# PROJECT DESCRIPTION FOR SCOPING

# **Proposed Paper Mill Plant Expansion Project**

Barangay Gugo, Samal, Bataan



ENVIRONMENTAL MANAGEMENT BUREAU Department of Environment and Natural Resources

DENR Compound, Visayas Avenue, Diliman, Quezon City, Metro Manila, Philippines



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#### Bataan 2020, Inc.

# 1.0 BASIC PROJECT INFORMATION

#### 1.1 **Project Information**

Project Name Proposed Paper Mill Plant Expansion Project		
Project Location Barangay Gugo, Samal, Bataan		
Project Type Pulp and Paper Industries		
Project Capacity	Existing Plant Capacity: 50,652 MT per annum Total Plant Expansion Capacity: 190,652 MT per annum	
Project Area	Existing Paper Mill Plant: 10 hectares Proposed Paper Mill Plant Expansion: 5.8 hectares	
Project Cost PhP 800,000,000.00		
Issued ECC ECC Ref No. R03-0910-0115 issued on October 16, 2009		

# 1.2 Proponent Profile

Project Proponent	Bataan 2020, Inc.	
Proponent Address	Barangay Gugo, Samal, Bataan	
Authorized Signatory/ Representative	Mr. Emmanuel Y. Gaspar Executive Committee Mr. Ismael Tolentino	
	Mechanical Maintenance Department Team Leader/ ManCom	
Contact Details	Mobile No.: (+63) 917 873 6305 / 0917 873 6296 Email: eyg@bataan2020.net <u>mel.tolentino@bataan2020.net</u>	

#### 2.0 PROJECT DESCRIPTION

Bataan 2020, Inc. (**Bataan 2020**) is a pioneer in the local paper making industry and a leading manufacturer of fine quality paper, paperboard and tissue in the Philippines. Established in 2000, Bataan 2020 took over the Bataan paper mill plant complex formerly operated by Bataan Pulp and Paper Mills Inc. (**BPPMI**), which was established in the year 1956. Currently, the company has four paper machines located in two (2) different existing sites, two (2) in the Municipality of Samal in Bataan and one (1) in Barangay Baesa in Quezon City with a total combined capacity of about 110,000 metric tons (**MT**) per annum.

Bataan 2020's proposed Paper Mill Plant Expansion Project, hereafter the "**Project**", intends to expand and increase the total annual capacity of its existing Paper Mill Plant in Samal, Bataan from a total annual capacity of 50,652 MT to 190,652 MT (approximately an increase of 400 MT/day from 144 MT/day, or 544 MT/day total capacity). The existing Paper Mill Plant was issued an Environmental Compliance Certificate (**ECC**) in 2009 by the Environmental Management Bureau of the Department of Environment and Natural Resources (**EMB-DENR**) with ECC Reference Code No. R03-0910-0115.

Currently, the paper mill plant in Samal, Bataan manufactures a wide range of products such as printing and writing paper, industrial packaging, and newsprints. With the total annual demand of paper growing at 2.5% per year in the Philippines, the Project intends to increase its capacity to help meet this demand in the local market.

The Project will help the Philippines fulfill its goals of promoting sustainable development in terms of economic, environmental, and social benefits by producing quality products from recycled goods. The following summarizes the project's sustainable benefits:





- Respond to the increasing paper demand in the Philippine market.
- Open opportunities for paper recycling and use of clean and efficient technologies to improve local environment;
- Generate employment and other economic opportunities and benefits to the local community during the project construction and operation period;
- Develop community and promote local participation through programs such as tree planting, relief assistance and medical mission, livelihood trainings, etc.

#### 2.1 Project Location and Area

The proposed Paper Mill Plant Expansion Project of Bataan 2020 will cover the 5.8 hectares lot adjacent to the existing paper mill plant (**Attachment 1**). The proposed project site is located in Barangay Gugo, Municipality of Samal, Province of Bataan. It is accessible from Manila by land route via North Luzon Expressway (**NLEX**) or Subic-Clark-Tarlac Expressway (**SCTEX**) then Roman Superhighway, about eight (8) kilometers from the municipal hall of Samal. Bataan 2020's Paper Mill Plant is within the Industrial Center of Samal and is considered as the "Industrial Center Node" of the Municipality as stipulated in its Comprehensive Land Use Plan (**CLUP**).

**Figure 2.1** shows the location of Samal, the host municipality. It is located at the eastern side of Bataan Province, bounded on the north by the municipality of Orani, on the south by the municipality of Abucay, on the west by Mount Natib and on the east by Manila Bay. It is approximately 114 kilometers away from Manila (**Figure 2.2**).



