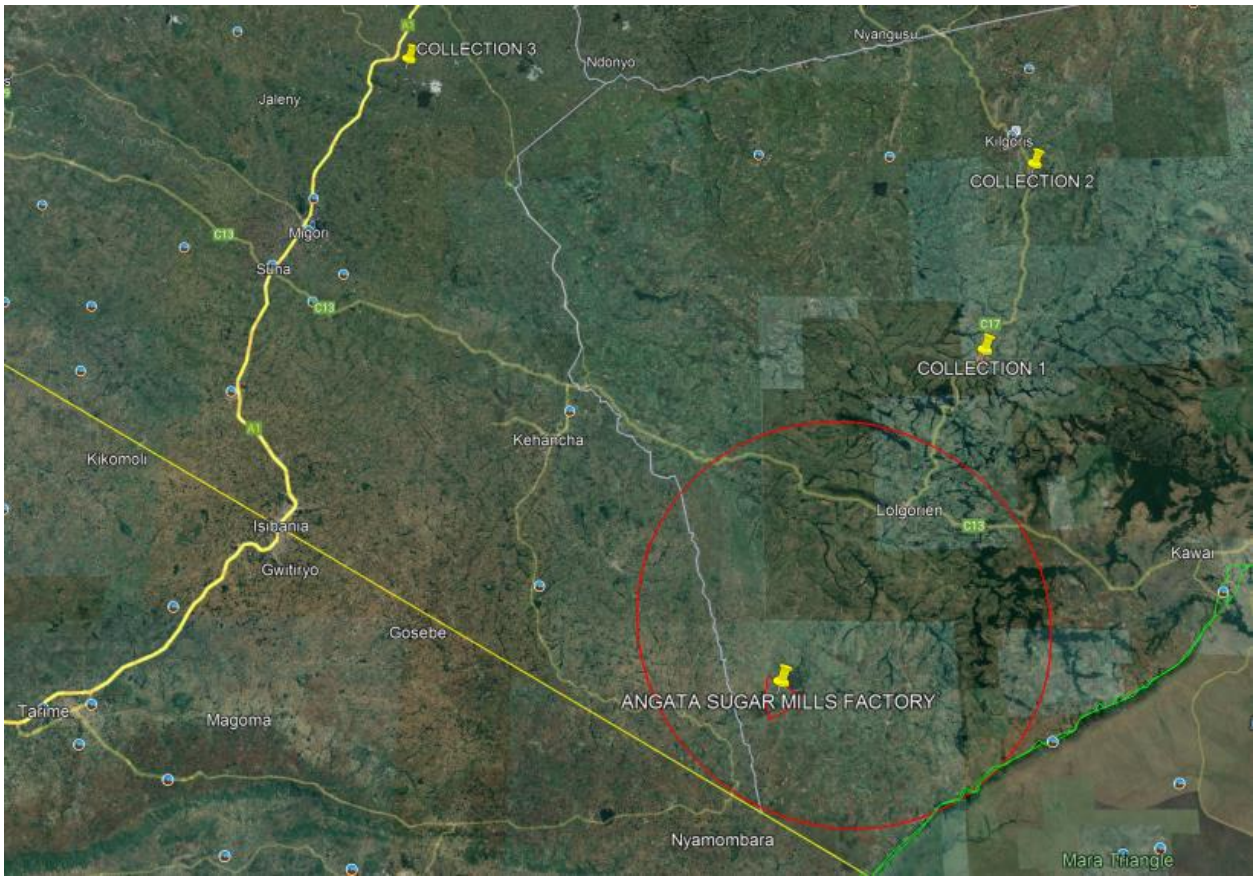
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY FOR THE PROPOSED SET UP OF A SUGAR PROCESSING PLANT TO BE LOCATED IN NAROK COUNTY ON LR NO TRANSMARA/MOYOI/195 BY ANGATA SUGAR MILLS LIMITED



ANGATA SUGAR MILLS LIMITED
P.O. BOX 3105-10621
NAIROBI
E-mail: info@angatasugar.com

DECLARATION

This Environmental and Social Impact Assessment has been prepared in accordance with the Environmental Management and Coordination Act (EMCA) 1999 amended in 2015 and the environmental (Impact Assessment and Audit) Regulations 2003 (amended 2019) for submission to the National Environment Management Authority (NEMA).

Prepared by: -

Matthew O. Were (EIA/EA NEMA registered Lead Expert No 1454)

On behalf of JKH Holding Limited

Signature: ..... **Date:** 20/02/2023

FIRM OF EXPERTS

JKH Holding Limited

(NEMA Registration No 10135)

JKH HOLDING LIMITED
Date: 20/02/2023
P.O. BOX 10277-00100, NAIROBI KENYA

THE PROPONENT

We confirm that this ESIA was prepared and forwarded to NEMA with our authority as the project proponent.

Proponent's Management Representative: -

Designation: -

Signature: ..... **Date:** 20/03/2023

On behalf of Angata Sugar Mills Limited (Proposed)

ANGATA SUGAR MILLS LIMITED
P. O. Box 3105 - 00621
NAIROBI, KENYA

Table of Contents

DECLARATION 1
EXECUTIVE SUMMARY 6
CHAPTER ONE 28
1.0 INTRODUCTION 28
1.1 Background 28
1.2 Rationale of the Proposed Project 29
1.3 Aim/Purpose of the ESIA Study 29
1.4 Scope of Work for the ESIA Study 29
1.5 Approach/Methodology for the ESIA Study 29
1.5.1 Field Inspections and trekking 30
1.5.2 Review of Available Literature 30
1.5.3 Stakeholder Identification and Consultations 31
1.5.4 Data Analysis and Reporting 31
CHAPTER TWO 32
2.0 POLICY, LEGISLATIVE AND ADMINISTRATIVE FRAMEWORK 32
2.1 National Policies and Regulations 32
2.2 National Policies 32
2.3 National Legislation 34
2.4 Institutional Framework 43
2.5 International Conventions 44
2.6 Relevant Legal Approvals – Permit/Licenses/Certificates 46
CHAPTER 3 47
3.0 DESCRIPTION OF THE PROPOSED PROJECT 47
3.1 Project description 47
3.2 Description of the proposed processes flow 47
3.2.1 Sugar Plant 47
3.3 Preliminary Design Basis of the Angata Sugar Mills Factory 48
3.3.1 General 48
3.4 Cleaner Production 49
CHAPTER FOUR 52
4.0 CONSIDERATION OF ALTERNATIVES 52
4.1 Project alternative considerations 52
4.1.1 Alternative to proposed site 52
4.1.2 Alternative land use activities 52

