## **WASTE-TO-ENERGY PROJECTS**

II. ENVIRONMENTAL IMPACTS AND MANAGEMENT PLAN

Possible Environmental/ Social Impacts	Baseline Environment	Preventive/ Mitigating Measures	Monitoring Parameters/ Implementation	Remarks
		Cost of preventive/mitigating as well a cost	as monitoring integrated in the construction /operation	
LAND				
Consistency with land use	Current land use w/in 1km radius (as per zoning ordinance):  Residential Commercial/ Institutional Industrial Agricultural/ Recreational Protected Areas Others, specify  Actual land uses w/in 1 km radius: Residential Commercial/ Institutional Industrial Agricultural/ Recreational Protected Areas Others, specify  Others, specify	<ul> <li>✓ See attached proof of compatibility with land use</li> <li>✓ Limit project activities to what is compatible to the land use</li> <li>✓ Others, specify</li> </ul>	Actual land uses w/in 1km radius:  Residential Commercial/ Institutional Industrial Agricultural/ Recreational Protected Areas Others, specify	

Possible Environmental/ Social Impacts	Baseline Environment	Preventive/ Mitigating Measures	Monitoring Parameters/ Implementation	Remarks
		Cost of preventive/mitigating as well a cost	as monitoring integrated in the construction /operation	
□ Land tenure / compatibility issue	Identify land tenure / compatibility issues:  CARP CADC/ CADT/ CALC/ CALT ROW Informal settlers Ecologically sensitive or protected area Others, specify	<ul> <li>□ Obtain appropriate clearances/ permits from concerned agencies</li> <li>□ Resettlement Plan prepared</li> <li>□ Provide relocation/disturbance compensation packages</li> <li>□ Ensure participation of IPs in consultations and dialogues</li> <li>□ MOA prepared/signed</li> <li>□ Provide adequate buffer</li> <li>□ Others, specify</li> </ul>	<ul> <li>✓ Regularly monitor presence/absence of complaints</li> <li>✓ Regular coordination with LGU or appropriate agencies</li> <li>☐ Others, specify</li> </ul>	
☐ Disturbance to wildlife due to vegetation clearing	Existing vegetation in the area:  Forestland  Marshland  Grassland  Mangrove  Wetland  Others, specify	<ul> <li>✓ Compliance with conditions of DENR/LGU SLUP, Tree Cutting Permit, ROW, PCA Permit</li> <li>✓ Limit land clearing as much as possible</li> <li>✓ Provide temporary fencing for vegetation that will be retained</li> <li>✓ Promote restoration of damaged or destroyed vegetation where possible (e.g. tree planting);</li> <li>☐ Provide adequate buffer zone</li> </ul>	<ul> <li>✓ Annual inspection of area replanted/re-vegetated</li> <li>☐ Others, specify</li> </ul>	

Possible Environmental/ Social Impacts	Baseline Environment	Preventive/ Mitigating Measures	Monitoring Parameters/ Implementation	Remarks
		Cost of preventive/mitigating as well a cost	s monitoring integrated in the construction /operation	
☐ Change in surface landform/ topography/ terrain/slope ☐ Soil Erosion	Slope:  Flat (0-3%) Gently sloping to rolling (3-18%) Steep (>18%)  Is the project site located in an area identified by MGB/PAGASA/PHIVOLCS as hazard prone?  Yes No	, , , , , , , , , , , , , , , , , , , ,	<ul> <li>□ Regular inspection of slope protection measures in erosion-prone areas</li> <li>□ Regular inspection for new eroded areas near the site</li> <li>□ Others, specify</li> </ul>	
		(EGGA) and implement corresponding recommendation  Others, specify		

Possible Environmental/ Social Impacts	Baseline Environment	Preventive/ Mitigating Measures	Monitoring Parameters/ Implementation	Remarks
		Cost of preventive/mitigating as well a cost	as monitoring integrated in the construction /operation	
☐ Soil/Land contamination due to materials leakage ☐ Depletion of soil nutrient content/soil productivity/Change in acidity/alkalinity of soil	Existing soil type in the area:  Sandy Clay Sandy-loam concrete/cement Others, specify	Secondary containment (pls. specify) :	<ul> <li>✓ Regular inspection for leakage of materials that can cause land/soil contamination.</li> <li>✓ Monitoring of soil physical and chemical properties</li> <li>☐ Others, specify</li> </ul>	
		<ul><li>✓ Engage third party company for waste collection</li><li>☐ Others, specify</li></ul>		
	Soil acidity/alkalinity  acidic basic  Soil test/analysis (secondary data) N =  P =  K =  Trace metals/micro nutrients =			