Figure 2.1 Location Map of the Proposed Paper Mill Expansion Project





Proposed Paper Mill Plant Expansion Project Brgy. Gugo, Samal, Bataan



Figure 2.2 Vicinity Map of the Proposed Paper Mill Expansion Project

# 2.1.1 Impact Areas

The direct impact area (**DIA**) of the proposed Project includes the 5.8 ha site for the proposed plant expansion and the related facilities within the existing Bataan 2020 Plant Complex. In terms of socioeconomic benefits, the DIA includes Barangay Gugo (host barangay), the municipality of Samal, the province of Bataan, and the entire Region 3, which will be the primary project beneficiaries for employment, business opportunities and taxes.

The indirect impact area (**IIA**) includes the receiving body of water and nearby rice paddies which are recipient of the treated effluent discharges and landfall sites of the ground level concentrations (GLCs) of plant emissions from the proposed Project, which are expected to be below the CAA limits. In terms of socioeconomic benefits, the IIA will cover the entire country by increasing the supply of packaging papers in the local market, lowering the demand for imported paper, and ultimately contributing further to its economic stability. The DIA and IIA of the proposed Paper Mill Plant Expansion Project of Bataan 2020 are presented in **Table 2.1** and **Figure 2.3** 

Table 2.1 Impact Areas of the Proposed Paper Mill Plant Expansion Project

Description	Impact Areas
Direct Impact Area (DIA)	<ul> <li>Proposed project expansion area (5.8 hectares)</li> <li>Existing related facilities</li> <li>Access roads to the project site</li> </ul>
	In terms of socioeconomic benefits: <ul> <li>Barangay Gugo</li> <li>Municipality of Samal</li> <li>Province of Bataan</li> <li>Region 3</li> </ul>
Indirect Impact Area (IIA)	<ul> <li>Nearby rice paddies/ farm land</li> <li>Receiving body of water</li> <li>Landfall sites for GLCs from plant emissions which are below CAA limits</li> <li>In terms of socioeconomic benefits:</li> <li>The entire country</li> </ul>







Figure 2.3 Impact Areas of the Proposed Paper Mill Plant Expansion Project





#### 2.2 Project Rationale

#### 2.2.1 Increasing Paper Demand

The paper industry contributes about 30 billion pesos per year in domestic sales value to the economy or saves the Philippines 700 million dollars per year in foreign exchange from imported paper and board. Current socio-economic conditions in the country are profitable for businesses in the paper industry. While paper and paperboard consumption in the Philippines is still low at 19 kg per capita, total annual demand is growing at 2.5% per year, with packaging and tissue grades experiencing high growth rates. Moreover, total paper and board demand in the Philippines is projected to surpass 2 million tons within five years, or an additional of 0.3 million tons per year at current consumption levels.<sup>1</sup>

To respond to the increasing demand on paper products, Bataan 2020 shall increase the capacity of its Paper Mill Plant in Samal, Bataan. The proposed project aims to increase the production capacity of the plant by 140,000 MT per year of high quality paper products that will meet the needs of the Philippine market.

#### 2.2.2 Opening Opportunities for Paper Recycling

Wastepaper contributes to nineteen percent (19%) of the total municipal solid waste in the Philippines. Metro Manila and other urbanized areas in the Philippines show the highest density in paper consumption. The continuous increase in wastepaper generation would potentially provide enough raw materials for paper millers. There is, thus, a great potential for recycling of wastepaper.<sup>3</sup>

Recycling of wastepaper, however, in the country is still very minimal. Of the estimated 6,700 tons of wastes generated per day in Metro Manila, approximately 720 tons per day are either recycled or composted. For waste paper alone, only 60% of the 100 tons produced in a year is being recycled and the rest goes to the landfill.<sup>2</sup>

The proposed project aims to help in the solid waste management of the country by opening more volume and opportunities for paper recycling.

#### 2.2.3 Socioeconomic Benefits

#### 2.2.3.1 Increase in Internal Revenue Allocation

The taxes collected from the proposed Paper Mill Plant Expansion Project, which include property tax, remittance, and corporate income tax, means additional income for Barangay Gugo, Municipality of Samal and Bataan Province through the increased Internal Revenue Allocation (**IRA**). There are also additional incomes through fees of various permits and clearances that the Bataan 2020, Inc. is required to secure. Bataan 2020, Inc. will also purchase construction supplies and materials from local suppliers.

#### 2.2.3.2 Employment Opportunity

The project will generate additional jobs and other economic benefits as it will require manpower during pre-construction, construction and operation phases. Rice hull suppliers and transporters from Samal, Bataan 2020, Inc. will prioritize hiring of qualified residents of Barangay Gugo in Samal, Bataan during project implementation.