4.1.3 Alternative materials and technology 52
4.1.4 Solid waste management alternatives 53
4.1.5 The no project alternative 53
CHAPTER 5 54
5.0 BASELINE ENVIRONMENTAL AND SOCIAL CONDITIONS 54
5.1 Project location 54
5.2 Overview of Narok County 54
5.2.1 Population, Size and Composition 54
5.2.2 Climate 55
5.2.3 Topography 55
5.2.4 Hydrology 55
5.2.5 Biological Environment 55
5.2.5.1 Flora 55
5.2.5.2 Fauna 55
5.2.6 Socio Economic Environment 56
5.2.6.1 Land Area and Administration 56
5.2.6.2 Ethnic groups 56
5.2.6.3 Education 56
5.2.6.4 Health 56
5.2.6.5 Agriculture 56
CHAPTER SIX 58
6.0 STAKEHOLDER CONSULTATIONS 58
6.1 Objectives of the Stakeholder Engagement 58
6.2 Guiding Principles of the Stakeholder Engagement Plan 58
6.3 Stakeholder Identification 59
6.4 Stakeholders Engagement Plan (SEP) 59
6.4.1 Overview of SEP 59
6.4.2 Stakeholder Engagement Process 60
6.4.3 Stakeholder Consultation Process 60
6.4.4 Project Stakeholder Identification Process 61
6.4.5 Stakeholder's Relevance to the Project 61
6.4.6 The Public Consultation 63
6.4.7 Community Perceptions of the Project 64
CHAPTER SEVEN 65
7.0 IMPACT ANALYSIS APPROACH AND METHODOLOGY 65

7.1 Impact Assessment 65
7.1.1 Identification of Potential Environmental and Social Issues and Impacts 65
7.1.2 Evaluation and Interpretation of Impacts 65
7.1.2.1 Impact Identification Characterization 65
7.1.2.2 Determining Impact Magnitude 67
7.1.2.3 Determining Receptor Sensitivity 67
7.1.2.4 Assessing Significance 68
7.1.3 Mitigation and Control 69
CHAPTER 8 70
8.0 POTENTIAL IMPACT IDENTIFICATION AND ASSESSMENT 70
8.1 Introduction 70
8.2 Project Activities of Environmental and Social Concern 70
8.2.1 Preparatory Phase Activities 70
8.2.2 Construction Phase Activities 70
8.2.3 Operational and Maintenance Phase Activities 70
8.2.4 Decommissioning Phase Activities 71
8.3 Evaluation of Potential Positive Impacts 71
8.3.1 Employment Opportunities, Local Resources use and improved local economy 71
8.3.2 Availability of sugar and improved environmental protection 71
8.3.3 Improved Institutional and National Revenue 71
8.3.4 Transfer of skills 71
8.3.5 Improvement of the area's infrastructure and land value 72
8.4 Evaluation of Adverse Impacts from the Proposed Project 72
CHAPTER 9 73
9.0 Potential Impacts and Mitigation Measures 73
CHAPTER 10 96
10.0 ENVIRONMENTAL MANAGEMENT PLAN 96
10.1 Introduction 96
CHAPTER 11 110
11.0 CONCLUSION AND RECOMMENDATIONS 110
11.1 Conclusion 110
11.2 Recommendations 111

EXECUTIVE SUMMARY

Angata Sugar Mills Limited (ASML), herein referred to as the proponent proposes to construct and operate a sugarcane milling factory with its auxiliary supporting facilities such as the effluent treatment plant (ETP), water treatment plant for the process water among others.

Globally, sugarcane growing and production has been practiced for centuries particularly in Asia, Europe, The Americas and Africa. The enterprise is common in plantation, large scale and small-scale farms. In Kenya, sugarcane cultivation activities are practiced mainly in Nyanza, Western Rift Valley and Coastal regions. The industry has contributed to the growth of economic development, particularly in the sectors of manufacturing and trade.

Sugarcane is the cash crop and main source of sugar around the world. Sugar is one of the key commodities that is processed and consumed worldwide. In Kenya, sugarcane crop has been ranked among the top six commercialized plants grown as indicated in a report by the Ministry of Agriculture, Livestock, Fisheries and Co-operatives titled Agricultural Transformation and Growth Strategy (ASTGS) 2019-2029. It is based on this that the sugar sub-sector has been considered as a vital contributor to the country's agricultural and economic sector, ASML sees an opportunity to invest in this sector and play a positive role in developing Kenya's industrial growth.

The proponent is proposing to setup a sugar processing plant to be located in Narok County. The project is very keen to ensure maximum use of the space allocated and establishment of infrastructure necessary of the operation of such entity thereby ensuring that wider economic benefits are passed onto the counties and the country at large associated with this project. The proposed project is in alignment with Kenya's pillar of foundations of macroeconomic stability in vision 2030. The proposed structural cost for the sugar mill and ancillary buildings will be Ksh 804,175,000.00 (Eight Hundred and Four Million, One and Seventy Five Thousand).

Purpose of the ESIA and Compliance with relevant laws and regulations

The purpose of the ESIA is to identify and address possible direct, indirect significant adverse environmental and social impacts to arise from the proposed project for acceptability and sustainability; and to satisfy both legal and institutional obligations specified under the Environmental Management and Coordination Act (EMCA) 1999 amended in 2015 and Environmental (Impact Assessment and Audit) Regulations 2003 amended in 2019. The project will also ensure compliance with all relevant national and international laws and regulations that govern such projects. A final ESIA study report will be submitted to the National Environmental Management Authority (NEMA) for an Environmental Permit.

ESIA Study Approach and Methodology

The approach and methodology adopted for the study included:

a) Field inspections and trekking;
b) Review of available literature;
c) Specialized studies for baseline information;
d) Stakeholder consultations;

e) Data analysis and assessment of potential environmental and social risks and impacts;
f) Development of Impact Mitigation and Control Measures;
g) Development of an Environmental Management Plan (EMP); and
h) Reporting.

Major Potential Impacts

The indirect positive impacts of the project will have a far-reaching effect nationwide from the construction and operation of the sugar factory.

