam Generation

The present power requirement of the plant is 17MW generated through 30 MW coal based co-generation power plant. Surplus power to the extent of 11 MW is supplied to State Grid. After expansion power requirement will be to the extent of 44 MW. To meet the additional power demand, it is proposed to install 30MW double extraction cum condensing type turbine. The surplus power available will be continued to supplied to state grid.

Extracted Steam from turbine is utilized in paper manufacturing process at various stages. The present steam requirement is about 140 TPH generated through a boiler of rated capacity of 175 TPH. After expansion the requirement of the steam will be 280 TPH which will be met through installation of CFBC boiler of identical capacity (i.e.175 TPH). The steam generation from Oil boiler is 50 TPH and proposed AFBC boiler steam generation will be 50 TPH to substitute Oil boiler.

7.0 Water Requirement

The water requirement of the plant is being met by intake from the backwater of Ujjani Dam, through a pipeline which is about 8 km in length. The water is required for paper manufacturing process, power plant (DM and cooling) and domestic purpose. The water balance is given below:

Sr. No.	Category	Existing Fresh water Consumption- m ³ /day	Fresh water Consumption- after expansion (estimated)	Effluent Generation- m ³ /day (after expansion)	Loss of water- m ³ /day (after expansion)
1	Process (Paper M/c., Stock Prep., Pulpers etc..)	7400	18170	17000	1170
2	Cooling (Boiler Feed/Cooling).	1400	3500	600	2900
3	DM Plant and Power Block	600	1471	1471	0
4	Mill Potable Water and Sanitation	20	30	28	2
5	Fire Services	5	10	-	10
6	Other Area Uses	5	10	-	10
7	Colony	280	380	361	19
	Total	9710	23571	19460	4111

*

8.0 Manpower Requirement

The mill is presently employing 991 persons comprising of various categories such as managers, officers, supervisors and all types of workers. The manpower requirement is given below.

Category	Existing Manpower	For Expansion	After Expansion Manpower
Skilled	275	130	405
Semi-skilled	219	120	339
Unskilled + Contract labours	386	100	486

Staff	111	46	157
Total	991	396	1387

9.0 Baseline Environmental Status

Environmental baseline data was collected in summer season (year 2005) on Meteorology, Ambient Air Quality, Noise Levels, Water quality, Soil Quality, Flora and Fauna, Landuse and Socio-economics in the study area of 10 km radius. Additionally one more season data was collected on the herbaceous species. Socio-economic survey conducted in the villages falling in the study area. Data was collected from secondary sources to support the field investigations. Landuse Pattern of the study area was established through Remote Sensing & GIS. The study area map of 10 km radius is given **Figure-3**.

9.1 Meteorology

The site-specific meteorological data was monitored in summer 2005 through continuous automatic weather station at plant. The temperature and humidity was found to be in the range of 15 °C to 40.5 °C and 17% to 82% respectively. The average wind speed was found to be in the range of 0.8 to 2.0 m/s and the predominant wind direction was observed from north.

9.2 Ambient Air Quality

The ambient air quality was monitored at 7 locations using Respirable Dust Samplers as per the procedures given in IS-5182.

Parameter	Range ($\mu\text{g}/\text{m}^3$)	CPCB Limit ($\mu\text{g}/\text{m}^3$)
Total Suspended Particulate Matter (TSPM)	42-162	200
Respirable Suspended Particulate Matter (RSPM)	13-60	100
Sulphur dioxide (SO_2)	10-24	80
Oxides of Nitrogen (NO_x)	11-30	80

It is observed that the present levels of pollutant are within AAQM limits as specified CPCB for rural and residential areas. SPM levels are influenced more due to local activities near the observation sites. Overall the ambient air quality of the region is found to be satisfactory, irrespective of the ongoing industrial operation in the region.

9.3 Noise Levels

Ambient noise levels were monitored at 8 locations covering sensitive, residential areas and near the highway.

Area	Range, dB (A)		CPCB Limits, dB (A)	
	Day	Night	Day	Night
Sensitive	46.3-49.3	48.0-49.2	50	40
Rural and Residential	47.5-52.1	47.0-49.5	55	45
Highway	55.8-57.9	58.7-59.4	--	
Industrial areas			75	70
Occupational Exposure			Exposure for 8 hours = 90	

Noise levels at all the monitoring location are influenced by the highway traffic induced noise. In-plant noise monitored at 6 locations and the levels found to be in the range of 50.1 to 96.0 dB. However, the recent installation of the acoustic hood has brought down the in-plant noise levels in the range of 50.1 to 85 dB (A). Noise levels around plant boundary are <50 dB (A) in all directions.