#### 2.2.3.3 Community Development through Corporate Social Responsibility

The Municipality of Samal has already been a beneficiary of Bataan 2020, Inc. corporate social responsibility program that includes programs on health, environment, and education. With the

<sup>&</sup>lt;sup>2</sup> <u>http://www.wadef.com/projects/isteac;</u> accessed March 26, 2018





<sup>&</sup>lt;sup>1</sup> <u>http://industry.gov.ph/industry/paper/;</u> accessed March 2, 2018

proposed Paper Mill Plant Expansion Project, Bataan 2020, Inc. will also expand its community development programs and activities to the community.

#### 2.3 **Project Components**

The proposed expansion project will share and maximize the use of some of the existing and future facilities within the Bataan 2020 Plant complex. Comparison of the components of the existing paper mill and the proposed expansion project are presented in **Table 2.2** while Site Development Plan is shown in **Figure 2.4**. Brief discussion of the components follows.

#### Table 2.2 Comparison of Features of Existing and Proposed Paper Mill Plant Expansion Project

Feature	Existing Paper Mill Plant	Proposed Paper Mill Plant Expansion	Combined Features		
Major Components					
Raw Material Yard	Include: Material yard 56,000 m <sup>2</sup> , transportation way and rainwater drainage system.	Share with existing	Include: Material yard 56,000 m <sup>2</sup> , transportation way and rainwater drainage system.		
Pulping	Capacity: 50,652 tpy	Capacity: 140,000 tpy	Capacity: 190,652 tpy		
	Include: Recycled Old Corrugated Cardboards (OCCs) conveyor from raw material vard	Include: Recycled Old Corrugated Cardboards (OCCs) conveyor from raw material vard	Include: Recycled Old Corrugated Cardboards (OCCs) conveyor from raw material vard		
Screening	Capacity: 144 tons/day	Capacity: 500 tons/day	Capacity: 644 tons/day		
Cleaning	Capacity: 144 tons/day	Capacity: 500 tons/day	Capacity: 644 tons/day		
Thickener	Capacity: 144 tons/day	Capacity: 450 tons/day	Capacity: 594 tons/day		
Refining	Capacity: 144 tons/day	Capacity: 450 tons/day	Capacity: 594 tons/day		
Storing (Storage Tank)	Capacity: 144 tons/day	Capacity: 500 tons/day	Capacity: 644 tons/day		
Paper Machine	Paper machines 1 & 2 (2 units)	Paper machine 3 (1 unit)	3 units		
Rewinding	Rewinder No.1 (1 unit)	Rewinder No.2 (1 unit)	2 units		
Support Facilities		L			
Feedwater System					
Water Requirement	6,000 m <sup>3</sup> /day	2,000 m <sup>3</sup> /day (Option to recycle from Existing Paper Mill Plant)	8,000 m <sup>3</sup> /day (6,000 m <sup>3</sup> /day if recycle option is implemented)		
Water Source	Existing five (5) unit deep wells	Existing five (5) unit deep wells	Existing five (5) unit deep wells		
Power Supply System	1	1			
Power Requirement	12.5 MW	10 MW	22.5 MW		
Source	Cogen 1 Power Plant	Cogen 2 Power Plant	Cogen 1 & 2 Power Plants		
Back-up Generator	One (1) unit	One (1) unit	Two (2) units		
Generator rated power	12.5 MW	18 MW	30.5 MW		
Generator Efficiency	80%	80%	80%		
Drainage System					
Storm Water Drainage System	Concrete discharge canal est. 120m long (min), 1.5m wide, 1.5m deep towards the Samal Creek	Concrete discharge canal est. 100m long (min) (Option to collect	Concrete discharge canal est. 220m long (min), 1.5m wide, 1.5m deep towards the Samal Creek (Option to collect		