The direct potential positive impact activities include:

a. Employment opportunities/job creation;
b. Improved local economy through payment of various taxes and use of local resources during project implementation;
c. Meeting the high demand for sugar in the country;
d. Improved institutional, county, and national revenue;
e. Improved infrastructure and security;
f. Additional social amenities, e.g. schools, dispensaries, social halls and boreholes/ water points;
g. Increased business opportunities;
h. Ready market for local goods and raw materials
i. Saving of foreign exchange for the country through reduced sugar imports;
j. Reduced urban migration of local community to major towns; and
k. Through this project, about 15,000 farmers will directly benefit through sugarcane farming

The potential adverse impacts and risks include:

a. Preparatory and Planning Phase

i. Land/wayleave Acquisition
ii. Occupational Health and Safety

b. Construction Phase

i. Air quality deterioration
ii. Vibration and noise nuisance
iii. Loss of vegetation and impacts on flora and fauna
iv. Sanitation/waste generation issues
v. Labour influx issues
vi. Occupational health and safety concerns and labour issues
vii. Public health and safety issues
viii. Traffic impact
ix. Surface water contamination/ impact on aquatic organisms

c. Operation and Maintenance Phase

i. Air quality deterioration
ii. Greenhouse Gas Emissions and Impact on Climate Change
iii. Contamination of Environment/ impact on flora and fauna
iv. Waste storage and disposal
v. Occupational health and safety concerns and labour issues

vi. Public health and safety issues

d. Post Construction Decommissioning Phase

The post-operational decommissioning phase impacts will be addressed in a separate section. The significant adverse impacts during the post-construction decommissioning phase will be similar to the construction phase impacts in general, in addition to loss of jobs.

Impact Mitigation and Management

The mitigation and management measures for the identified significant adverse impacts are provided in the table labelled *Summary of potential impacts and mitigation measures* below.

The application of the mitigation measures in general is expected to reduce major and moderate impacts to minor or negligible impacts that may not require further mitigation.

Environmental Management Plan

An Environmental Management Plan (EMP) is developed for the project in accordance with the EMCA 1999 (amended in 2015) and Environmental (Impact Assessment and Audit) Regulations 2003 (amended in 2019), to assist the project to be carried out in an environmentally safe and sustainable manner. The EMP addresses issues related to the following:

i. Adoption of Environmental Health and Safety Policy and Operational Procedures;
ii. Adoption of Environmental Health and Safety Management System;
iii. Development of Specific Environmental/Social Management Plans;
iv. Technical Co-operation;
v. Staff Information and Awareness Creation;
vi. Public and Community Participation;
vii. Construction and Operational Phases Impact Management Plan;
viii. Environmental and Social Monitoring Programmes;
ix. Audits and Reviews;
x. Capacity Building and Training;
xi. Grievance Redress Mechanism;
xii. Community Development/Social Responsibility;
xiii. Environmental Reporting;
xiv. Emergency Response Planning; and
xv. Environmental and Social Management Budgeting.

Table 1: Summary of potential impact and mitigation measures

Anticipated Environmental and Social Impacts	**Receptor(s)**	**Proposed Mitigation and Management Measures**
Preparatory and Planning Phase		
Project site Acquisition	All institutions within the project site	i. Ensure all stakeholders are engaged in the early stage of the project. ii. Project plans and designs must be discussed and

		agreed by location owners. iii. All permits and necessary documentation needed for acquiring the site must be approved. iv. Angata Sugar Mills Limited and the Contractor will liaise with the county to access the option of providing a toilet facility for use to prevent open defecation if necessary. v. Disclose public information of the project.
Occupational health and safety	Angata Sugar Mill Limited Company staff, contractors and consultants	i. The various contractors to be engaged will be required to comply with the Kenyan Occupational Health and Safety Policy when working within the project site. ii. The contractor will be required to provide first Aid Kits on site to treat minor ailments and cuts. However, major cases will be referred such as Lolgorian Level IV General Hospital. iii. The owner as well as their various contractors will be required to provide the appropriate personal protective equipment (PPEs) such as safety boots and coats, hand gloves, earplugs and nose masks when carrying out their operations. Supervisors will be mandated to ensure the use of these protective devices and implement sanctions when necessary. iv. Ensure that well-trained workers will be engaged for the various construction roles.
Construction Phase Impacts		
Air Quality Deterioration	Workers/ Local communities and road users	i. Dust emissions from trucks, will be controlled and

		minimized by the use of designated routes in order to minimize impacts to residents, construction workers, users and institutions along the transport route. ii. Ensure vehicular speed limits of 30kph over any unpaved landscape to minimize dust generation. Material dumping will be regulated to reduce dust emissions. iii. Owners / operators of construction equipment and vehicles will implement the manufacturer recommend ed engine maintenance programmes to minimize the emission of fumes into the environment. iv. Contractor will monitor dust and remedial action will be taken whenever dust generating activities take place. v. Dust-related grievances will be investigated and managed as part of the Grievance Mechanism.
Vibration and noise nuisance	Workers/local communities and road users	i. The contractor should employ standard noise abatement measures and engineering best practices to ensure that the impact of these issues is minimized and reduced to acceptable limits. ii. The contractor should ensure that earthworks and other construction activities will be phased out or controlled to reduce noise generation during construction. iii. All equipment shall be operated and maintained in accordance with appropriate industry and equipment standards

		including specifications for noise levels and manufacturer's specifications (including regular checks and maintenance). iv. Machines and equipment in intermittent use shall be shut down in the intervening periods between works or throttled down to a minimum.
Loss of vegetation and impacts on flora and fauna	Terrestrial Flora, Fauna	i. Undertake pre-clearing survey and assessment of the flora to be impacted especially if construction will be carried out in the rainy season to help identify sensitive areas such as vegetation with active nesting. ii. The contractor will develop construction code of practice and ensure critical areas is avoided. iii. Allow an appropriate buffer distance between any construction activity and remnant native vegetation, where practicable. iv. Limit construction activities to only designated places and clearly mark out all vegetation, which will not be cleared, so that they are clearly visible as "no-go areas" to construction staff and vehicles. v. Dismantle and remove all equipment and machinery after construction from site. vi. Rehabilitate trenches and disturbed areas as soon as possible.
Sanitation/Waste Generation Concerns	Soil, Roads	**General Waste** i. The contractor must appoint a waste management coordinator. The coordinator shall