9.4 Soil Quality

Soil sampling was at 6 locations and parameters related to fertility potential are analysed. It is observed that Soil is less in nitrogen content and rich in potassium. Major crops grown in the area are sugarcane, jowar, onion, cereals and vegetables.

Parameter	Range
pH (1:2.5)	7.9-8.7
Bulk Density gm/cc	1.05-1.41
Nitrogen, kg/ha	13.9-26.5
Phosphorous, kg/ha	12.0-127.1
Potassium, kg/ha	302.4-2112

9.5 Water Quality

Water quality monitoring was done at 4 Surface water locations and 4 ground water locations. It is observed that the surface water quality is within the Class C limits of IS: 2296, and the ground water quality within the limits of IS: 10500 of Drinking water Standards.

Parameter	Surface Water Quality	Ground Water Quality
pH	7.71-8.16	7.66-7.94
Suspended Solid, mg/l	10-12	16-22
COD, mg/l	9-40	-
BOD, mg/l	4-13	-

Total Hardness, mg/l	180-210	210-410
Chlorides, mg/l	44-63	29-160
Sulphates, mg/l	51-125	11-111

9.6 Ecological Studies

Ecological survey was carried out at 6 Terrestrial and 6 aquatic sites. Faunal study was done by Interviewing the local people, pug marks study and bird watching. About 92 species of plant, 15 species of animals, 7 species of reptiles and about 96 species of birds were reported. About 33 species of freshwater fish were recorded. There is no forest area within the study area. Migratory Flamingos and many other species visit Ujjani waterbody every year during winter season and some of them also breed here.

9.7 Socio-Economic Status

Socio-economic status of the study area was studied by primary survey in 10 villages through group discussion and questionnaire and collecting data from Census 2001. The monthly earnings of the villagers range from Rs. 500 to Rs. 10,000/-. There is Influx of migrant labour due to enhanced employment and enterprise opportunity in the area. Farming is major occupation for 80% of the villages.

Villagers have reported increase in the basic infrastructure and amenities like school, transportation, medical facilities, Bank etc in recent times, especially after the establishment of BILT, Bhigwan. No adverse impacts on health linked to BILT, Bhigwan were recorded during the interaction with the respondents.

Through an NGO –BAIF, BILT is implementing ‘Community Development Initiative called ‘Uday’. Local community is benefiting from the BILT by direct employment or indirect enterprise opportunity. Availability of water for irrigation, enhanced agricultural production, increased employment, enhanced awareness and lifestyle improvement were the major benefits perceived by the local communities.

10.0 **Air Pollution & Control Measures**

Air Emissions are expected in the form of Particulate matter (PM) & Sulphur Dioxide (SO₂) due to burning of coal in CFBC Boiler and furnace Oil/LDO in Oil boiler. The height of the stack attached to the coal-fired boiler is 120 m while the height of 75 m is provided to Oil boiler. The Oil boiler is

put into operation only in case of CFBC boiler shut down. The emissions from new CFBC boiler (175 TPH) will route through the stack attached to existing CFBC boiler. New AFBC boiler will substitute oil boiler and its emission will route through existing 75M stack. The emissions from the stacks are given below:

Source	Before Expansion	After Expansion
CFBC Boiler	CFBC-1 PM – 117 mg/NM ³ SO ₂ – 7830 kg/day	CFBC-1 & 2 PM – 117 mg/NM ³ ** SO ₂ – 16800 kg/day*
Oil Boiler / AFBC Boiler	SO ₂ - 5000 kg/day	SO ₂ - 3000 kg/day

*Based on Coal consumption rate (1400 TPD) and sulphur content 0.6%; ** The present PM is 117 mg/NM³ and expected to remain same after expansion. It will not exceed the consented limit of 150 mg/NM³.

Emissions are found to be within the specified MPCB limits. One ESP provided for coal fired boiler to control the PM emissions with efficiency 99.7%.

Air pollution impact assessment is done through ISCST3 Air pollution dispersion model developed by USEPA. Site specific meteorological data and emission rates given above are used for prediction. It is observed that after the expansion the maximum incremental concentrations for SO₂ and SPM will be 24.0 µg/m³ and 3.5 µg/m³ respectively it is found that the incremental concentrations are well within the CPCB specified limits both for SPM (200 µg/M³) and SO₂ (80 µg/M³). Overall impact will be minimum after expansion due to increase in ambient air quality levels.