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		rainwater for reuse)	rainwater for reuse)		
Sanitary Drainage	Concrete discharge	Concrete discharge	Concrete discharge canal		
System	canal est. 20m long	canal est. 5m long (min),	est. 25m long (min), 0.2		
, , , , , , , , , , , , , , , , , , ,	(min), 0.2 wide, 1m	0.2 wide, 1m deep	wide, 1m deep.		
	deep				
Emergency Systems	• •		•		
Eye Wash Stations	4 stations	4 stations	8 stations		
Fire Protection System	Sprinkler system,	Sprinkler system, indoor	Sprinkler system, indoor		
,	indoor and outdoor fire	and outdoor fire	and outdoor fire hydrants		
	hydrants and hose	hydrants and hose	and hose boxes, portable		
	boxes, portable and	boxes, portable and	and mobile extinguishers,		
	mobile extinguishers,	mobile extinguishers,	fire detection and alarm		
	fire detection and alarm	fire detection and alarm	system		
	system	system			
General Infrastructure					
Central Control Room	Single storey concrete	Shared	Single storey concrete		
	building		building		
Warehouse and	One (1) unit; 300 sq. m	Shared	One (1) unit; 300 sq.m		
Maintenance Building					
Parking Areas	One (1) unit; 500 sq.m	1 unit; 300 sq.m	2 units; 800 sq.m		
Alleys and pathways	One (1) unit; 600sq. m	1 unit; 600 sq. m	2 units; 1,200 sq.m		
Major and minor roads	1,200sq.m	1,200 sq.m	2,400 sq.m		
Motor Pool Building	One (1) unit; 600 sq.m	Shared	1 unit; 600 sq.m		
Guard House	Two (2) units; 5 sq.m	Shared	2 units; 5 sq.m		
Pollution Control Devic	es				
Air Pollution Control In	stallations				
Stack Height	68 meters	68 meters	68 meters each		
Bag Filters/Dust	Capacity:	Capacity:	Capacity:		
Collectors	26,700m <sup>3</sup> /hr	30,000m <sup>3</sup> /hr	56,700 m <sup>3</sup> /hr		
Electrostatic	One (1) unit; Est.	One (1) unit; Est.	One (1) unit; Est. 339,000		
Precipitator	159,000 m <sup>3</sup> /hr; 96%	180,000 m <sup>3</sup> /hr, 96%	m <sup>3</sup> /hr; 96% Efficiency		
	Efficiency Rate	Efficiency Rate	Rate		
Wastewater Treatment	Facility				
Operational Waste	Capacity: 200m <sup>3</sup>	Shared	Capacity: 200m <sup>3</sup>		
Domestic Wastes and	Capacity: Stand-alone	Capacity: Stand-alone	Capacity: Stand-alone		
washings	septic tanks 10m <sup>3</sup>	septic tanks 10m <sup>3</sup>	septic tanks 20m <sup>3</sup>		
Solid Waste Management					
Paper Mill Sludge	Area: 4 hectares	Shared	Area: 4 hectares		
Waste Disposal					
System					
Garbage Bins	8 units	8 units	16 units		
Manpower and Cost					
Manpower requirement		Construction: 150	Construction: 150		
		workers	workers		
	Operation- 313 workers	Operation - 62 workers	Operation - 375 workers		
Investment Cost	PhP 1.200.000.000.00	PhP 800,000,000.00	PhP 2.000.000.000.00		





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# Figure 2.4 Site Development Plan for the Proposed Paper Mill Plant Expansion Project

# 2.3.1 Main Components of the Expansion Plant

#### 2.3.1.1 Pulper

Pulping of old corrugated cardboards (OCC) and other recyclable papers are carried out in pulper. A sample pulper specification is shown below:

Pulper Specifications		
Capacity	450 – 550 tpd	
Input Voltage	380V/ 50 Hz	
Service	OEM	
Automatic Grade Automatic		

The pulper is made up of a cylinder shaped recipient, which has a propeller in the bottom part, which shakes up the sheets of pulp that are placed in it. By means of the continuous rubbing of the pulp against the propeller, the fibers which form the bundle of pulp are separated, leaving a suspension in the water with a consistency as per requirement.

#### 2.3.1.2 Screen and Cleaner

Pulp from the washed pulp storage tower is pumped to one (1) primary screen. These screens use a finned rotor or foiled drum to impart centrifugal force on the stock to force it through the screen and help separate the fibers by size and weight. This will be sent to the cleaner to separate rejects from desirable pulp ("accepts"). Pulp from the cleaner is pumped to second screen to further separate the fibers by size and weight.

Screen Specifications			
Feature	Second Screening		
Туре	Hole screen	Slot screen	
Capacity	500 tpd	500 tpd	
Hole size	2.4 – 2.6 mm	0.25 mm	
Pressure	1.2 – 4 bar	1.2 - 4 bar	
Rotor Speed	435 rpm	207 rpm	





Cleaner Specifications			
Type Automatic reject discharge			
Capacity	500 tpd		
Slot size	0.2 mm		
Pressure	0-3.5 bar		

#### 2.3.1.3 Thickener

The drum of the thickener is installed eccentric to the vat radius, with more clearance on the feed side than on the discharge side. The drum rotates in the direction of the incoming feed, carrying the pulp underneath the drum to a compaction zone on the other side where dewatering occurs. Filtrate passes through the perforated deck and is discharged through the open end of the drum and an outlet connection on the vat head. The liquid level inside the drum is lower than the level in the vat outside the drum, creating a static pressure differential that drives filtration. Pulp discharge consistency can be regulated by removing or adding stainless steel weirs to the overflow wall between the filter vat and the pulp discharge box. By regulating the same, pulp is thickened for easy storage in chest.

