EXECUTIVE SUMMARY FOR THE PUBLIC (English Version)

Lumino Monkayo Tree Plantation for Biomass Production Project

Municipality of Monkayo, Davao de Oro

Version	:	1.0
Date	:	19-Oct-2023
Prepared by	:	GreenDevelopment Sustainable Solutions, Inc.

Project Fact Sheet

Name of Project:	**Lumino Monkayo Tree Plantation Project**
Location of Project:	**CADT R11-MON-0703-0007** Barangays Awao, Banlag, Baylo, Casoon, Naboc, Pasian, Rizal, San Jose, Salvacion, Tubo-tubo, and Upper Ulip in Monkayo, Davao de Oro
Service contract	Memorandum of Agreement With the United Tribal Council of Elders / Leaders Association, Inc. (UTCELAI)
Project Type	• **Tree Plantation:** Category D – Non-Environmentally Critical Project (NECP) 2.2.1 Community-Based Forest Resources Utilization Without Tree Harvesting (Non-ECP) 2.2.1 Community-Based Forest Resources Utilization • **Headquarters:** Category B 3.6.2 Office and Residential Building (Non-ECP) with More Than 5 Hectares Total and Gross Floor Area • **Road Widening:** Category B. 3.4.2 (Non-ECP) Road Widening and Rehabilitation of Greater Than 20 Kilometers • **Tree Harvesting:** Category A – Environmentally Critical Project (ECP) 2.2.1 Community-Based Forest Resources Utilization with ≥ 10,000 m^3 Annual Volume of trees to be cut.
Project Area / Capacity	12,501.76 hectares (1,107,492 cu.m. annual yield)
Total project cost:	PHP 774,879,000.00
Project Duration:	Construction and development: 2 years Operation: 24 years Daily operational cycles: Tree planting and maintenance - eight hours per day Nursery operation and office works - eight hours per day Harvesting - eight hours per day
Proponent Profile	
Name of Proponent:	**Lumino Energy Plantations, Inc. (LEPI)**
Office address:	Kilometer 8, Barangay San Jose, Bislig City
Contact Person:	Mr. Joel P. Lubguban – President Email Address: jlubguban@luminocapital.com Contact Number: 0968-854-3285
Authorized Representative for ECC application:	Joseph JR Anders Abella – Chief Operating Officer GreenDevelopment Sustainable Solutions, Inc. (GSSI) Contact Number: (02) 8362 4933

Project Proponent

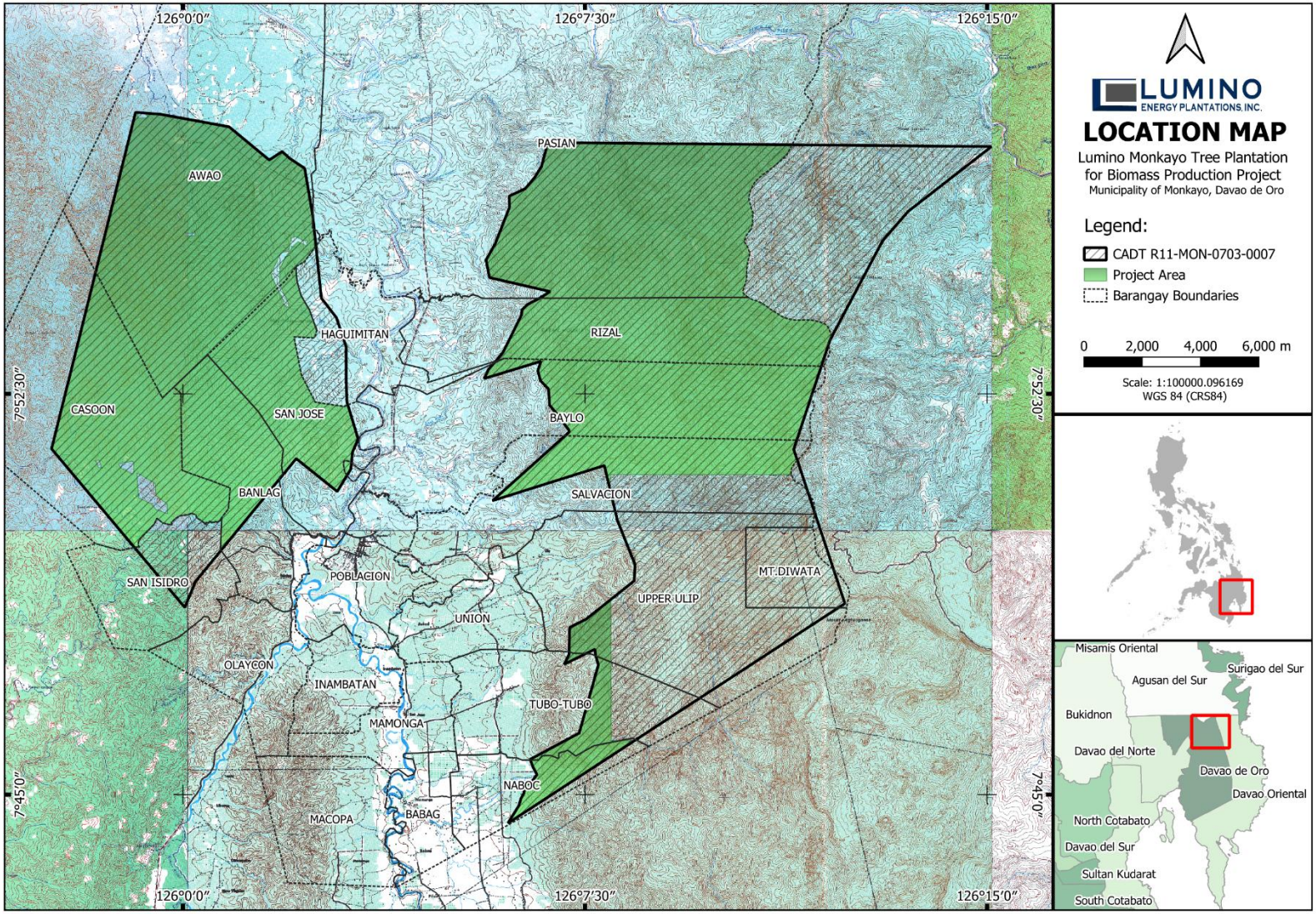
1 The implementation of the project will be carried out by Lumino Energy Plantations, Inc. (LEPI), a legitimate company based in the Philippines with the registration number CS201953529 and recognized by the Securities and Exchange Commission. LEPI's headquarters are located at Km. 8, Barangay San Jose, Bislig City, Surigao del Sur and is a subsidiary of Lumino Biomass Fuel, Inc.