Possible Environmental/ Social Impacts	Baseline Environment	Preventive/ Mitigating Measures	Monitoring Parameters/ Implementation	Remarks
		Cost of preventive/mitigating as well a cost	as monitoring integrated in the construction /operation	
Building of Structure and Improper solid waste disposal leading to  Impairment of visual aesthetics  Devaluation of land values	Solid Waste Management Scheme in the area:  SLF MRF Composting Regular Collection of Solid Wastes  Presence of visually significant landforms/landscape/structures? Yes No	<ul> <li>✓ Implement landscaping and other beautification measures</li> <li>✓ Provide adequate buffer</li> <li>☐ Composting of Organic Wastes</li> <li>✓ Coordinate with the municipal / city waste collectors</li> <li>☐ Implement landscaping and other beautification measures</li> <li>✓ Provide adequate buffer</li> <li>☐ Compensate adjacent property owners</li> <li>☐ Others, specify</li> </ul>	<ul> <li>☑ Daily inspection for presence of garbage in the facility</li> <li>☑ Weekly inspection of waste accumulated</li> <li>☑ Regular inspection of landscaping and other beautification activities</li> <li>☑ Regular monitoring of buffer zones</li> <li>☑ Regularly monitor presence/absence of complaints from adjacent property owners</li> <li>☐ Others, specify</li> </ul>	
WATER		l		
<ul> <li>✓ Increased siltation due to project activities</li> <li>✓ Water quality degradation</li> <li>☐ Thermal pollution</li> <li>☐ Others, specify</li> </ul>	Specify nearest/receiving water body:  Distance to nearest/receiving water body:  □ 0 to less than 0.5 km	<ul> <li>✓ Set-up proper and adequate sanitary facilities</li> <li>✓ Ensure strict observance of proper waste handling and disposal and proper sanitation including by the contractors and its workers (if any)</li> <li>Provision of wastewater treatment facility</li> </ul>	Regular (ocular) inspection of:  Drainage / canal systems Water treatment facility  Regular monitoring of ambient water quality:  Parameter Frequency pH Annual Semi-annual Quarterly	

Possible Environmental/ Social Impacts	Baseline Environment	Preventive/ Mitigating Measures	Monitoring Parameters/ Implementation	Remarks
		Cost of preventive/mitigating as well a cost	s monitoring integrated in the construction /operation	
	□ 0.5 to 1 km	For process wastewater, specify	▼ TSS	
	☐ More than 1 km	type of treatment facility:	☐ Semi-annual	
	Classification of nearest/receiving		Quarterly	
	water body:		☐ Annual	
	☐ Freshwater ☐ Marine/ coastal		☐ Semi-annual ☐ Quarterly	
	water		☑ Color ☐ Annual	
	AA SA	specify type of treatment facility:	☐ Semi-annual	
	☐ A ☐ SB		☐ Quarterly	
	□ B □ SC		Oil and Grease	
	□ C □ SD		☐ Semi-annual	
	□ D		Quarterly	
		☑ Set up silt traps to minimize	☐ Trace Metals ☐ Annual (Pb, Cd, Hg, ☐ Semi-annual	
	Current Water Use:	downstream siltation	(Pb, Cd, Hg, Cr(VI), As) ☐ Semi-annual ☐ Quarterly	
	☐ Fishery	Thermal pollution control system, please specify:	□ Quarterly	
	☐ Tourist Zone / Park		Regular monitoring of plant effluent:	
	☐ Recreational		Parameter Frequency  ☑ pH ☐ Annual	
	☐ Industrial☐ Agricultural		Semi-annual	
	Agricultural		☐ Quarterly	
	Distance of project area to the	✓ Provide oil containment system	☑ TSS ☐ Annual	
	nearest well used:	(i.e. ring canal, grease traps) for fuel tanks/ motor pool/	concentration Semi-annual	
	☐ 0 to less than 0.5 km	maintenance areas	☐ Quarterly	
	□ 0.5 to 1 km	✓ Others, specify		
	☐ More than 1 km			

Possible Environmental/ Social Impacts	Baseline Environment	Preventive/ Mitigating Measures	Monitoring Parameters/ Implementation	Remarks
		Cost of preventive/mitigating as well a cost	as monitoring integrated in the construction /operation	
	Use of the nearest well:  Drinking/Domestic Industrial Agricultural		BOD	
□ Competition in water use □ Depletion of water resources	Size of population using receiving surface water:  □ ≤ 1,000 persons □ >1,000 and ≤ 5,000 persons □ >5,000 person  Current Water Use: □ Fishery □ Tourist Zone / Park □ Recreational □ Industrial □ Agricultural	<ul> <li>□ Implement rainwater harvesting, community ponds and/ or similar measures as an alternative source of water</li> <li>□ Observe water conservation measures;</li> <li>□ Careful selection of project site to avoid disruption of traditional water uses</li> <li>□ Obtain Water Permit from NWRB</li> <li>□ Improve efficiency of water supply and distribution system</li> <li>□ Increase, when practical, storage capacities of water</li> </ul>	<ul> <li>✓ Regularly monitor presence/absence of complaints</li> <li>✓ Regular coordination with concerned agencies</li> <li>✓ Regularly monitor occurrences of water shortages</li> <li>✓ Others, specify</li> </ul>	