		prepare and implement a Waste Management Plan which specifies procedures and, incorporates the existing waste management plan for the proposed project. This is to facilitate tracking of loads, and protocols for the maintenance of records of the quantities of wastes generated, recycled and disposed. ii. Waste remaining after implementation of the waste hierarchy measures will be collected by private waste management companies who are NEMA licensed. iii. The contractor should provide adequate waste bins at the temporary work camps to minimize littering of the project site. The collected refuse will then be transferred to the approved disposal site. iv. Good site practices shall be implemented to avoid waste generation and promote waste minimization. **Construction Waste** i. All scraps or other solid wastes will be disposed of at the approved disposal site. ii. Excavated soils/concrete will be reused as much as possible for backfilling trenches dug during construction. iii. Contaminated soil will be considered as waste material and disposed of accordingly at the authorized Landfill Site. iv. Excavated material shall be used on site to the extent practical. **Hazardous Waste**

		All hazardous waste (e.g. oily waste) generated during construction/installation will be appropriately stored as per manufacturer's instructions. For onward recycling, treatment or disposal, NEMA approved hazardous waste collectors will be engaged for collection and disposal of all hazardous waste.
Labour influx issues	Local communities	i. Angata Sugar Mills Limited will implement a labour influx management plan to holistically address labour influx issues. ii. Angata Sugar Mills Limited will implement a stakeholder engagement plan that will include: a. Informing stakeholders of increases in workforce and potential for influx. b. Engaging with local government/traditional authorities on issues, risks and opportunities regarding labour influx. c. Engaging local communities to understand their concerns, raise awareness of risks and opportunities, and identify solutions to issues relating to labour influx. d. Developing a feedback and grievance mechanism to collect any feedback or complaints related to labour influx associated with the project.
Occupational Health and Safety Concerns and Labour Issues	Workers	**Adoption of Health and Safety Policies** The contractor will be required to prepare and implement health, safety and environmental protection construction activities in

		compliance with the policy of OSHA. The responsibility for implementing this policy lies directly and personally with the contractor through its workers. The policy objectives shall include the following: a. Conduct activities in the project site in accordance with relevant national and international laws and regulations on occupational health and safety. This Relations Act, 2007; The Work Injury Benefits Act, 2007; The Employment Act, 2007; The public Health Act (Cap 242); The Factories and other organizational framework for the efficient and effective management of occupational health, safety and environment issues; b. Maintain safe plant, machinery and equipment; c. Maintain incident and injury-free working environments; d. Prevent occupational related diseases/ illness among workers; and e. Promote and maintain a clean, healthy and hygienic environment. **The Contractors Occupational Health and Safety Plan (OHSP)** i. The contractor will be required to develop an Occupational Health and Safety Plan (OHSP), including requirements for PPE, task risk assessment, mandatory training, audit and monitoring, incident reporting etc. ii. The Contractor will apply the hazard hierarchy when

		planning work to avoid/eliminate risks and reduce risk to as low as reasonably practical. iii. The contractors will educate workers on its health and safety policy. Workers will therefore be required to follow the health and safety policy developed prior to commencement of the works. The adoption of the health and safety policy at site will serve as a precautionary measure to prevent/ minimize the possibility of accidents and reduce health associated risks. iv. The contractors will train selected workers as first aid givers and provide adequate first aid kits at the construction minor ailments and cuts. However, major cases will be referred well developed medical hospitals such as the Lolgorian Level IV General Hospital. **Use of Experienced Personnel** i. The contractors will ensure that well-trained workers will be engaged for the various construction roles. Only drivers with the requisite licenses will be allowed to moving equipment within the project site. Initial training and testing given to all new drivers, operators and other field workers to help minimize the occurrence of accidents on site. ii. The contractors will ensure that regular defensive driving training sessions are organized for the drivers to ensure their safety and the

		safety of the general public. iii. Provision of Personal Protective Equipment (PPE). iv. The contractor will ensure that workers are provided with the appropriate personal protective equipment such as safety boots and coats, hand gloves, earplugs and nose masks. Supervisors will be mandated to ensure the use of these protective devices and implement sanctions when necessary. **Phasing out of Material Movements/ Scheduling Material Movements** Movement of tanks, pipes and other construction materials to site or storage areas will be carried out in phases and properly regulated to control the number of cargo vehicles coming into the project site at any given time to reduce the risk of accidents. Angata Sugar Mills Limited intends to carefully plan materials movement to minimize these impacts. Materials and equipment will be transported to the sites during off peak periods. **Use of Equipment** All equipment to be used will be in good condition and scheduled regular maintenance will be ensured to reduce/minimize of accidents. **Worker Rights and Wellbeing** The Contractor will develop and implement a Human Resource Policy and plan that adheres to the requirements of the policy, including requirements for workers to have contracts, Workers Grievance Mechanism and develop retrenchment plans if

		there is a requirement for collective dismissals.
Public Health and Safety, and Security Impacts	Public/Communities	**Restriction of Access** i. Angata Sugar Mills Limited security personnel will maintain security at the proposed site to ensure that only authorized persons are allowed into the construction area. ii. The security personnel will be trained to respect the human rights of the local people. **Public Health /Toilet facilities** i. The contractor will provide mobile toilet facilities for workers during construction of the project. ii. Uncovered trenches or deep excavations will be protected using indicator linings or illustrative warning notices or wire mesh (whichever best suits the situation) to prevent fall hazards. All trenches and excavation will be covered as soon as possible. iii. As much as possible the contractor will adopt progressive opening of trenches to reduce risks to as low as reasonably practicable. iv. Caution/warning signs should be placed at vantage points around the project site **Scheduling of Work** i. The contractor will analyze traffic flows and ensure that the transport of equipment is carried out during low peak periods. ii. Announcement and Notification of Work Transport of Equipment and Materials.