- Mitigation Measures

Electrostatic Precipitator is installed at coal-fired boiler to contain the particulate matter emissions. Similar arrangement will be made for proposed CFBC boiler. Stack height of 120m for coal fired boiler and 75m for Oil / AFBC standby boiler is provided as prescribed by MPCB. This has enabled proper dispersion of pollutants in atmosphere. Based on design calculations it is inferred that the existing stack height is adequate even after addition of one CFBC boiler and AFBC boiler.

Water sprinkling at coal stack yard and other dust generating sources is done regularly. All internal roads are asphalted. Weekly monitoring of stack emissions to check the efficiency of pollution control equipments. Besides this BILT is monitoring Ambient Air Quality in and around plant site at 4 locations.

11.0 Water Pollution & Control Measures

Wastewater in BILT plant is generated from Paper Machine, Off Machine Coater, Utilities area. Besides plant, there is domestic wastewater generation from colony. The details of the water requirements, effluent generation and loss of water after the expansion is as under:

Sr. No.	Category	Fresh Water Consumption M ³ /day	Effluent Generation M ³ /day	Loss of Water M ³ /day
1	Paper machine/ process	18170	17000	1170
2	Boiler/Cooling (CFBC)	3500	600	2900
3	DM Plant	1471	1471	0
4	Mill Potable water and sanitation	30	28	2
5	Fire services	10	-	10
6	Other area uses	10	-	10
7	Colony	380	361	19
	Total	23571	19460	4111

At present BILT unit is generating effluent of about 8136M³/day including domestic waste and after expansion additional 11324 M³/day. Therefore, total effluent generation will be 19460. After the expansion. 1/3rd of the treated effluent will be reused and 2/3rd will be discharged after treatment. This is being treated in the Effluent Treatment Plant (ETP) of capacity 22,000 M³/day. The treatment system followed is the extended aeration system and the Environment Department of BILT having qualified staff does the maintenance of the ETP.

The ETP flow diagram is given as **Figure-4**.

The treated wastewater quality is as per the norms specified by MPCB. The treated effluent quality is given below.

Sr. No.	Parameters	Unit	MPCB Limits	Treated wastewater quality
1	pH	-	7.0 – 8.5	7.93-7.98
2	Total Suspended Solids	mg/l	10	2.73-3.04
3	BOD (3 Days at 27 ⁰ C)	mg/l	10	2.88-3.12
4	COD	mg/l	120	44-52
5	Oil & Grease	mg/l	10	Nil
6	TDS	mg/l	700	420-549
7	Sulphide	mg/l	2	Nil

Part of the treated effluent is used into the operations (sprinkling over the coal and flyash for dust suppression, floor cleaning, equipments cleaning, plantations, etc) to the extent possible. Excess of the treated water (i.e. 35%) is discharged through 12 km underground pipeline to Nira river basin near Bori village at the downstream. Most of the wastewater in the pipeline is tapped by the local farmers (as the area is water scarcity zone). BILT is monitoring the soil quality in the greenbelt areas at 4 locations in the plant where the treated wastewater is utilized for irrigation and it is found that the soil quality of the area is not affected. Also a separate research was undertaken by the Science and Technology Park, University of Pune, to investigate impact of treated effluents on the soil and ground water quality. It was found that i. Treated effluent is found suitable for irrigation, ii. There is no adverse effect of application of effluents for irrigating the soils in the area in terms of accumulation of salts and iii. All the waters from BILT area depict SAR values less than 10 indicating excellent quality for irrigation. iv. Residual Sodium Carbonate (RSC) calculated for the waters surrounding the BILT area depict lot of variation, reflecting variation in water quality characteristics. The canal water and the treated effluent water belong to safe category of water. However, the salinity of groundwater in the region is comparatively high. This is mainly because farmers largely depend upon only treated water for irrigation and they avoid using ground water due to extra cost of pumping. It is therefore suggested that the groundwater should be used/pumped periodically, which will allow flushing of salts and control development of any salinity in the groundwater.

Daily treated wastewater quality monitoring is done to check the efficiency of the treatment process.

The existing ETP will be adequate for treatment of the wastewater generated even after expansion. The quality of treated effluents would be in the same range as similar treatment is proposed.

Water Conservation Measures

Treated effluent is being used substantially i.e. around 5000 M³/day for greenbelt development in the plant and colony premises. Treated wastewater is also utilized for dust suppression in coal yard and ash handling unit. In the proposed expansion, due to better technology paper machines the water consumption per ton of paper will be reduced to about 16–17 M³ only, as against the present water consumption of 23-25 M³. Due to this the water requirement for the proposed expansion will be within the existing sanctioned capacity of 25000 M³/day.