Possible Environmental/ Social Impacts	Baseline Environment	Preventive/ Mitigating Measures	Monitoring Parameters/ Implementation	Remarks
		cost	as monitoring integrated in the construction /operation	
	Available/nearest water source.  Deep well Water district/LGU Surface water Others, specify	supply structures for resilience to greater climate variations and extremes  Others, specify		
☐ Increased occurrence of flooding	Is the project site located in an area identified by MGB/PAG-ASA as flood prone?  Yes No	<ul> <li>□ Use appropriate design for project facilities</li> <li>□ Implement appropriate drainage system</li> <li>□ Regularly remove debris and other materials that may obstruct water flow</li> <li>□ Use appropriate technology (e.g., raised hand-pumps) to protect drinking water from flood contamination</li> <li>□ Others, specify</li> </ul>	<ul> <li>✓ Regularly monitor presence/absence of complaints</li> <li>✓ Regular coordination with concerned agencies</li> <li>✓ Regularly monitor increased frequency of flooding</li> <li>✓ Others, specify</li> </ul>	

Possible Environmental/ Social Impacts	Baseline Environment	Preventive/ Mitigating Measures	Monitoring Parameters/ Implementation	Remarks
		Cost of preventive/mitigating as well a cost	as monitoring integrated in the construction /operation	
Air quality degradation	Distance to nearest community:  □ 0 to less than 0.5 km □ 0.5 to 1 km □ More than 1 km	<ul> <li>✓ Properly operate and maintain all emission sources (e.g. vehicles, pumps, generator, etc)</li> <li>✓ Install appropriate air pollution control device/s, please specify:</li> <li>✓ Strictly enforce good housekeeping practices</li> <li>☐ Control vehicle speed to lessen suspension of road dust</li> <li>☐ Conduct water spraying to suppress dust sources and minimize discomfort to nearby residents</li> <li>✓ Use covered vehicles to deliver materials that may generate dust</li> <li>☐ Other, specify</li> </ul>	Regularly monitor presence/absence of complaints  Regular (ocular) inspection of:  Absence of white or black smoke from vehicles, heavy equipment and generator  Absence of black smoke from stack/s  Presence of truck cover during deliveries  Regular monitoring of ambient air quality:  Parameter Frequency PM10 Annual Semi-annual Quarterly  TSP Annual Semi-annual Quarterly  NO2 Annual Semi-annual Quarterly  NO2 Annual Semi-annual Quarterly  Semi-annual Semi-annual Semi-annual	

Possible Environmental/ Social Impacts	Baseline Environment	Preventive/ Mitigating Measures	Implen	Parameters/ nentation	Remarks
		Cost of preventive/mitigating as well a cost	s monitoring integrated in	the construction /operation	
			☐ Trace metals:	<ul><li>☐ Annual</li><li>☐ Semi-annual</li><li>☐ Quarterly</li></ul>	
			☐ Others, specify	☐ Annual ☐ Semi-annual ☐ Quarterly	
			Regular monitoring	of stack emissions:	
			Parameter	Frequency	
			☑ PM10	☐ Annual	
				☐ Semi-annual	
				☐ Quarterly	
			☑ TSP	☐ Annual	
				☐ Semi-annual	
				☐ Quarterly	
			☑ NO <sub>x</sub>	☐ Annual	
				☐ Semi-annual	
				☐ Quarterly	
			☑ so <sub>x</sub>	☐ Annual	
				☐ Semi-annual	
				☐ Quarterly	
			☐ Trace metals:	☐ Annual	
				☐ Semi-annual	