		iii. Traffic impacts resulting from carting of equipment and materials will be limited to the selected project roads and will be managed in line with the Traffic Management Plan to be prepared by the contractor for the movement of materials. iv. The traffic management plan will be prepared in consultation with Narok County Government in order to minimize congestion on roads within the project site. v. All the vehicles to be used for the project and especially in transporting equipment and materials will be serviced regularly and all the drivers to be engaged/assigned, would be required to hold the requisite driver's license as prescribed by the National Transport and Safety Authority (NTSA), and would be educated on public safety issues. Adequate traffic management measures will be instituted to caution the public and to create safety awareness. vi. Some adequate measures and conditions to be instituted by the contractor in the transport of materials include the following: a. Haulage of materials including quarry products to the project site will be limited to off-peak hours; b. Trucks transporting quarry products and other friable materials to the project site will be covered; c. Road worthy dump trucks will be used;

		d. Very experienced drivers will be engaged; e. Traffic wardens will monitor dump truck movements and ensure public and traffic safety; and f. Carry out regular inspections of haulage roads. In the event truck failure along haulage routes, such trucks will be towed within 24 hours.
Road crossing and traffic impact	Commercial and private vehicles	i. The contractor will be required to schedule its work such that crossing of the untarred access road is done when traffic is low to minimize inconvenience to motorists. ii. Where the untarred access road has to be blocked for work to proceed smoothly, adequate signs and notices will be strategically placed at diversion routes. iii. Any damaged sections of the roads will be reinstated by the contractor
Operations and Maintenance Phase Impacts		
Air Pollution	Workers and other users	Facility operator will incorporate the Air Quality Management Plan into standard operations. The plan will include the following: a. Dust from vehicular movement b. Dust from cleaning activities c. Exhaust emission from vehicles and machinery d. Fumes from chemicals and welding e. Volatile Organic Compounds (VOCs) from fuel storage areas f. Noise from operation of machinery g. Monitoring Regular maintenance of machinery/ equipment in accordance with manufacturers' specifications to ensure minimum

		levels of emission from the factory operations.
Waste Management	Workers and users	**Education campaigns** The facility operator will ensure proper management and disposal of waste generated and will continue to educate workers on its waste management plan. **Waste Collection and Disposal** i. The facility operator will appoint a waste management coordinator. The coordinator shall prepare and implement a Waste Management Plan which specifies procedures and, incorporates the existing waste management plan for the project. This is to facilitate tracking of loads, and protocols for the maintenance of records of the quantities of wastes generated, recycled and disposed. ii. Ensure different types of waste are segregated in different containers or skip to enhance recycling of material and proper disposal of waste. iii. Ensure chemical wastes are stored, handled and disposed of in accordance with the Waste Management Regulations (2006)
Noise Nuisance	Factory workers	i. The project operators will ensure that silent equipment (low noise versions, which may cost a little extra) are used in the project. Additionally, silencers, mufflers and other appropriate engineering control devices shall be used on the noise generating equipment. Where possible, electrical instead of diesel or diesel-electric moving equipment will be used.

		ii. Reduce noise levels through optimizing the plant's layout iii. Regular site inspections will be carried out to audit the compliance with regard to noise control. iv. The project operators will provide appropriate PPEs for workers use.
Occupational Health and Safety concerns and Labour Issues	Factory workers and subcontractors	**Training in equipment and chemical handling** i. Risk assessments will be undertaken and avoidance / elimination of hazards prioritized to reduce the need for manual handling of chemicals. ii. The plant's operator will also ensure that workers handling fuels, chemicals, machinery and equipment are well trained. Such workers will be provided with the necessary documentations including Material Safety Data Sheet (MSDS) to serve as reference sources on the dangers and ways of handling these chemicals, fuels etc. **Provision of appropriate PPEs** i. The facility operators will ensure that the Management provide workers with adequate personal protective equipment (PPEs) including overalls, earplugs, and safety gloves etc. as their particular operations would require. ii. Non-conductive hand tools rated for the voltage at which live electrical work is being performed at a section will be provided. iii. Caution/warning signs should be placed at

		vantage points around the site **Preventive Measures** The facility operator will prepare comprehensive maintenance programme on commencement of operations to put in place measures to avert any serious breakdowns or failures. The required maintenance for the systems will include among others: a. Environmental incident / accident investigation; b. Routine equipment maintenance/ inspection schedule; c. Annual equipment inspection and maintenance record; d. Procedure for pre-arranged repair service; e. Procedure for preventive maintenance; and f. Regular calibration of equipment. The following safety precautions will be implemented to minimize danger of electrocution at the factory: a. As much as possible avoid working on live electrical parts except when de-energizing the equipment the equipment creates additional hazards or when the equipment must be energized to allow for testing that can only be performed live. b. Permit to work system will also be implemented for hot works, electrical works and work at height. c. Prior to initiation of hot works, it will be checked that there is no flammable material, gas or dry woodwork which could catch fire; and that surfaces which have been

		in contact with hydrocarbons or toxic substances are completely clean. d. Ensure that all staff working on live equipment or lines will be without conductive apparel (watches, bracelets, rings, key chains, necklaces, zippers, cloth with conductive thread, etc.) e. Provide barricades and signage for all live electrical equipment **Emergency Provisions** The facility operators will implement its emergency response plan (to be developed from the framework plan to be provided). The plan which will incorporate the emergency response plan set by Angata Sugar Mills Limited Company and it will include information on how all emergency situations will be handled including fire, mechanical failures etc. that will arise from operations to minimize any hazards to humans and the environment. Management will ensure a yearly review of the plan. **Housekeeping** Good housekeeping practices will be an integral part facility operation to maintain a well laid out working space and avert accidents resulting from slippage, fires from torn electrical wires, cobwebs etc.
Public Health, Safety and Security	Factory workers, Local communities, General Public	i. The design of the facility has incorporated adequate safety and security considerations as provided in Section on project description in this ESIA Study, and the operations of the facility will incorporate a scheduled inspection, monitoring and

		maintenance regime to avoid accidents. ii. Angata Sugar Mills Limited will collaborate with its selected security personnel to maintain security of the facilities within the project site environment to ensure that only authorized persons have access to the facilities. iii. Angata Sugar Mills Limited will engage private security firms and also involve key local community members in maintaining security of the facilities. iv. The security firm and the key community members will be hired and trained to comply with required security protocols for operations of such facilities. The security people will also be trained to respect human rights of the local people to avoid conflicts and human right abuses. v. Angata Sugar Mills Limited will define a protocol for community reporting of observed incidents. vi. Angata Sugar Mills Limited will identify emergency scenarios and develop emergency preparedness and response plans with allocation of responsibilities to local communities and authorities, (where appropriate). vii. Angata Sugar Mills Limited will continue safety awareness and education programs for impacted communities. viii. Angata Sugar Mills Limited will carry out community awareness /sensitization on the above guidelines to be developed