Project Components

2 The five major components of the project proposed to be in the ECC are the: a) tree plantation, b) headquarters, and c) nurseries, (d) logging road and (e) conservation / protection area.

Major Project Components

Component	Proposed location	Area Allocation (has.)	Specification / Description
Tree Plantation/Plantable Area	CADT R11-MON-0703-0007 covering 11 barangays	11,074.92	The planting intensity of up to 4,444 trees per hectare at 1.5 X 1.5 meters to 3 X 3 meters spacing will be done, subject to area conditions and optimization during operations. It will be planted in the area identified by LEPI and UTCELAI as production forest areas. Protection areas such as sacred grounds, secondary forests, buffer areas, and those considered as protection zone will be separated for protection and conservation. Assisted natural regeneration, including enrichment planting of native tree species, will be done. The cycle or rotation period is three (3) years from planting. The management will be conducted, together with the Indigenous People, for the next twenty-four (24) years or more based on the contract
Headquarters	Within CADT R11-MON-0703-0007 in Barangay Pasian, Monkayo	5.00	Center for the project's administrative, maintenance, and logistical operations
Nurseries		66.41	The nursery seedlings production center will have one main central nursery and seven (7) satellite nurseries spread over the project area, with a total seedling capacity of approximately 28.7 million seedlings.
Logging road	Existing barangay roads within CADT R11-MON-0703-0007	97.68	For logs, seedlings, equipment, and personnel transport
Conservation/Protection Area	Buffer Zone	1,257.75	All inland water with a 40-meter buffer zone.
Total		**12,501.76**	



Project site within the CADT R11-MON-0703-0007

Process Technology

3 The management of the plantation will be done by block method because the area is composed of harvestable trees from the previous concessionaire. The identified plantable blocks will be subjected to the standard planting and cycle.

4 Plantation management is broadly divided into nine management phases: a) Planting Site Survey and Delineation, b) Selection and Sourcing of Species for Planting, c) Nursery Establishment / Planting Stock Production, d) Planting Site Preparation, e) Transport of Planting Materials, f) Rotation Cycle g) Planting h)Protection and Maintenance, i) Harvesting. The brief descriptions of the management schemes are shown in the succeeding paragraphs.

1. **Planting site survey and delineation** - Survey is conducted to provide a general lay-out of the area, the existing vegetation, and the status of reproduction and soil condition. Delineation is done to determine the boundaries, identify the production areas, and separate the protection areas as also identified by the Indigenous People (IPs) to ensure balance and sustainability. Delineation using GIS will divide the area into blocks for easier management. The resulting will reflect the present infrastructures, proposed nursery sites and infrastructures, roads, etc.

2. **Selection and sourcing of species for planting** - Acacia mangium is a species of tree that is well adapted to the Philippines for reforestation and rehabilitation purposes, according to reports and studies. It is an evergreen, fast-growing tropical tree that can grow up to 30 m tall and 50 cm thick. The tree is native to Indonesia, Papua New Guinea, and Australia. Still, it has been introduced to other countries for use as a plantation tree due to its rapid growth and tolerance to poor soil. A. mangium has a variety of uses, including furniture, cabinets, turnery, floors, particleboard, plywood, veneer, fence posts, firewood, and charcoal. It is also used in pulp and paper making because of its good pulp traits. The suitability of A. mangium to the site conditions of the Philippines was determined based on soil, climate, elevation, and slope, and the seeds will be sourced locally.

3. **Nursery establishment and planting stock production** - Nurseries will be established to produce the required number of planting stock. There will a Central Nursery at the center of all plantations and Satellite Nurseries near the plantations for easier hauling of seedlings. Seedling procurement may be done locally should a shortage of seedling from the nurseries occur.

4. **Preparation of the planting site** - Preparation of planting sites involve clearing and cultivation activities such as brushing, clearing, marking, staking and hole digging of planting spots. Partial removal of unwanted vegetation and weeds is done by one to two-meter diameter spots or manually using bolo, scythe, and other tools by the IPs hired as laborers. If necessary, cultivation will be done by removing rocks that may impede the growth of seedlings and loosening the soil. Since the goal is for wood pellets as fuelwood, 1.5 by 1.5-meter to 3 by 3-meter spacing, subject to area conditions and optimization during operations, will be used to maximize tree density per hectare and increase wood yield. Spacing arrangement will be irregular due to the presence of grown trees. Following the square spacing but may be adjusted in case of existing plants, rocks, or other obstacles. The total number of seedlings is then computed subtracting the standing stock. Staking and hole digging will be done by marking each spot hole with a stake. An appropriate depth will be dug to accommodate the roots of the seedling and the accompanying fertilizer.