Possible Environmental/ Social Impacts	Baseline Environment	Preventive/ Mitigating Measures	Monitoring Parameters/ Implementation	Remarks
		Cost of preventive/mitigating as well a cost	as monitoring integrated in the construction /operation	
			☐ Quarterly	
			☐ Others, ☐ Annual ☐ Semi-annual ☐ Quarterly	
Nuisance due to noise generation	Distance to nearest community:  0 to less than 0.5 km  0.5 to 1 km  More than 1 km	<ul> <li>✓ Properly operate and maintain all noise sources (e.g. vehicles, pumps, generator, etc)</li> <li>✓ Install when applicable, the appropriate noise control device/s (e.g., mufflers, silencer, sound barriers, etc.)</li> <li>☐ Implement appropriate operating hours</li> <li>✓ Provide adequate buffer and/or planting of trees</li> <li>☐ Others, specify</li> </ul>	<ul> <li>✓ Regularly monitor presence/absence of complaints</li> <li>✓ Regular monitoring of buffer zones</li> <li>✓ Quarterly monitoring of noise level</li> <li>✓ Others, specify</li> </ul>	
<ul> <li>Nuisance due to generation of obnoxious/unpleasant odor</li> </ul>	Distance to nearest community:  ☐ 0 to less than 0.5 km ☐ 0.5 to 1 km ☐ More than 1 km	<ul> <li>☐ Use of environment-friendly deodorizer or odor masking substances</li> <li>☐ Provide adequate buffer and/or planting of trees</li> </ul>	Regularly monitor presence/absence of complaints  Others, specify:	

Possible Environmental/ Social Impacts	Baseline Environment	Preventive/ Mitigating Measures	Monitoring Parameters/ Implementation	Remarks
·		Cost of preventive/mitigating as well a cost	as monitoring integrated in the construction /operation	
	Is the wind direction blowing towards the nearest community most of the year?  Yes  No	☐ Others, specify		
PEOPLE & CULTURE				
<ul> <li>□ Displacement of residents including indigenous (if any) people in the project site and within its vicinity</li> <li>□ Enhanced employment and/or livelihood opportunities</li> <li>☑ Increased revenues for LGU</li> <li>□ Disruption/Competition in delivery of public services (e.g., education, peace and order, etc.)</li> <li>□ Enhanced delivery of public services (e.g., education, peace and order, etc.)</li> <li>□ Increase in traffic volume and worsening of traffic flow</li> </ul>	Size of population of host barangay/s:	<ul> <li>□ Provide relocation/disturbance compensation packages</li> <li>☑ Prioritize local residents for employment</li> <li>☑ Promptly pay local taxes and other financial obligations</li> <li>☑ Regular coordination with LGU</li> <li>□ Conduct prior consultation and coordination to minimize disruption of daily domestic activities</li> <li>□ Ensure participation of IPs in consultations and dialogues &amp; consider IP rights and cultural practices in the provision of relocation/disturbance compensation packages</li> <li>□ Provide appropriate traffic/warning signs, lighting, etc</li> <li>□ Others, specify</li> </ul>		

Possible Environmental/ Social Impacts	Baseline Environment	Preventive/ Mitigating Measures	Monitoring Parameters/ Implementation	Remarks
		Cost of preventive/mitigating as well as monitoring integrated in the construction /operation cost		
	☐ Low Description:			
	Available services within/near the host barangay:  Schools (e.g. elementary, high school, college)  Health facilities (e.g., clinics, hospitals, etc.)  Peace and order (e.g., police outpost, Brgy. Tanod, etc.)  Recreation and sports facilities  Others, specify			
☐ Destruction/disturbance of physical cultural resources. (✓ if project site has been identified to have such by NM, NHCP, NCAA and LGUs)	Physical Cultural resources within the vicinity of the project site:	☐ Implement appropriate protocols based on NM, NHCP, NCAA and LGU guidelines including those for chance finds (if any). Specify:		

Possible Environmental/ Social Impacts	Baseline Environment	Preventive/ Mitigating Measures	Monitoring Parameters/ Implementation	Remarks
		Cost of preventive/mitigating as well as monitoring integrated in the construction /operation cost		
✓ Impacts on community	Source of risks (please specify)	Regular coordination with LGU	✓ Presence/absence of complaints	
health and safety	☐ Explosives :	☐ Provide appropriate warning	☑ Regular coordination with LGU	
Safety Risks		signs, lighting and barricades, whenever practicable	☐ Others, specify	
Fire		Observe proper housekeeping		
Explosions		☐ Provide on-site medical services		
☐ Release of toxic materials		for any emergency.		
Structural failure	☐ Flammable substances:	<ul> <li>Participate in public awareness programs on health and safety</li> </ul>		
		<ul> <li>Implement appropriate safety programs for both community and workers</li> </ul>		
	☐ Toxic substances:	Strictly comply with fire, safety and similar regulatory requirements		
		☐ Strictly comply with requirements of RA 6969		
		☐ Others, specify		
	☐ Others, specify			

Possible Environmental/ Social Impacts	Baseline Environment	Preventive/ Mitigating Measures	Monitoring Parameters/ Implementation	Remarks
		Cost of preventive/mitigating as well as monitoring integrated in the construction /operation cost		