		regarding public access/use restrictions and safety. ix. Angata Sugar Mills Limited will organize, in collaboration with the respective local community representative members i.e. chiefs and elders and the County Government Health Department, awareness creation seminars and educational programmes for all workers and the general public on the behavioral changes required to prevent the spread of HIV/AIDS and other STDs.
Accidental events and impacts on terrestrial ecology and property	Factory workers and Local communities	i. The design of the facilities has incorporated adequate safety and security considerations as provided in the project description section of the study, to minimize potential accidents. ii. Angata Sugar Mills Limited will develop and implement an emergency preparedness and response plan in collaboration with relevant stakeholders including relevant government authorities as it is deemed appropriate.
Sustainability of the sugar project	County government of Narok/ Ministry of Agriculture, Livestock, Fisheries and Co-operatives / Factory workers	i. The Management of Angata Sugar Mills Limited will seek to operate profitably by implementing a system to collect appropriate user charges to cover the running and maintenance cost of its facilities. ii. The factory will develop and implement an emergency response plan to handle all emergencies including fire and security

		issues that will arise from all its operations to minimize any hazards to humans and the environment. Management will ensure a periodic review of the plan. iii. A comprehensive maintenance programme will be put in place to avert any serious breakdowns or failures or accidents. The required maintenance for the systems will include among others: a. Environmental incident/ accident investigation; b. Carry out mock fire response drills; c. Routine equipment maintenance/ inspection schedule; d. Annual equipment inspection and maintenance record; e. Procedure for pre-arranged repair service; f. Procedure for preventive maintenance; g. Procedures for handling materials; iv. Coordinate with other agencies and organizations to provide technical assistance to inform activities and programs that can support the project. v. Ensure resource use efficiency influencing supply chain sustainability. vi. Adopt a comprehensive monitoring plan to ensure effective implementation of mitigation and management measures.
Decommissioning Phase		
Post-construction phase		
Loss of jobs after preparatory and construction phases	Preparatory and construction phase workers	i. All workers to be engaged by the Contractor will be informed that their engagement is temporary and ends after

		construction, and that their engagement is not a guarantee for reemployment during the operational phase. ii. The contracts for all consultants to be involved during the preparatory and construction phase will clearly indicate the duration of their assignment.
Occupational health and safety	Similar to construction phase	Apply mitigation measures for construction phase
Post-operation phase		
Loss of job	Operation and decommissioning pha se workers	A retrenchment policy will be developed and included in the condition of service/service agreement for workers for them to know what they will be entitled to during retrenchment and closure of the affected company/ operator.
All other impacts	Bio-physical and social Environment	A detailed EIA will be carried out for approval and permitting by the operator before final decommissioning to confirm all impacts and appropriate mitigation measures to be implemented.

Conclusion

Results from the ESIA study show that the proposed Angata Sugar Mills Factory will have numerous positive socio-economic impacts as outlined earlier. However, the negative environmental impacts resulting from establishment of the facility are mitigatable. Therefore, implementation of an Environmental Management Plan will assist in dealing with environmental issues during the various project cycles. In addition to this, stakeholders are willing to participate in project implementation where necessary to help ensure that the project is implemented in an environmentally friendly and socially acceptable manner to the benefit of the country. The local communities however expect that appropriate measures will be put in place to address the potential risk especially explosion identified during the engagement.

This proposed project is therefore recommendable for approval by the National Environment Management Authority (NEMA) for issuance of an EIA license.

CHAPTER ONE
1.0 INTRODUCTION
1.1 Background

Angata Sugar Mills Limited (ASML), herein referred to as the proponent proposes to construct and operate a sugarcane milling factory with its auxiliary supporting facilities such as the effluent treatment plant (ETP), water treatment plant for the process water among others.

Globally, sugarcane growing and production has been practiced for centuries particularly in Asia, Europe, The Americas and Africa. The enterprise is common in plantation, large scale and small-scale farms. In Kenya, sugarcane cultivation activities are practiced mainly in Nyanza, Western Rift Valley and Coastal regions. The industry has contributed to the growth of economic development, particularly in the sectors of manufacturing and trade.

Sugarcane is the cash crop and main source of sugar around the world. Sugar is one of the key commodities that is processed and consumed worldwide. In Kenya, sugarcane crop has been ranked among the top six commercialized plants grown as indicated in a report by the Ministry of Agriculture, Livestock, Fisheries and Co-operatives titled Agricultural Transformation and Growth Strategy (ASTGS) 2019-2029. It is based on this that the sugar sub-sector has been considered as a vital contributor to the country's agricultural and economic sector, ASML sees an opportunity to invest in this sector and play a positive role in developing Kenya's industrial growth.

The proponent is proposing to setup a sugar processing plant to be located in Narok County. The project is very keen to ensure maximum use of the space allocated and establishment of infrastructure necessary of the operation of such entity thereby ensuring that wider economic benefits are passed onto the counties and the country at large associated with this project. The proposed project is in alignment with Kenya's pillar of foundations of macroeconomic stability in vision 2030. The cost of the proposed project is $33.8 Million.

The proposed project will be located in Transmara West Sub-county, Narok County, on LR No. TRANSMARA / MOYOI / 195 that covers an area of 200 acres (GPS latitude -1.36507, longitude: 34.7708).

The Kenya Government policy on all new projects, programmes or activities requires that a project of this nature undergoes the process an Environmental and Social Impact Assessment during its planning stages to ensure that significant impacts on the environment and social aspects are taken into consideration during the design, construction, operation and decommissioning of the facility. The scope of this Environmental and Social Impact Assessment, therefore, covered:

i. The baseline environmental conditions of the area;
ii. Description of the proposed project;
iii. Description of the relevant environmental laws;
iv. Identification and discussion of any adverse impacts to the environment anticipated from the proposed project;
v. Description of appropriate mitigation measures;

vi. Preparation of an environmental management plan outline for all the phases of the project.

1.2 Rationale of the Proposed Project

The status of sugarcane production in Kenya in recent past years has been substantially inconsistent. Areas under cane farming have remained relatively high, but the output of sugarcane per hectare has suffered remarkable decline due to a myriad of factors among them: widespread use of low-quality sugarcane varieties, poor agricultural and land management practices, delayed harvesting of mature sugarcane and general mismanagement of the sugar factories leading to quite a number closing down. The proposed mill intends to reverse this trend by becoming one of the leading sugar production mills in the proposed region and the country at large.