5. **Transport of planting materials** - Proper hauling of the seedlings to plantation site is necessary because seedling transport is critical to its survival. Watering the seedlings before loading may help. Seedlings should be handled on the container not the stem to avoid damage.

6. **Rotation Cycle -** The plantation management system of LEPI is the establishment of an *A. mangium* plantation with a rotation cycle of three (3) years. The short rotations usually associated with the use of exotic species reduce the probability of damages caused by natural perturbations[1], which increases the probability that the planted trees will provide the expected outcomes.

[1] *Arbez M (2001) Ecological impacts of plantation forests on biodiversity and genetic diversity. In: Green T (ed) Ecological and socio-economic impacts of close-to-nature forestry and plantation forestry: A comparative analysis. European Forest Institute. pp 7-20.*

7. **Planting** - Planting can be done throughout the year because of the climate in the area. The prescribed quantity of organic and soil-based bio-fertilizer will be applied to improve water-holding capacity. Seedling will be placed with the ball of soil on the same level as the ground surface, filling in with the topsoil first then the subsoil, pressing firmly to remove air spaces and to stabilize it. A shallow catchment around the seedling will be made to trap rainwater and retain soil moisture. Mulch or dried leaves may also be placed around the seedling to reduce water loss and hardening of topsoil. The company shall adopt high-density plantations to maximize yield. At 1.5 X 1.5 meters to 3 X 3 meters spacing will be done or up to 4,444 trees per hectare, subject to area conditions and optimization during operations the expected yield per hectare is 300 tons at 50% moisture content or fresh cut condition. The yield represents the main stem, including branches.

8. **Protection and maintenance** - This phase includes all silvicultural activities during the maintenance of the plantation. Management activities include fire protection and guarding; replanting; weeding; pruning; thinning; and regeneration. Different management blocks may require variable management treatments which sometimes require no thinning or pruning.

9. **Harvesting** - Manual harvesting will be employed in the cutting of trees in the plantations. The scheme will provide additional employment for the community members. Manual harvesting is preferred over the mechanical type due to its reduced environmental impact, considering that the project will implement the short rotation woody crop plantation scheme.

10. **Log Transport / Hauling** - All wood harvested from the plantation will be loaded mechanically on haulers along the road. Woods that will be harvested are smaller in diameter and length than timber; hence hauler trucks will be configured to accommodate the woody crops.

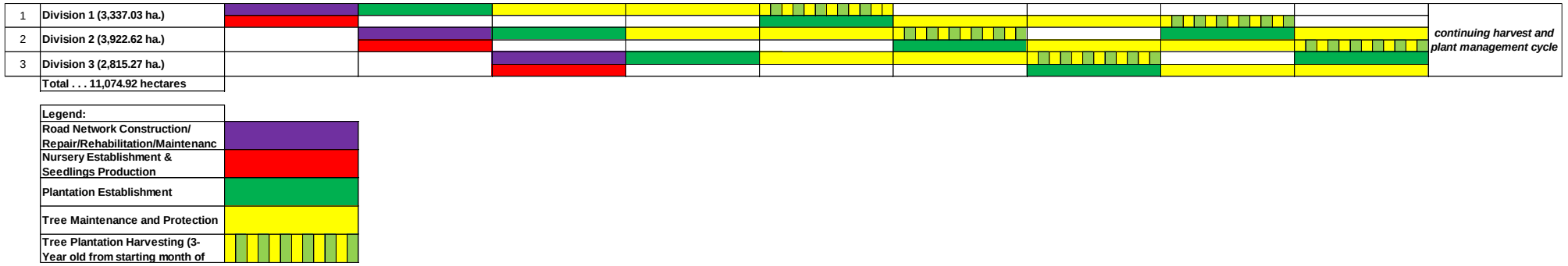
11. **Scaling and Weighing** - Harvested wood will be scaled and weighed at the mill site for documentation purposes and to monitor the production performance of the plantation. A standard scale and weighing method will be used in compliance with the law on tree harvesting and to determine the actual yield of the plantation.