(Low Density) Thickener 1 Specifications		(High Density) Thickener 2 Specifications	
Туре	Gravity	Туре	Twin wire press
Main drive power	11 kW	Power requirements	35 kW
Disk diameter	5200 mm	Operating speed	12 to 20 meters per min
Filter area	213.5 m <sup>2</sup>	Operating width	3,500 mm
Capacity	230 TPD	Capacity	220 TPD

#### 2.3.1.4 Refiner

The refiner is a conical machine which consists of a series of revolving discs.

The refiner is controlled by adjusting the gap between rotor and stator fillings. The signal for automatic or manual control may come from the main motor load, the amount of the refining energy, the temperature rise of the stock, the drainage characteristics of the stock, the vacuum from a flat box or couch roll, or from the air permeability of the paper web. Manual power control, either by turning gap control device by hand or by pushing a button that activates a gap control device, is the simplest way to adjust the refiner load. The advantage of this simple method is that flow or consistency variations automatically change the refiner load to the correct direction, although not accurately in proportion. If the gap clearance is kept constant, decreased flow or consistency decreases the thickness of fibre flocs between bars thus also decreasing the refiner load.

Refiner Specifications			
Туре	Double disc refiner		
Capacity	450 tpd		
Disc diameter	965 mm		
Rotation speed	514 rpm		
Motor rating	1000 kW		
Power consumption	25 hp		

#### 2.3.1.5 Storage Tank

The thickened pulp is stored in a screened unbleached pulp storage tank through a conveyor. Pulp is stored in large storage towers up to 30 m high with capacities up to 500 tpd. These towers are for large throughput and agitators to ensure a homogeneous stock.

#### 2.3.1.6 Paper Machine

Paper machine includes main equipment such as: three head boxes, forming section including three fourdrinier wires and top former wire, press part including long nip and shoe press unit,





primary-dryer part, size press with film metering press machine, secondary drying part and a primary calender.

#### 2.3.1.7 Rewinder

Jumbo rolls are rewinded and cut into roll with suitable diameters and sizes accorded to customer requirements by rewinder. Roll is packaged and supplied to customer.

Rewinder Specifications			
Capacity	> 300 tpd		
Speed	> 200 meters/min		
Output Paper Width	> 2000 mm		
Automation Grade	Semi-Automatic, Automatic		

#### 2.3.2 Support Facilities

#### 2.3.2.1 Feed Water System

The existing feed water system will be utilized to supply the water requirements for both the existing paper mill plant and the proposed expansion project. The water will be sourced from the five (5) deep wells of Bataan 2020 at an extraction rate of 750 gallons per minute. No additional deep wells will be constructed for the expansion.

The existing Paper Mill Plant requires about 6,000 m<sup>3</sup> of water daily while the proposed expansion will require an additional 2,000 m<sup>3</sup>. The wastewater discharged from the existing plant will be treated in the Wastewater Treatment Facility and will then be reused in the expansion plant.

#### 2.3.2.2 Power Requirement

The expansion project will make use of the Cogen 2 (1 x 25 MW Multi-Feed Stock Power Plant) for its power requirement of 10 MW. Bataan 2020 presently utilizes the Atmospheric Fluidized Bed Combustion (AFBC) technology using rice hull to generate steam and electric power while maintaining low emissions.

#### 2.3.3 Pollution Control Devices and Waste Management System

# 2.3.3.1 Air Pollution Control Installations

#### 2.3.3.2 Electrostatic Precipitator

The electrostatic precipitator shall be installed to remove suspended particulate matter from the flue gas coming out of the proposed paper mill plant so that the effluent particulate loading does not exceed specified limits. The electrostatic precipitator will consist of 3 chambers (one casing per unit) suitable for 100% duty gas flow at Boiler Maximum Continuous Rating. It will be a cold side flue gas electrostatic precipitator and will be located between the air preheater outlet and the ID fan inlet.

#### 2.3.3.3 Exhaust Stack

The project will have a separate stack with a stack height of 60 meters. This will provide proper dispersion of the plant's emission to the atmosphere.

#### 2.3.3.4 Water Pollution Control Devices

#### 2.3.3.5 Wastewater Treatment Facility

The wastewater treatment facility of the existing paper mill plant with a capacity of 5,000 m<sup>3</sup> will be shared with the proposed paper mill expansion plant (**Figure 2.5**).





The treated wastewater will be reused by the paper mill plant in order to consume less amount of raw water and discharge less amount of wastewater. Some of the treated wastewater will also be used for coal dust suppression, for ash conditioning, for road cleaning and for gardening. An effluent pit was provided in the paper mill plant area with effluent transfer pumps.

The system design (Cycle of Concentration, **COC**) was done such that the hardness does not increase to an extent that would cause heavy scaling in the system. However, this figure of COC increases as the total dissolved solids (**TDS**) increases in the inlet raw water.