1.3 Aim/Purpose of the ESIA Study

The purpose of the ESIA study is to identify and address possible direct, indirect and cumulative significant adverse environmental and social impacts to arise from the proposed project for acceptability and sustainability. The study aims at satisfying both legal and institutional obligations specified under the Environmental Management and Coordination Act 1999 (amended 2015). This ESIA has also been developed as part of Angata Sugar Mills Limited's commitment to address the requirements of the setting up of such projects in Kenya as set by NEMA, a parastatal under the Ministry of Environment and Forestry in Kenya; to support the identification of project environmental and social impacts in comparison with potential benefits and the requirements for mitigation.

1.4 Scope of Work for the ESIA Study

The scope of work for the ESIA study is to:

a. Provide technical description of the proposed project and identify all activities of environmental/social concern;
b. Establish the existing environmental and socio-economic baseline conditions of the project area of influence;
c. Predict and examine all the significant environmental impacts on the surrounding communities and the general environment during implementation of the proposed project and advise on appropriate mitigation and abatement measures against potential adverse impacts;
d. Provide a monitoring program for predicted impacts;
e. Provide an Environmental and Social Management Plan (ESMP);
f. Document the socio-economic and cultural advantages and disadvantages associated with the proposed project for stakeholders and interested groups to make an informed decision on the level of environmental compromise and permitting;
g. Provide framework to guide the development of an emergency response plan for the project;
h. Provide guidelines to be followed in the event of decommissioning; and
i. Carry out public consultations and include the outcome in the ESIA report with arrangements to address stakeholders' concerns.

1.5 Approach/Methodology for the ESIA Study

The approach and methodology adopted for the study include but not limited to:

i. Field inspections and trekking;
ii. Review of available literature;
iii. Specialists studies for baseline information;
iv. Stakeholders' Consultations; and
v. Data analysis and reporting.

1.5.1 Field Inspections and trekking

Surveys of the proposed project sites were carried out for four days from 30th January 2023 to 2nd February 2023 to confirm the project's area of influence as well as the environmental and social issues that could arise from the implementation of the proposed project. The field studies identified the project's area of influence, key stakeholders, as well as environmental and social issues and conditions to be affected or are likely to develop from the implementation of the proposed project.

1.5.2 Review of Available Literature

The major documents reviewed include:

i. Documents from the project implementers on scope of the project;
    a. Project's site plan
    b. Architectural drawings of the proposed project
ii. Narok County Integrated Development Plan (2018-2022)
iii. Kenya National Bureau of Statistics. (2019). 2019 Kenya Population and Housing Census: Volume II, Distribution of Population by Administrative Units. Nairobi. Retrieved from Africa Check.
iv. Energy and Petroleum Regulatory Authority (2019).
v. Ministry of Environment and Natural Resources. 1999. Environmental Management Coordination Act. Nairobi: Government Press.
vi. Ministry of Environment Kenya. 2004. Legal Notice 31: The Factories and Other Places of Work (Safety and Health Committee) Rules. Nairobi: Government Printers.
vii. Ministry of Environment Kenya. 2006. Legal Notice 120: Environment Management and Coordination (Water Quality) Regulations. Nairobi: Government Printers.
viii. Ministry of Environment Kenya. 2006. Legal Notice 121: Environmental Management and Coordination (Waste Management) Regulations. Nairobi: Government Printers.
ix. Ministry of Environment Kenya. 2006. Legal Notice 160: Environment Management and Coordination (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations. Nairobi: Government Printers.
x. Ministry of Environment Kenya. 2009. Legal Notice 61: Environmental Management and Coordination (Noise and excessive vibration Pollution) (Control) Regulation. Nairobi: Government Printers.
xi. Ministry of Environment Kenya. 2014. Legal Notice 41: Environment Management Coordination (Air Quality) Regulations. Nairobi: Government Printers.
xii. United Nations (UN) Convention on Biological Diversity 1994.
xiii. United Nations Framework Convention on Climate Change (UNFCCC).
xiv. Stockholm Convention on Persistent Organic Pollutants.
xv. Basel Convention on the control of transboundary movements of hazardous wastes and their disposal.

xvi. ILO Conventions

1.5.3 Stakeholder Identification and Consultations

The project proponents have been engaged to understand the project scope, design and implementation and to obtain relevant project documents. Extensive consultations have been held with key stakeholders and interested groups as part of information gathering process on environmental and socio-economic issues by means of one-on one interviews and stakeholder consultation meetings. These include relevant Government Institutions and regulatory bodies, the project beneficiaries, engineers, local political authorities and project interest groups.

The stakeholder engagements also assisted in appreciating the role of the identified stakeholders in the successful implementation of the proposed project. Details of the stakeholders' consultations are provided under Chapter 6.

1.5.4 Data Analysis and Reporting

The data obtained from the desk and field studies were analysed and have been presented in this Environmental and Social Impact Assessment Report for the purposes of applying for an ESIA licence.

CHAPTER 2
2.0 POLICY, LEGISLATIVE AND ADMINISTRATIVE FRAMEWORK

This section of the report discusses the policies, applicable Environmental Health and Safety (EHS) legislations and institutional framework that are relevant to the Proposed Project.

2.1 National Policies and Regulations

In Kenya there are various sector specific legal instruments that cover environmental and social issues such as public health; soil erosion; protected areas; endangered species; and water quality; air quality, noise and vibration; cultural, historical, scientific and archaeological sites; land use; resettlement; etc.

The main piece of legislation governing environmental management in Kenya is the Environmental Management and Co-ordination Act (EMCA) of 1999, Amended 2015. The main objective of this Act is to provide for the establishment of an appropriate legal and institutional framework for the management of the environment in Kenya. EMCA provided for the establishment of a National Environment Management Authority (NEMA), which became operational in July 2002. NEMA has the statutory mandate to coordinate all environmental activities.

The EMCA has given rise to various regulations that govern environmental Impact Assessment and Audit and regulations governing Water Quality, Air Quality, Noise and Excessive Vibrations, Waste Management, Wetlands, River Banks, Lake Shores and Sea Shore Management and Conservation of Biological Diversity.

2.2 National Policies

The table below shows the National Policies relevant to the proposed sugar factory.