Operation

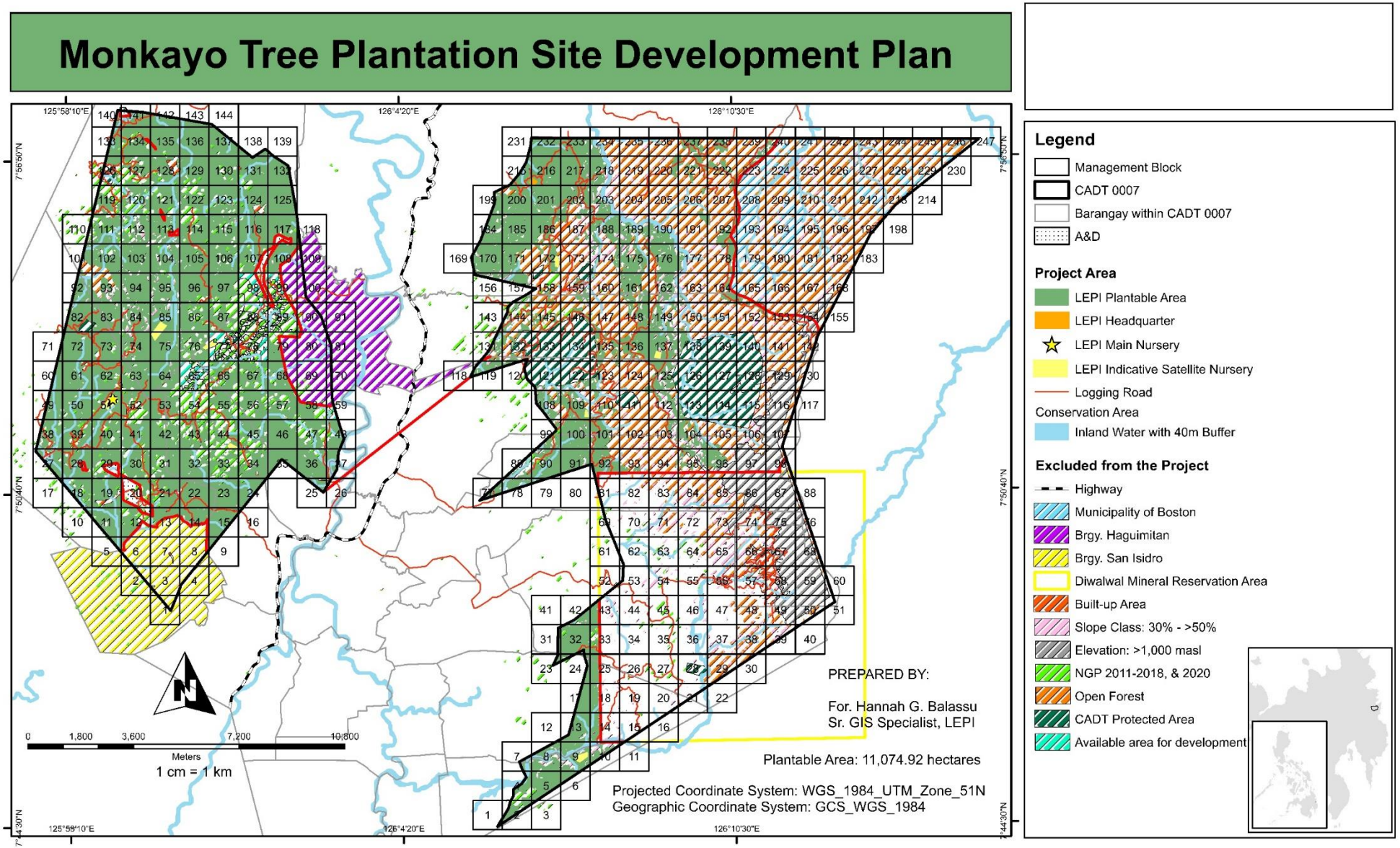
5 The project will operate with a cycle or rotation period of three years from planting. The plantation management will involve the Indigenous People for the next 24 years or more based on the contract. The intensity of planting is 4,444 trees per hectare. *The Acacia mangium* will be planted in areas identified by the LEPI and UTCEL as production forests. Areas such as sacred grounds, buffer zone and protected zone will be enhanced with assisted regeneration.

6 The newly developed plantations shall be harvested when they reach their rotation period of three years or earlier, depending on the end-use of the product. All harvested products shall be hauled, transported, and delivered to the company's log yard to be established and located near the project area and access roads. The harvesting and transport of trees plantation inside the CADT area will be in accordance with the approved Ancestral Domains Sustainable Development and Protection Plan (ADSDPP) and existing laws, rules, and regulations of the NCIP and DENR.

Project Development Timeline



Note: Annual projected yield is up to 1,107,492 cubic meters of wood materials.



Monkayo Tree Plantation Site Development Plan

Summary of Alternatives Considered in terms of Siting, Technology Selection/Operation Processes and Design

Selection criterion	Option	Potential Environmental impact
Siting		
Tree Plantation (Plantable area)	Slope class below 30% with suitable land use such as brush/shrubs, grasslands, areas with perennial and annual crops, and some open forest and open/barren areas within CADT 0703-007	- Long-term employment for the IP members of UTCEL - Increased revenues for the National Government and LGUs - Changes in vegetation during site clearing - Enhanced soil erosion and surface run-off during heavy rainy days - Disturbance to wildlife due to vegetation clearing - Sedimentation during site clearing and tree harvesting due to heavy rainy days to the existing body of water
Logging road	Existing barangay roads	- Public access to their communities - Fugitive dust dispersion during road site clearing and lay-outing - Removal of vegetation for road widening - Disruption of resident's routines due to road construction
Headquarter	Medium and relatively flat land, clear and with easy access to the main highway, and has sufficient area	- Enhanced local tourism due to the operation of demonstration plantation - Minimal site clearing and land preparation - Generation of solid wastes - Soil contamination in the case of improper solid wastes disposal
Nurseries	Available large and relatively flat area, accessibility to stream and road, and minimal flood hazard and the high potential groundwater. The proposed 66.41 hectares main nursery operation at designated barangays will produce the target number of seedlings	- Long-term employment for the IP federation members of UTCEL - Minimal site clearing and land preparation - Generation of solid wastes - Fugitive dust dispersion during road site clearing
Protection area	All inland water bodies within 40 meter-buffer zones areas with concentrations of biological diversity, including endemic species and rare, threatened, or endangered species. The protection area has 1,257.75 hectares and no other alternative site.	- Enhanced vegetation and provided protection efforts - Riverine habitat restoration and conservation of freshwater biota and fishes
Technology selection		
Tree Plantation (Plantable area)	High-density plantation management blockings to maximize yield per hectare with planting spacing of 1.5m x 1.5m to 3m x 3m or up to 4,444 trees per hectare, subject to area conditions and optimization during operations, with a rotation cutting cycle of three (3) years.	- Disturbance to wildlife due to annual vegetation clearing after the rotation cutting cycle of 3 years - Disturbance to wildlife due to vegetation clearing