#### 2.3.3.6 Sewage Treatment Plant

The sewage will be discharged to sewage treatment plant (**STP**), where the effluent shall be reduced from organic matter into stable sediment. The incoming water shall pass through a biological treatment and then to the sedimentation pond to separate the water from the sludge. Sediment sludge will be transferred to sludge holding tank. The STP shall be designed to meet the required effluent quality before discharge.

#### 2.3.3.7 Solid Waste Management

The sludge from the paper mill plant is produced at two steps in the process of treating the effluent. Primary sludge is recovered by the first stage of the processing at the primary clarifier. Primary clarification is usually carried out by sedimentation. In sedimentation, the wastewater to be treated is pumped into large settling tanks, with the solids being removed from the tank bottom. These solids can range from 1.5% to 6.5% depending on the characteristics of the material. The overflow, or clarified water, is passed on to the secondary treatment. Secondary treatment is a biological process in which micro-organisms convert the waste to carbon dioxide and water while consuming oxygen. The resulting solids are then removed through clarification as in the primary treatment. The resulting sludge is then mixed with the primary sludge prior to dewatering and disposal.







Figure 2.5 Wastewater Treatment Facility of Bataan 2020



#### Bataan 2020, Inc.

### 2.4 Project Phases, Key Environmental Aspects, Waste, Issues, Built-in Measures

Environmental Aspect (Project Activity which will likely impact the Environmental Component)	Environmental Component Likely to be Affected	Potential Impact	Prevention/Mitigation/Enhancement Measures
CONSTRUCTION PHA	SE		
	LAND		
Site clearing Site preparation and	Land use and Classification	Change/Inconsistency in Land Use	• The Project site is beside the existing plant complex of Bataan 2020 and within the industrial area which is consistent with the general land use of Samal. Therefore, there is no issue with the change in land use.
earthwork		Encroachment to ECA	The Project site does not encroach an ECA.
Construction of the	Geology/ Geomorphology	Change in surface     landform/terrain/slope	Prepare a proper grading plan including a cut and fill strategy.
proposed Project		Change in sub-surface     underground geomorphology	<ul> <li>The excavations that will be done at the project site shall cause permanent but low level of disturbance.</li> <li>Strict conformance to the recommendations of the geotechnical study</li> </ul>
Site Preparation, and Earthwork	Pedology	Soil erosion	<ul> <li>Construction of soil erosion control measures either by engineering structure or planting of grasses/trees.</li> <li>Placement of excavated soil materials in appropriate stockpile areas with avoidance of stockpiling along drainage ways/creeks.</li> <li>The soil stockpiles will be covered with plastic sheets/geotextile, or planted with grasses/ small shrubs for erosion control.</li> </ul>
	Terrestrial Ecology	Vegetation removal and loss     of habitat	Trees will be cut only when necessary during construction of the proposed Project.
		Threat to existence and/or loss of important local species	• The proposed Project site is beside the existing plant of Bataan 2020 which is within an industrial area where potential ecologically sensitive
		<ul> <li>Threat to abundance, frequency and distribution of important species</li> <li>Hindrance to wildlife access</li> </ul>	habitats may not be present.
	WATER		
Water consumption during construction	Hydrology/ Hydrogeology	Change in drainage morphology/inducement of flooding/reduction in stream	• The water requirement of the proposed Project will be supplied by the existing deep wells of Bataan 2020.



Environmental Aspect (Project Activity which will likely impact the Environmental Component)	Environmental Component Likely to be Affected	Potential Impact	Prevention/Mitigation/Enhancement Measures
		<ul> <li>volumetric flow</li> <li>Change in stream, lake water depth</li> <li>Depletion of water resources/ competition in water use</li> </ul>	<ul> <li>Bataan 2020 shall implement necessary measures to conserve water and reduce water usage.</li> </ul>
Mobilization of construction equipment and materials Generation of domestic waste	Water Quality	<ul> <li>Degradation of surface groundwater quality</li> </ul>	<ul> <li>Provision of containment structures in the storage areas for oil in the motor pool area</li> <li>Return of contaminated cans/containers of hazardous materials such as paints, thinners, wood preservatives and others to the supplier/producer for treatment and safe disposal</li> <li>Provision of portalets, no litter signs, waste can</li> <li>Regular monitoring of surface and groundwater quality</li> </ul>
	AIR		
Mobilization of Construction Equipment and delivery of materials Construction of the proposed project	Meteorology/ climatology Air Quality and Noise	<ul> <li>Change in local climate and local temperature</li> <li>Degradation of Air Quality</li> </ul>	<ul> <li>Bataan 2020 will establish a buffer zone and native species shall be used for vegetation, as these would be expected to have good survival rate.</li> <li>Every main haul road shall be paved with concrete, bituminous materials, hardcores or metal plates; keep the road clear of dusty materials; spray the road with water or a dust suppression chemical so as to maintain the entire road surface wet; and immediately before leaving a construction site, every vehicle shall be washed to remove any dusty materials from its body and wheels;</li> <li>Where a vehicle leaving a construction site is carrying a load of dusty materials, the load shall be covered entirely with clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle;</li> <li>The working area of any excavation or earth moving operation shall be sprayed with water or a dusty suppression chemical immediately before, during and immediately after the operation so as to maintain the entire surface wet;</li> <li>Exposed earth shall be properly treated by compaction or by vegetation planting within six (6) months after the last construction activity on the construction site or part of the construction site where the exposed earth</li> </ul>