12.0 Noise Pollution & Control Measures

Noise generating sources in the plant are Turbo generator, paper machines, compressors, boiler etc. The source noise levels are in the range of 79.2 – 96 dB (A).

Sr. No.	Location	Noise Levels dB (A)
1	Boiler House	79.2
2	Turbine Generator (Outside Acoustic Hood)	81.0
3	Compressor House	88.6
4	Turb-air room	96.0 and <85*
5	Paper Machine	87.5

*Reduced after installation of acoustic hood recently (March 07).

Noise dispersion prediction has been done using a mathematical model and it revealed that the predicted noise levels would be in the range of 39.6 – 46.0 dB (A) along the plant boundary.

Workers in high noise areas are provided with Ear muff & ear Plugs. Greenbelt (72 ha) provided in the plant and colony helps to attenuate noise considerably. Acoustic Hood Silencer is installed for Turbo-air vacuum system to reduce noise. Sound barriers, enclosures with suitable absorption material in the high noise generating areas are installed. Fortnightly ambient noise monitoring at 8 locations and bi-monthly monitoring of work zone noise levels is done to check the noise levels.

13.0 Solid Waste Generation & Disposal

The solid wastes generated are fly ash and fibrous sludge from ETP. The details of solid waste generation and quantities, disposal methods are given below:

Sr. No.	Source	Before Expansion (TPD)	After Expansion (TPD)	Disposal

Sr. No.	Source	Before Expansion (TPD)	After Expansion (TPD)	Disposal
1	Fly ash/ Boiler ash	165	500	Given to outside parties for cement, sheets and bricks manufacturing. Also BILT is planning to set-up fly ash bricks manufacturing plant wherein Fly-ash will be converted into building material.
2	ETP Sludge	15	50	Used in Vermi-composting or burnt in boiler and board manufacturing

There is no dumping of fly ash. The ash is directly loaded into the vendor truck. Separate storage arrangements are made for ETP Sludge. There is no impact on land environment due to solid waste generation and disposal.

14.0 Hazardous Waste Generation and disposal

The hazardous wastes generated in paper mill include waste Oil, Oily cotton waste, Oily filters, empty drums and filter wash. All the waste is stored in the specially earmarked hazardous waste yard before disposal. The details related to hazardous waste generation and disposal are given below:

Sr. No.	Type of Waste	Hazardous Waste Category)*	Before Expansion (annual basis)	After Expansion (annual basis)	Disposal
1	Used Oil /Waste Oil	5.1	18 MT	42 MT	Sale to authorized party or incinerate in CFBC boiler
2	Waste residue containing Oil	5.2	Filter: 360 nos. Bearings: 720 nos. Mud, cotton and saw dust: 6.205 MT	Filter: 828 nos. Bearings: 1656 nos. Mud, cotton and saw dust: 14.27 MT	Metallic item after cleaning sold and remaining shall be incinerated in CFBC boiler

Sr. No.	Type of Waste	Hazardous Waste Category)*	Before Expansion (annual basis)	After Expansion (annual basis)	Disposal
3	Use of paint pigment, lacquers, varnishes, paints and inks	21.2	Paints can: 36 nos. Ink can and tubes: 14 nos. Waste paper containing dried ink: 50 kg Waste Plastic: 72 MT	Paints can: 83 nos. Ink can and tubes: 32 nos. Waste paper containing dried ink: 1150 kg Waste Plastic: 166 MT	Metallic and plastic items sold to scrap contractor after cleaning and remaining shall be incinerated in CFBC boiler
4	Waste residue containing pesticides	29.1	1860 nos.	4278 nos.	Return to original party
5	Discarded containers. Liners used for hazardous waste/chemicals	33.3	12960 nos.	29808 nos.	Reuse by original party/cleaned and sold to scrap contractors.

*As per Schedule-I of Hazardous Waste Rules, 2003

15.0 Greenbelt Development

BILT has developed about 72 hectares of greenbelt within the premises of plant and colony. Wide varieties of fruit bearing, local and ornamental plants have been planted. About 1,63,000 saplings of 45 varieties have been developed with the survival rate of 94%. A 15 km pipeline grid is provided with outlets at regular intervals for watering the plants. ETP Treated water is used for irrigating the plantation. It is proposed to increase greenbelt with an additional 43 ha. to a total of 115 ha in next 5 years (33% of the total area).

The map showing existing and proposed greenbelt area is given as **Figure-5**.