Selection criterion	Option	Potential Environmental impact
	Silvicultural practices such as weeding, pruning, thinning, and organic fertilization, if needed	- Generation of biodegradable solid wastes - Non-soil contamination
Logging road	Provide construction and maintenance standards	- Short-term employment opportunity - Provide public access for rehabilitated and well-maintained logging roads - Fugitive dust generation - Traffic generation during road site clearing and lay outing
Headquarter	Provide construction and operation standards	- Fugitive dust generation during site clearing and civil works - Traffic disturbances during construction materials deliveries and spoil materials hauling - Generation of solid wastes at the temporary facility during construction and domestic activities of headquarter personnel - Generation of domestic wastewater - Minimal water and power resources competition with nearby settlements
Nurseries	Provide additional nursery operation standards	- Fugitive dust generation during site clearing and civil works - Generation of solid wastes at the temporary facility during construction and domestic activities of nursery personnel - Minimal water and power resources competition with nearby settlements
Protection area	Natural regeneration, community-based patrolling, and IEC works. Adopt FMB Monitoring strategy for ANR and tree planting Activities	- Enhanced vegetation and provided habitat to wildlife - Enhanced soil stability to minimize erosion during the operation phase - Increased community awareness of biodiversity
Resources Utilization		
Tree Plantation (Plantable area)	Rainwater	- Prevented water scarcity and competition
	Manpower: engagement of IPs	- Long-term employment for the IP members of UTCEL - No household displacement - Increased revenues for the National Government and LGUs - Minimize in-migration and impact on cultural/lifestyle change of the IPs and impact on their cultural resources
Logging road	Land: Existing barangay roads	- Minimal earthworks and soil volume requirements - No displacement of households and farms - No local and national funds counterparts
Headquarter	Water: groundwater, the local water utility, and rainwater harvesting	- Combined sources minimize water competition with nearby settlements
	Power: DANECO and standby generator	- Minimal power competition with nearby settlements - Increase noise levels during standby generator uses the operation of standby generator during power outages
Main Nursery	Water: groundwater and rainwater harvesting	Combined sources minimize water competition with nearby settlements
	Power: DANECO and standby generator	- Minimal power competition with nearby settlements

Selection criterion	Option	Potential Environmental impact
		- Increase noise levels from the operation of standby generator during power outages
Protection area	Manpower: patrolling and IEC works	Enhanced protection and increased communities' awareness of biodiversity

Concise Integrated Summary of the Main Impacts and Residual Effects after Applying Mitigation

7 The table in the following pages provides a comprehensive an integrated summary of the potential impacts and mitigation measures for the project during the pre-construction, construction, operation, and abandonment phases, taking into account various environmental components. The table also provides options for prevention, mitigation, or enhancement to control and minimize the impacts.Target efficiency of each option is listed, and residual effects are also identified.

Project Proponent's Statement of Commitment and Capability to Implement Necessary Measures to Prevent Adverse Impacts

8 Lumino Energy Plantations Inc. commits to following the guidelines outlined in the Environmental Management Plan (EMP), Environmental Monitoring Plan (EMoP), and Environmental Compliance Certificate (ECC) during all phases of the project. We take our environmental responsibilities seriously and are dedicated to ensuring that all measures taken to address potential impacts are in accordance with relevant laws, policies, guidelines, and standards. Our goal is to meet the target level of efficiency and performance outlined in the EMP to guarantee that the protective and mitigating measures we implement are adequate and meet the project's requirements.

Integrated Summary of the Main Impacts and Residual Effects After Mitigation

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention, Mitigation or Enhancement	Target Efficiency	Residual Effects
PRE-CONSTRUCTION PHASE					
Due diligence	(LAND) Land use and classification	• Compatibility with existing land use	• Confirm classification of the other project areas to the zoning regulation of the Municipality of Monkayo • Confirm existence of NGP areas within the project site with DENR CENRO	Confirm 100% of the Project Areas zoning regulations and nearest areas for NGP.	Issuance of the Zoning Clearance NGP overlap issues resolved
	(LAND) Pedology	• Soil erosion, loss of topsoil and overburden	• Formulate a Soil Erosion Management Plan (SEMP) that includes among others minimized cut and fill operations and Immediate removal of excavated soil stockpiles	100% Formulation of Soil Erosion Plan	Soil erosion controlled and minimized
	PEOPLE	• Displacement of land and conflict in land ownership	• Compliance to NCIP regulation as authority over project area	100% Completion of Pre Conditions of the NCIP Certificate	-
	PEOPLE	• Traffic congestion	• Prepare a workable Traffic Management Plan (TMP) at all affected public roads	100% completion of Traffic Management Plan	-
Land acquisition	(LAND) Land use and classification	• Possible tenurial/ land issue	• Ensure authority to develop the project site	Secured MOA with the CADT Holder	Land issues resolved
Design of the project components	(LAND) Land use and classification	• Encroachment in Environmentally Critical Areas (ECA)	• Include susceptibility of the project site to geo- and hydrological hazards in the detailed design	Periodic monitoring conducted	-
	(LAND) Geology – Impacts of the project	• Change in sub-surface and underground geomorphology • Inducement of geo-hazards	• Conduct Geotechnical Investigation and EGGA and consider its recommendations	100% Completion of EGGA Activities and implementation of recommendations	Unnecessary changes in surface landform, sub-surface geomorphology, and inducement of geohazards minimized
		• Geo-, hydrological, and meteorological hazards	• Consider recommendations of the GIR and EGGAR and use industry standards for seismic and structural design parameters	100% Completion of EGGA Activities and implementation of recommendations	Susceptibility of the Project components from geo- and hydrological hazards minimized
Design of the project components	(LAND) Terrestrial biology	• Impacts on terrestrial flora and fauna	• Conduct a complete census of flora to determine the total count of	100% compliance to Tree Cutting Permit requirements	Impacts to terrestrial ecology controlled and minimized