Environmental Aspect (Project Activity which will likely impact the Environmental Component)	Environmental Component Likely to be Affected	Potential Impact	Prevention/Mitigation/Enhancement Measures
		Increase in ambient noise level	<ul> <li>Any stockpile of dusty material shall be either covered entirely by impervious sheeting; placed in an area sheltered on the top and the three (3) sides; or sprayed with water or a dust suppression chemical so as to maintain the entire surface wet.</li> <li>Regular monitoring of ambient air (TSP) quality.</li> <li>Scheduling certain high noise emitting works to more acceptable times of the day</li> <li>Use of the most environmentally acceptable equipment which is properly maintained and silenced</li> <li>Use of the least intrusive method of work</li> <li>Proper instruction and supervision of staff</li> <li>Acoustic screening</li> <li>Defective equipment/parts with abnormal noise and/or vibration will be either repaired or replaced</li> <li>Schedule use of equipment/machines emitting high noise like pile driver during day time operation while, minimize use during night time operation</li> <li>All employees working on site will be provided with proper ear protectors</li> </ul>
	PEOPLE		
Implementation of livelihood projects as part of SDP	Local residents	Increase income for residents	Positive Impact
Hiring of workers	Local residents	Increase in local employment	<ul> <li>Priority employment for qualified local residents without discrimination to women</li> </ul>
Increase in taxes and revenues	Local community	<ul> <li>Improvement in infrastructures and social services</li> </ul>	Diligent payment of taxes/revenues
Accidents	Local residents	Construction-related hazards	<ul> <li>Environment, health and safety training of project personnel prior to construction</li> </ul>
Generation of wastes	Local residents and workers	Health and sanitation	<ul> <li>Provision of portalets, no litter signs, waste can</li> <li>Applying the hierarchy of measures: Reduce, Segregate, Re-use,</li> </ul>





Environmental Aspect (Project Activity which will likely impact the Environmental Component)	Environmental Component Likely to be Affected	Potential Impact	Prevention/Mitigation/Enhancement Measures
			<ul> <li>Recycle and Dispose</li> <li>Proper disposal of non-recyclable wastes through an accredited contractor</li> </ul>
<b>OPERATION PHASE</b>			
	LAND		
Foundation Stability	Geology	Subsidence and Liquefaction	<ul> <li>Structural monitoring of buildings/facilities especially after each earthquake</li> <li>Formulation of detailed Emergency Preparedness and Response Plan</li> </ul>
Accidental chemical spill	Pedology	Soil contamination	<ul> <li>Provision of spill kit on-site</li> <li>Regular monitoring of soil guality</li> </ul>
	WATER		
Generation of domestic waste water Generation of process wastewater	Water Quality	Degradation of surface and groundwater quality	<ul> <li>Upgrading of the existing Wastewater Treatment System that will efficiently treat the wastewater from the existing plant and the proposed expansion</li> <li>Installation of STP to treat the domestic wastewater</li> <li>Proper handling and storage of chemicals, lubricants, etc. in covered areas with impermeable flooring and installation of proper bund walls</li> <li>Daily supervision of possible leaks or spillages in the storage area</li> <li>Provision of chemical spill kit on-site.</li> </ul>
	AIR		
Utilization of rice hull, coal, etc. for fuel	Air Quality	Degradation of Air Quality	<ul> <li>Conduct ambient air quality monitoring and stack emissions testing together with the existing plant</li> </ul>
Use of diesel generator engines	Noise Quality	<ul> <li>Increase in ambient noise level</li> </ul>	<ul> <li>Use of the most environmentally acceptable equipment which is properly maintained and silenced</li> <li>Proper instruction and supervision of staff</li> <li>Acoustic screening</li> <li>Electrically powered equipment shall be preferred, where practicable, over mechanically powered alternatives. If mechanical powered machines will be used, it shall be fitted with suitable silencers and mufflers</li> <li>Defective equipment/parts with abnormal noise and/or vibration will be either repaired or replaced</li> </ul>