16.0 Community Development Measures

BILT has Corporate Social Responsibility Cell to look after the community development measures. BILT Bhigwan unit is implementing 'Community Development Initiative called 'Uday' with the help of NGO (BAIF). Macro planning with community participation is done in the areas of Animal Husbandry, Literacy awareness programmes and Health & sanitation. BILT has provided Computer literacy mobile van with the help of local educational institute. Every year about Rs 15 lakhs are spent on community development programmes.

17.0 Environment Management

The company is certified with ISO: 14001 for environment management & OSHAS: 18001 for safety and health. Environment Monitoring is done for following attributes as per MPCB/MoEF guidelines.

Sr. no.	Environmental attributes monitored
1	Ambient air quality – 4 locations- twice a week
2	Meteorology – continuous at plant site
3	Weekly Stack emissions monitoring
4	Fortnightly Ambient noise levels – 8 locations
5	Bi-monthly work zone noise levels- 20 locations
6	Waste water quality – Twice a day
7	Surface and ground water quality – Monthly
8	Monitoring of Solid/Hazardous waste generation
9	Monitoring Greenbelt development

Full-fledged environmental analysis lab exists at the plant site with qualified staff. Submission of Environment Statement is done every year to MPCB and submission of Environmental Statement to MoEF is done every six months. Present monitoring programme will continue even after expansion of the plant.

17.1 Environment Management Cell

Environmental department is headed by a General Manager (Eng.) and supported by Deputy General Manager and Manager-Environment with two Executives (Env.) and operators. It is a nodal agency to coordinate and provide necessary services on environmental issues and also responsible for interaction with the environmental regulatory bodies (MPCB/MoEF) on various environmental issues. The cell is also responsible for analysis of environmental parameters and maintaining records and makes timely submission of environmental statements to MPCB/MoEF.

17.2 Expenditure on Environment Management

The present capital expenditure on the environmental pollution control is Rs. 23.04 Cr and the recurring cost Rs. 19.17 lakhs/month. The proposed capital cost for pollution control will be Rs. 15 Cr and the recurring cost envisaged is Rs. 34.05 lakhs/ month.

18.0 **Disaster Management**

The major risk areas in the plant are:

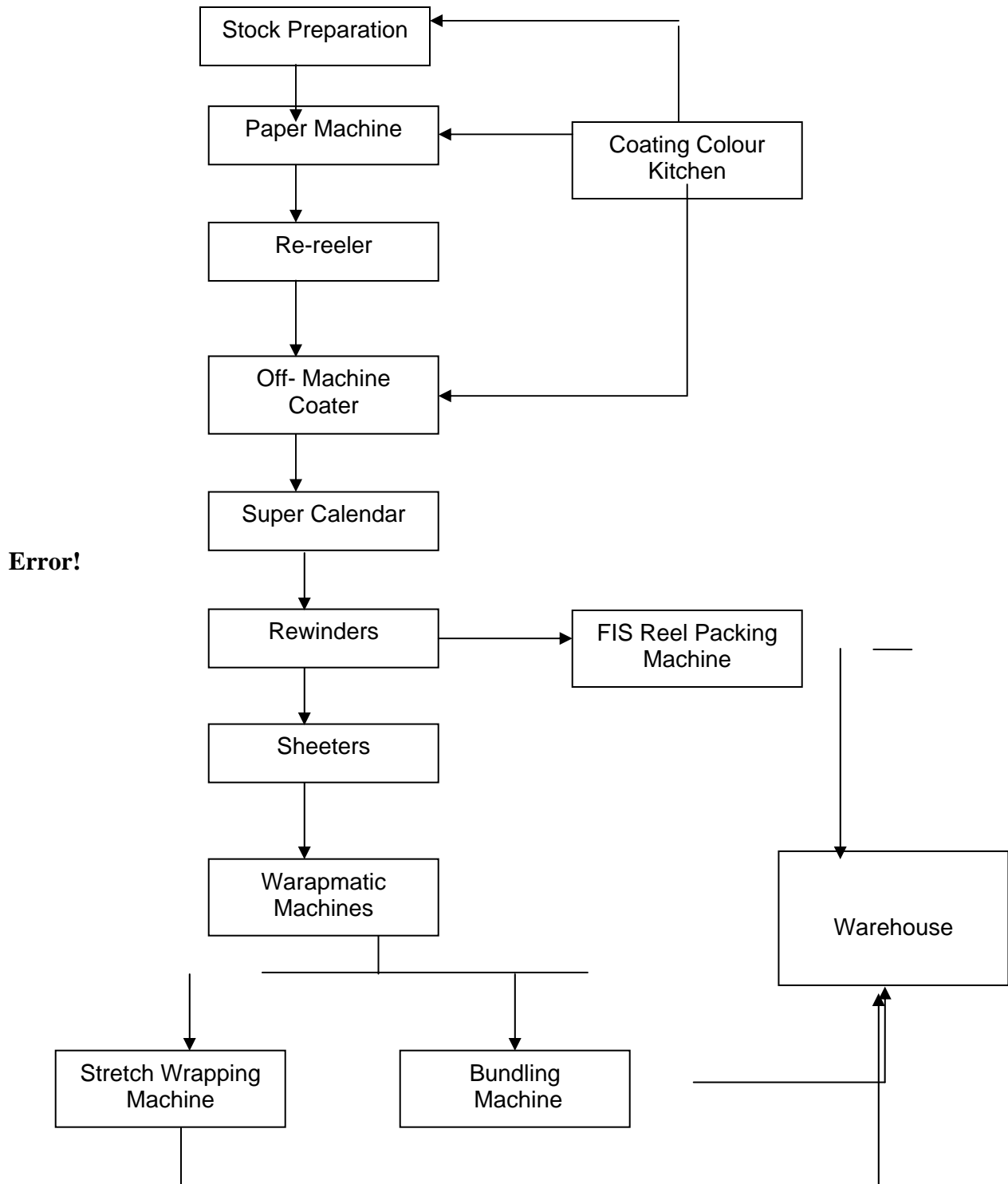
- Chlorine Storage shed and pipeline
- Pulp storage area
- Paper machine area
- Ware House
- Chemical preparation Section
- Oil storage tanks
- Boilers
- Coal Storage yard