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention, Mitigation or Enhancement	Target Efficiency	Residual Effects
			affected trees and other arborescent taxa; • Consider the locations of significant vegetation types and populations during project design; • Secure a Tree Cutting Permit from the DENR; • Prepare a Construction Vegetation Removal Plan (CVRP); • Prepare a Construction Vegetation and Tree Planting Program (CVTPP); • Prepare a Buffer Zone Plan (BZP); • Prepare a Tree Transfer and Balling Plan (TTBP) for affected mature trees. • Prepare a Tree Survival and Monitoring Plan (TSMP); • Prepare a Vegetation and Tree Planting Program during Operations (VTPPO); • Conduct a comprehensive Terrestrial Fauna Assessment; • Prepare a Biodiversity Conservation Plan (BCP); and • Prepare a Wildlife Monitoring Plan (WMP) • Follow Biodiversity Management System (BMS) Framework		
CONSTRUCTION PHASE					
• Site clearing and preparation • Construction of utilities (road, drainage, water supply, septic vaults) • Erection of headquarter	(LAND) Land use and classification	• Impairment of visual aesthetics	• Proper implementation of the Buffer Zone Plan (BZP)	100% Completion and implementation of Buffer Zone Plan	Issuance of the Zoning Clearance NGP overlap issues resolved
		• Devaluation of land value as a result of improper solid waste management	• Proper implementation of the Construction Plan and CWMP	100% Completion of the Construction Plan and CWMP	Insignificant devaluation of land value due to improper solid waste management
	(LAND) Geology	• Change in sub-surface geomorphology	• Proper implementation of the Construction Plan	100% Completion of the Construction Plan and	Unnecessary changes in surface landform,

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention, Mitigation or Enhancement	Target Efficiency	Residual Effects
				CWMP, and Continuous Monitoring of its implementation.	sub-surface geomorphology, and inducement of geohazards minimized
		• Effects of geo- and hydrological hazards	• Proper implementation of the Construction Plan	100% Completion of the Construction Plan and CWMP	Susceptibility of the Project components from geo- and hydrological hazards minimized
	(LAND) Pedology	• Soil erosion or loss of topsoil	• Proper implementation of the Construction Plan • Proper implementation of the SEMP	100% Completion of the SEMP and its implementation	Soil erosion controlled and minimized
		• Change in soil quality/fertility	• Further study on soil fertility and micronutrient requirements of the tree species for planting • Formulate a Soil Fertility Augmentation Plan (SFAP) • Proper implementation of the Construction Plan • Provide oil sumps in machine repair shops • Proper storage and disposal of used oil and other hazardous wastes	Periodic Monitoring of Soil Quality Continuous implementation of Solid waste management plans	Changes in existing soil quality and fertility controlled and minimized
	(LAND) Terrestrial ecology	• Vegetation removal and loss of habitat • Threat to existence of important local species, abundance, frequency and distribution of important species • Hindrance to wildlife access.	• Proper implementation of the Construction Plan • Proper implementation of the CVRP, CVTPP, BZP, TTBP, BMS and Tree Cutting Permit conditions • Strict implementation of a "*No Hunting and No Collecting*" policy • Minimize hindering the flow of streams at the project area. • Limit the development activities within the planned structure or component footprint.	100% Completion of Construction Plan and continuous monitoring of its implementation. 100% Acquisition of Necessary permits and licenses. 100% implementation of Plans mentioned	Impacts to terrestrial ecology controlled and minimized
	(WATER) Hydrology	• Change in drainage morphology • Inducement of flooding	• Provide temporary drainage system • Provide detention ponds in the immediate drainage outlet to maintain the peak runoff	100% Completion of Flood Management Plan.	Minimized changes in the existing drainage morphology

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention, Mitigation or Enhancement	Target Efficiency	Residual Effects
			• Formulate a Flood Management Plan (FMP) for the operation phase		
	(WATER) Water quality	• Degradation of surface water quality	• Housekeeping practices • Provide onsite sanitary facilities • Provide adequate drainage leading to siltation ponds • Monitor water quality in affected portions of the Agusan and Simulao Rivers, and its tributaries (as necessary)	Continuous Monitoring of Water quality	Water pollution of waterbodies controlled and minimized
	(WATER) Freshwater ecology	• Impact to freshwater biodiversity	• Proper implementation of the SEMP • Provide cover, bunds, and drainage canal leading to silt ponds for stockpiles • Proper implementation of the CWMP • Proper Implementation of the BMS • Provide onsite sanitation facilities • Provide cover on vehicles carrying construction materials • Formulate and implement protocols to address gasoline and oil spills from boats (if used during construction) using the Agusan River.	100% Completion of the SEMP and its implementation Periodic monitoring of Freshwater Ecology	Impacts to the freshwater ecology controlled and minimized
	(AIR) Meteorology	• Contribution in terms of greenhouse gas emissions	• Regular and proper maintenance of motor vehicles and heavy equipment • Optimize schedule of vehicle use • Regular and proper maintenance of onsite power generators	Continuous monitoring of the implementation of Maintenance of heavy equipment both internally and from contractors	Insignificant greenhouse gas emissions
	(AIR) Air quality	• Degradation of air quality	• Implement dust suppression methods, e.g., water application and vehicle speed restriction • Optimize the use of heavy equipment and motor vehicles • Compacting of exposed soil surfaces • Provide tarpaulin cover on trucks loaded with construction materials • Regular maintenance of heavy equipment and motor vehicles	Continuous Implementation of dust preventing practices 100% implementation of Pollution Management Measures. Periodic monitoring of Air Quality	Air pollution controlled and minimized