Environmental Aspect (Project Activity which will likely impact the Environmental Component)	Environmental Component Likely to be Affected	Potential Impact	Prevention/Mitigation/Enhancement Measures
			All employees working on site will be provided with proper ear protectors
			Conduct noise level monitoring
	Waste	Generation of sowage/solid	Provision of STP, portalets and latrings, no litter signs, waste can
	Management	• Generation of sewage/solid waste	<ul> <li>Applying the hierarchy of measures: Reduce, Segregate, Re-use, Recycle and Dispose</li> <li>Proper disposal of non-recyclable wastes through an accredited contractor</li> </ul>
Hiring of workers	Population	Change in population (size, distribution)	<ul> <li>Priority hiring of qualified local residents in coordination with the Municipal Gov't and host barangay</li> <li>Training program and skill transfer for local residents</li> </ul>
	Social services	Overburdening of public social services	<ul> <li>Priority hiring of qualified local residents</li> <li>Utilize the existing plant medical clinic staffed by at least a doctor and a nurse</li> <li>Utilize the ambulance of the existing plant</li> </ul>
	Health	Introduction of diseases	<ul> <li>Clean bill-of-health as a condition for employment Medical check-up shall be part of the CSR program of Bataan 2020 to monitor the occurrence of unusual health problems that can be associated with the proposed Project</li> <li>Provision of potable water, sanitary facilities and garbage bins for workers</li> <li>Provision of medical clinic and a safety officer to monitor safe working conditions</li> <li>Provision of Medical/First Aid kits in all work places</li> </ul>
Operation of the plant	Local residents	<ul> <li>Increased social and economic financial activity</li> </ul>	Positive impact, no mitigation required
	Workers and properties	Fire hazard	Provision of fire suppression systems, fire detection system, fire host stations and portable fire extinguishers
ABANDONMENT I	PHASE		
<b>_</b>	LAND		
Decommissioning	Pedology	<ul> <li>Soil contamination</li> </ul>	<ul> <li>The Abandonment Rehabilitation Plan shall be followed strictly with</li> </ul>





Environmental Aspect (Project Activity which will likely impact the Environmental Component)	Environmental Component Likely to be Affected	Potential Impact	Prevention/Mitigation/Enhancement Measures
			emphasis on the strategy of sustaining erosion/ sedimentation control within and adjacent vicinity of the plant and rendering the Project area free of soil contamination
	Terrestrial Ecology	Increase biodiversity due to retention of buffer zone	Positive impact, no mitigation needed
	WATER		
Disposal of waste	Ground and surface water quality	<ul> <li>Disposal of wastes may lead to possible impacts from spills and discharges of contaminants affecting ground and surface water quality</li> </ul>	<ul> <li>Proper disposal of wastes.</li> <li>Collection of spills</li> </ul>
	AIR		
	Air Quality and Noise	<ul><li>Generation of noise</li><li>Generation of dust</li></ul>	<ul> <li>Proper maintenance of dismantling equipment/vehicles</li> <li>Use of noise suppressors/mufflers</li> <li>Limiting noisy activities during daytime</li> <li>Watering during dismantling to minimize dust</li> <li>Conduct ambient air (TSP) and noise level monitoring</li> </ul>
	PEOPLE		
Hiring of workers for demolition and abandonment activities	Local residents	<ul> <li>Increase in local employment during abandonment</li> <li>New skills developed for decommissioning may be marketable elsewhere</li> </ul>	Priority for qualified local residents
Loss of jobs/ employment		<ul> <li>Reduction in employment opportunities to include the staff of local service contractors with long-standing service contracts with the project, for example, maintenance services, site transport services and</li> </ul>	<ul> <li>Six (6)-month notice prior to termination of contract to give ample time to look for next employment</li> <li>Effective management via consultation, planning and communications with affected workers</li> <li>Financial support within a human resources plan</li> </ul>



Environmental Aspect (Project Activity which will likely impact the Environmental Component)	Environmental Component Likely to be Affected	Potential Impact	Prevention/Mitigation/Enhancement Measures
		franchised catering companies	
	Demographic	<ul> <li>Out migration of affected project personnel to seek work elsewhere</li> </ul>	
Decommissioning activities	Local Community	<ul> <li>Nuisance</li> <li>Decommissioning activities may cause local disturbance or damage through increased road traffic, noise, etc.</li> </ul>	<ul> <li>Formulation and implementation of decommissioning impact management plan</li> </ul>



#### 2.5 Project Cost and Duration

The construction of the proposed Paper Mill Plant Expansion Project is estimated to cost Eight Hundred Million Pesos (Php 800,000,000.00). The proposed Project is expected to be completed by the 1<sup>st</sup> Quarter 2020 and construction works will take about 24 months.







# Attachment 1. Photographs of the Project Site







Attachment 2. Topographic Map of the Project Site