Plant is fully covered by fire hydrant system. Fire extinguishers and fire alarms are located at strategic locations all over the plant. Automatic water sprinkling system in warehouse and paper machine area is installed. Onsite Emergency Preparedness Plan (EPP) is prepared and is upgraded from time to time. Safety officer to look after safety issues in the plant heads a safety department. Periodic Mock drills for implementation of EPP is practiced here. In, 2005 it has acquired ISO 18001 OSHAS Certification for Occupational Health and Safety Management.

Figure 1: The layout of the plant

Figure 2: Flow Diagram of Paper Manufacturing Process

A. Existing Manufacturing Process



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B. Proposed Manufacturing Process

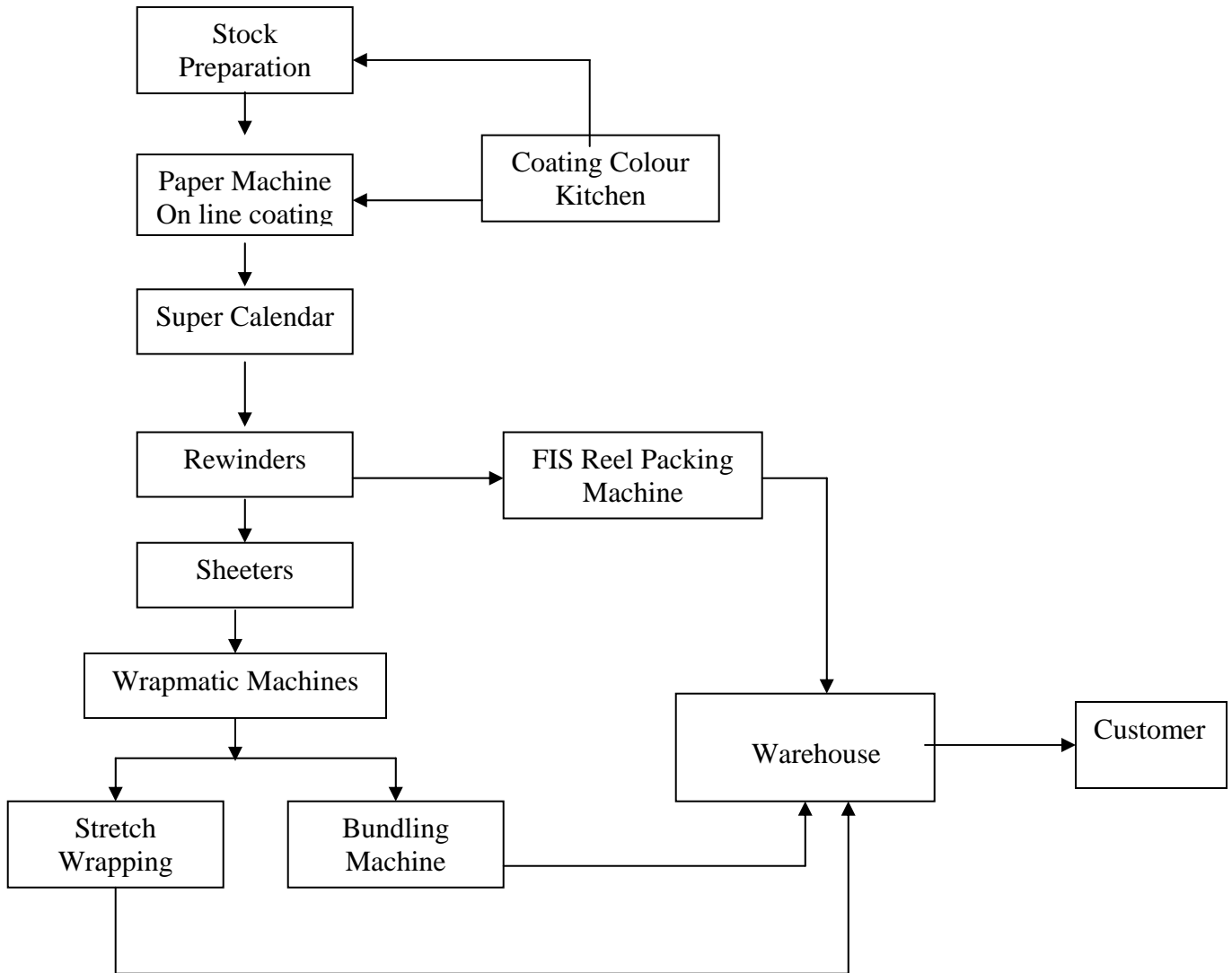


Figure 3: Study Area Map of 10 Km radius

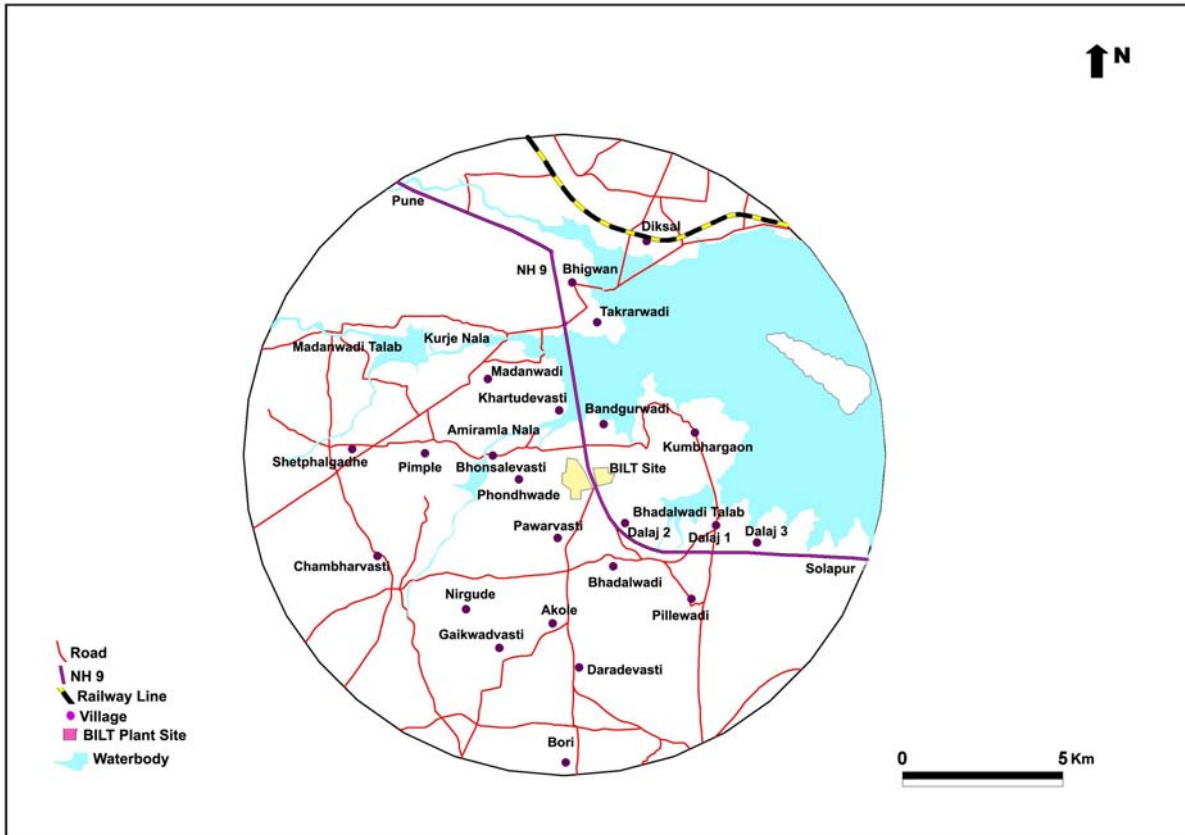


Figure 4: Flow Diagram of Effluent Treatment Plant

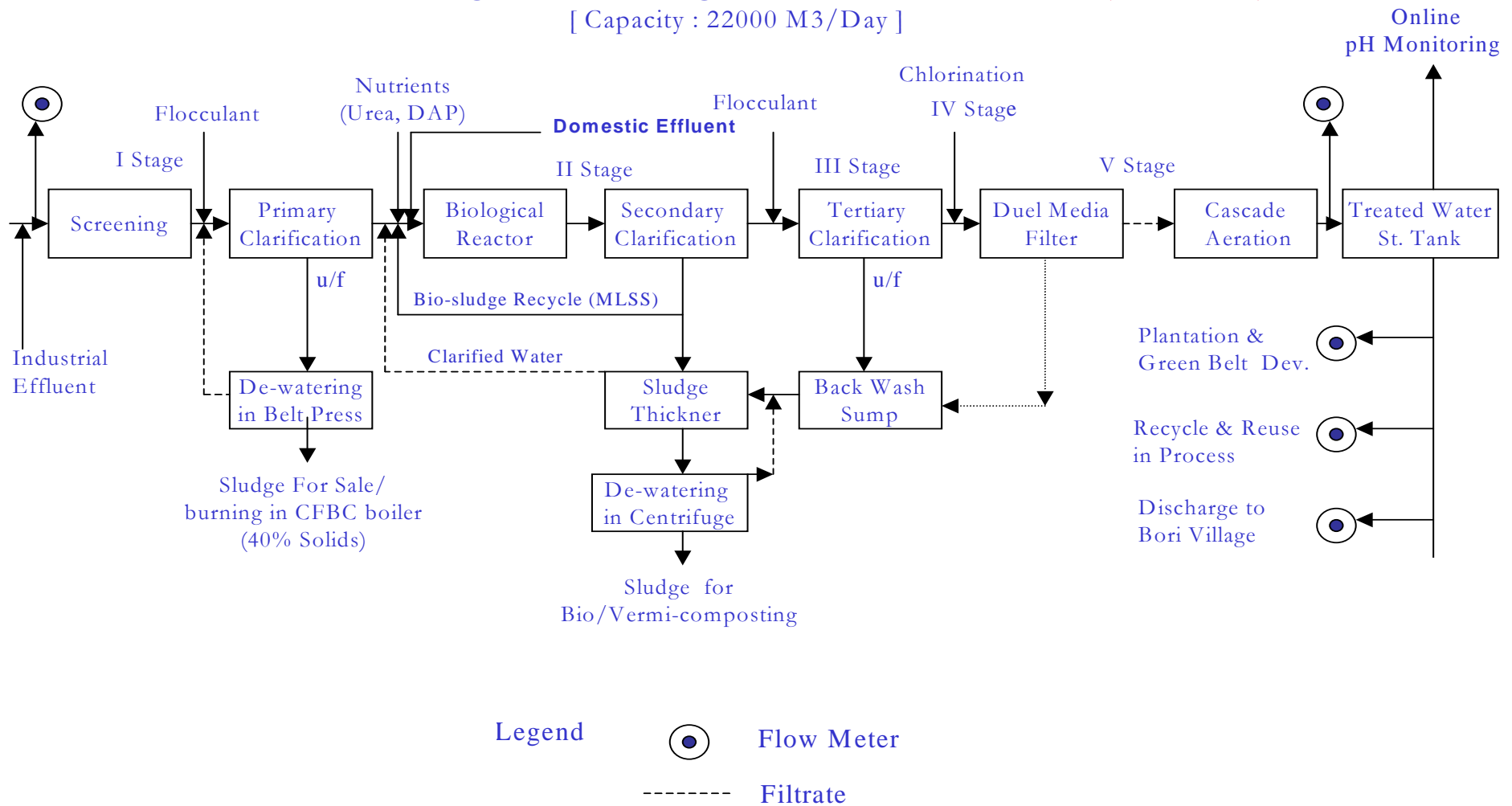


Figure 5: Existing and proposed greenbelt development