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention, Mitigation or Enhancement	Target Efficiency	Residual Effects
			• Regular maintenance of standby generator • Prohibit engine idling in parking areas		
	(AIR) Noise	• Noise pollution	• Provide and maintain mufflers of gasoline or diesel engines powered equipment • Establish barriers and shielding stationary vibrating equipment	Continuous monitoring of Construction Plan	Excessive noise levels attenuated
	PEOPLE	• In-migration	• Monitor arrival of informal dwellers within the project area	100% completion and implementation of Construction plan including its development of Tempfacil..	In-migration controlled and addressed
		• Impacts on IPs/Culture/Lifestyle	• Proper orientation of migrant workers on culture of IP groups	100% Completion of NCIP Requirements	Impacts on IP group, culture, and lifestyle minimized
		• Impacts on physical cultural resources	• Report chance finds to National Museum	100% Turnover of any found cultural resources.	Physical cultural resources preserved
		• Threat to public health and safety	• Contractor's vaccination plans and to sustain the minimum health protocols in conformance with the national and local guidelines • Regular and proper maintenance of heavy equipment and vehicles • Proper implementation of the CWMP • Proper implementation of the Construction Plan	100% Creation and Implementation of Safety Process and Procedures, including but not limited to wearing PPEs, CoViD-19 related measures. 100% of Contractors submitting Safety and Health Management Plans.	Threat to public health and safety controlled and minimized
		• Generation of local benefits from the project (BENEFICIAL IMPACT)	• Prioritize hiring of qualified residents from the host barangays • Purchase supplies from local sources • Provide livelihood opportunities if possible • Prompt payment of taxes and other legal fees	100% completion of SDMP	Local benefits from the project maximized

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention, Mitigation or Enhancement	Target Efficiency	Residual Effects
		Threat to delivery of basic services and resource competition	• Monitor arrival of informal dwellers within the project area	Monitoring of migrating applicants	Threat to delivery of basic services and resource competition controlled and minimized
		Traffic contribution along impact roads	• Implement the Traffic Management Plan	100% completion and implementation of traffic Management Plan	Traffic congestion and accidents controlled and minimized
OPERATION PHASE					
Administrative Works	PEOPLE	Generation of local benefits from the project (BENEFICIAL IMPACT)	• Prioritize hiring of qualified residents from host barangay • Purchase supplies from local sources • Provide livelihood opportunities • Prompt payment of fees and taxes	100% implementation of SDMP	Local benefits from the project maximized
Nursery Operation & Tree Planting	(LAND) Land use and classification	Impairment of visual aesthetics	• Sustained implementation of the BZP	100% implementation of BZP	Minimal impairment of visual aesthetics
		Devaluation of land value as a result of improper solid waste management	• Proper implementation of the IWMP • Best housekeeping practices	100% implementation of IWMP	Insignificant devaluation of land value due to improper solid waste management
		Effects of geo- and hydrological hazards	• Undertake assessment of slope protection measures after heavy rain or seismic events • Maintain drainage system • Regular inspection of structure integrity	All assessments undertaken and necessary actions implemented	Susceptibility of the Project components from geo- and hydrological hazards minimized
	(LAND) Pedology	Soil contamination by municipal and hazardous waste	• Proper implementation of the IWMP • Best housekeeping practices	100% implementation of IWMP	Soil contamination controlled and minimized
		Soil erosion	• Sustained implementation of the SEMP	100% implementation of SEMP	Soil erosion controlled and minimized

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention, Mitigation or Enhancement	Target Efficiency	Residual Effects
	(LAND) Terrestrial ecology	• Vegetation removal • Threat to existence of important indigenous species • Threat to Abundance, Frequency, and Distribution of Important Species • Hindrance to Wildlife Access (avifauna)	• Sustained implementation of the Buffer Zone Plan • Proper Implementation of the Tree Survival and Monitoring Plan • Proper Implementation of the Vegetation and Tree Planting Program during Operations • Sustained implementation of the Biodiversity Conservation Plan (BCP) • Proper Implementation of the Wildlife Monitoring Plan (WMP) • Proper Implementation of the BMS	100% implementation of Plans mentioned	Impacts to terrestrial ecology controlled and minimized
	(WATER) Freshwater ecology	• Impact to freshwater biodiversity	• Sustained implementation of the SEMP • Proper implementation of the IWMP • Provide onsite sanitation facilities • Sustained implementation of protocols to address gasoline and oil spills from boats (if used during operation) using the Agusan River.	100% implementation of SEMP and WMP mentioned	Impacts to freshwater ecology controlled and minimized
Plantation Protection and Maintenance Operations	(LAND) Pedology	• Soil contamination by municipal and hazardous wastes	• Proper implementation of the IWMP • Best housekeeping practices	100% implementation of IWMP	Soil contamination controlled and minimized
		• Soil erosion	• Sustained implementation of the SEMP	100% implementation of SEMP	Soil erosion controlled and minimized
	(LAND) Terrestrial ecology	• Vegetation removal • Threat to existence of important indigenous species • Threat to Abundance, Frequency, and Distribution of Important Species • Hindrance to Wildlife Access (avifauna)	• Sustained implementation of the Buffer Zone Plan • Proper Implementation of the Tree Survival and Monitoring Plan • Proper Implementation of the Vegetation and Tree Planting Program during Operations • Sustained implementation of the Biodiversity Conservation Plan (BCP) • Proper Implementation of the Wildlife Monitoring Plan (WMP) • Proper Implementation of the BMS	100% implementation of Plans mentioned	Impacts to terrestrial ecology controlled and minimized

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention, Mitigation or Enhancement	Target Efficiency	Residual Effects
Harvesting	(LAND) Terrestrial ecology	• Vegetation removal and loss of habitat • Threat to existence of important local species, abundance, frequency and distribution of important species • Hindrance to wildlife access.	• Sustained implementation of the Buffer Zone Plan • Proper Implementation of the Tree Survival and Monitoring Plan • Proper Implementation of the Vegetation and Tree Planting Program during Operations • Sustained implementation of the Biodiversity Conservation Plan (BCP) • Proper Implementation of the Wildlife Monitoring Plan (WMP) • Proper Implementation of the BMS	100% implementation of Plans mentioned	Impacts to terrestrial ecology controlled and minimized
	(WATER) Hydrology	• Change in drainage morphology • Inducement of flooding • Increase in run-off	• Provide temporary drainage system • Provide detention ponds in the immediate drainage outlet to maintain the peak runoff • Formulate a Flood Management Plan (FMP) for the operation phase	100% implementation of FMP	Flooding and run-offs minimized
	(WATER) Water quality	• Vegetation removal may have potential impact on siltation • Degradation of surface water quality	• Best housekeeping practices • Provision of sanitation facilities • Maintain drainage system leading to siltation ponds • Monitor water quality in affected portions of the Agusan and Simulao Rivers, and its tributaries (as necessary)	100% implementation of drainage plan	Water pollution of waterbodies controlled and minimized
	(WATER) Freshwater ecology	• Impact to freshwater biodiversity	• Sustained implementation of the SEMP • Proper implementation of the IWMP • Proper Implementation of the BMS • Provide onsite sanitation facilities • Sustained implementation of protocols to address gasoline and oil spills from boats (if used during operation) using the Agusan River.	100% implementation of SEMP	Impacts to the freshwater ecology controlled and minimized
	(AIR) Meteorology	• Contribution in terms of greenhouse gas emissions	• Regular maintenance of standby generator(s) • Optimize use of motor vehicles	• 100% implementation of necessary equipment maintenance and usage	Insignificant greenhouse gas emissions

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention, Mitigation or Enhancement	Target Efficiency	Residual Effects
			• Prohibit engine idling in parking areas	of Pollution control devices on applicable equipment • 100% implementation of tree planting and reforestation plans	
	(AIR) Air quality	• Degradation of air quality	• Implement dust suppression methods, e.g., water application and vehicle speed restriction • Optimize the use of off-road equipment equipment and motor vehicles • Compacting of exposed soil surfaces • Provide tarpaulin cover on trucks loaded with logs • Regular maintenance of off-road equipment equipment and motor vehicles • Prohibit engine idling in parking areas	100% implementation of necessary equipment maintenance and usage of Pollution control devices on applicable equipment	Air pollution controlled and minimized
	(AIR) Noise	• Noise pollution	• Regular maintenance of off-road equipment • Maintain vegetated buffer along the perimeter	Continuous Monitoring of noise level in the project site.	Excessive noise levels attenuated
	(PEOPLE)	• Threat to public health and safety	• LEPI's vaccination plans and to sustain the minimum health protocols in conformance with the national and local guidelines • Provide onsite sanitation facilities • Regular and proper maintenance of vehicles • Proper operation and maintenance of sanitary facilities • Proper implementation of the IWMP	100% implementation of health and safety management plan.	Threat to public health and safety controlled and minimized
Log Storage and Transportation and Road Maintenance	(LAND) Pedology	• Soil erosion	• Sustained implementation of the SEMP	100% implementation of IWMP	Soil contamination controlled and minimized

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention, Mitigation or Enhancement	Target Efficiency	Residual Effects
		• Soil Compaction	• Sustained implementation of the SEMP	100% implementation of SEMP	Soil erosion controlled and minimized
	(AIR) Meteorology	• Contribution in terms of greenhouse gas emissions	• Optimize use of heavy vehicles • Prohibit engine idling in parking areas	• 100% implementation of necessary equipment maintenance and usage of Pollution control devices on applicable equipment • 100% implementation of tree planting and reforestation plans	Insignificant greenhouse gas emissions
	(AIR) Air quality	• Degradation of air quality	• Implement dust suppression methods, e.g., water application and vehicle speed restriction • Optimize the use of heavy equipment and motor vehicles • Compacting of exposed soil surfaces • Provide tarpaulin cover on trucks loaded with logs • Regular maintenance of heavy equipment and motor vehicles • Prohibit engine idling in parking areas	• 100% implementation of necessary equipment maintenance and usage of Pollution control devices on applicable equipment	Air pollution controlled and minimized
	(AIR) Noise	• Noise pollution	• Maintenance of heavy equipment • Maintain vegetated buffer along the perimeter	Continuous Monitoring of noise level in the project site.	Excessive noise levels attenuated

Project Phase / Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention, Mitigation or Enhancement	Target Efficiency	Residual Effects
	(PEOPLE)	• Threat to public health and safety	• LEPI's vaccination plans and to sustain the minimum health protocols in conformance with the national and local guidelines • Provide onsite sanitation facilities • Regular and proper maintenance of vehicles • Proper operation and maintenance of sanitary facilities • Proper implementation of the Traffic Management Plan • Proper implementation of the IWMP	100% implementation of health and safety management plan.	Threat to public health and safety controlled and minimized
		• Traffic congestion	• Proper implementation of the Traffic Management Plan	100% implementation of Traffic Management Plan	Traffic congestion and accidents controlled and minimized
ABANDONMENT / REHABILITATION PHASE					
Administrative Works	(PEOPLE)	• Possible loss of employment / • Loss of livelihood	• Series of consultations with stakeholders before implementation of abandonment for proper turn-over of constructed facilities and structures	100% of stake holders representatives involved 100% implementation of Abandonment and Rehabilitation Plans	Local benefits from the project maximized
Rehabilitation/ Restoration	(LAND)	• Land use change			