Table 2: National Policies relevant to the proposed sugar factory

National Policy	Community Development
The National Environment policy, 2013	i. The National Environment Policy aims to provide a holistic framework to guide environmental and natural resource management in Kenya. ii. It also ensures that the link between the environment and poverty reduction is integrated into all government processes and institutions in order to facilitate and realize sustainable development at all levels in the context of a green economy, enhancing social inclusion, improving human welfare, creating employment opportunities and maintaining a healthy functioning ecosystem.
The Kenya Health Policy 2012 – 2030	i. The policy is based on the Constitution of Kenya 2010, Vision 2030 and global health commitments. ii. Its broad aim is to ensure equity, people-centeredness and Participation, efficiency, multi-sectoral approach and social accountability in delivery of healthcare services. iii. It sets out the goal, objectives, guiding principles and policy directions aimed at achieving Kenya's health agenda and a comprehensive implementation framework. Also included, is the institutional management plan under the evolved system of government taking into account the varied roles of the national and county levels of Government.

	iv. The policy also sets out a monitoring and evaluation framework to track progress in achieving the policy objectives.
The National Environmental Sanitation and Hygiene Policy 2007	i. The Environmental Sanitation and Hygiene (ESH) Policy is intended to improve people's health and quality of life. ii. Strategic interventions have been developed to determine the success of the policy implementation. iii. One of the key purposes of this policy is to clarify the various roles in order to enhance the existing legal and constitutional framework and to encourage the private sector, civil society and community participation in the planning, implementation and ownership of ESH services. iv. Sanitation and the Environment: One of the key objectives of the policy is to protect the environment from pollution and its negative effect on human health. The government will seek to minimize negative impacts arising from various types of sanitation systems, and maximize positive effects. v. Well-functioning sanitation and hygiene systems are a means of protecting the environment. vi. The health risks associated with poor ESH increase poverty.
National Policy on Water Resources Management and Development (Sessional Paper No.1 of 1999).	i. Recognizes the need to avoid the pollution of water resources and thus proposes development of strict stream effluent discharge standards for controlling the discharge of wastes into water bodies. Also recognizes the need to make water abstraction and disposal permits dynamic and economic instruments for water pollution control ii. Proposes a process of water quality monitoring of all water bodies and pollution control inspection of potential polluting sources. Proposes that all factories and other waste water generating concerns be required to incorporate in their designs waste water treatment devices iii. Proposes the monitoring of water quality parameters to provide baseline data for the purposes of pollution control. Also proposes monitoring of water abstraction and water use to work out naturalized river flows, misuse and over abstraction
Land Policy (Sessional Paper No. 3 of 2009).	i. Envisions the efficient, sustainable and equitable use of land for prosperity and posterity ii. Seeks to secure rights over land and provide for sustainable growth, investment and the reduction of poverty in line with the Government's overall development objectives. iii. Seeks to offer a framework of policies and laws designed to ensure the maintenance of a system of land administration and management that will provide inter alia, economically viable, socially equitable and environmentally sustainable allocation and use of land, efficient and effective utilization of land and land-based resources. iv. Commits the government to restoration of the environmental integrity of land and facilitation of the sustainable management of land-based resources. This is through incentives to encourage the use of technology and scientific methods for soil conservation; encouraging use of traditional land conservation methods; establishing measures to control degradation of land through abuse of inputs and inappropriate land use practices; and

	establishing institutional mechanisms for conservation of quality of land for environmental conservation purposes v. Government shall develop a comprehensive and integrated land use policy having regard to fragile areas and the needs of neighboring communities and individuals in such areas vi. Government shall ensure that environmental impact assessments and audits are carried out on all proposed projects, programmes and activities on land that have a likelihood to degrade the environment.
The Kenya National Biodiversity Strategy and Action Plan, 2000	The overall objective of the NBSAP is to address the national and international undertakings elaborated in Article 6 of the Convention on Biological Diversity' (CBD). It is a national framework of action for the implementation of the Convention to ensure that the present rate of biodiversity loss is reversed, and that present levels of biological resources are maintained at sustainable levels for Posterity.

2.3 National Legislation

The following legislative provisions and regulations are considered key to management of the environmental, health and safety aspects related to the proposed development.

Legal and regulatory framework applicable to the project

No	Legislation/Regulation/Standard	Provisions	Relevance to the Project/ License or Permit Required/ or Activity requiring regulation
1	The Constitution of Kenya (2010)	i. The Constitution has enhanced protection and enforcement of fundamental rights amongst other gains. It provides for a two-tier structure of government, i.e. the National and the County Governments. It distributes the functions and powers between the two levels as detailed in Chapter Eleven and the Fourth Schedule. ii. Specifically, in relation to the energy sector, Part 1 of the Fourth Schedule provides that the National Government shall	The project shall be implemented in consultation with both the national government and the county government including the relevant authorities.

		be responsible for: - a. Protection of the environment and natural resources with a view to establishing a durable and sustainable system of development including water protection, securing sufficient residual water, hydraulic engineering and the safety of dams. iii. In relation to the County Governments, Part 2 of the Fourth Schedule provides that they shall be responsible for county planning and development.	
2	Environmental Management and Coordination Act 1999, Amended 2015	i. Provides for protection and conservation of the environment, environmental impact assessment, and environmental auditing and monitoring. ii. Provides that all reasonable measures shall be taken to mitigate any undesirable effects not contemplated in the ESIA and an environmental audit report on those measures be prepared and submitted to NEMA	Project has initiated this ESIA in compliance with regulations.
3	Environmental (Impact Assessment and Audit) Regulations, 2003 Amended 2019	Provides for the procedure for carrying out the Environmental and Social	The ESIA to be carried out in accordance to the regulations

		Impact Assessment (ESIA). Provides for the contents of an ESIA Study Report.	
4	Environmental Management and Co-ordination (Water Quality) Regulations 2006	Provides for the protection of ground and surface water resources. Provides for the parameters in the quality of wastewater discharged from any facility/activity into the environment or sewer.	Any discharges to the surface water courses during operation phases to be monitored for conformance with the standards.
5	Environmental Management and Co-ordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009	i. Prohibits the generation of unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment. ii. Provides for the maximum noise levels permissible in various environmental set ups such as residential areas, places of worship, commercial areas and mixed residential. iii. Provides that where a sound source creates or is likely to emit noise or excessive vibrations, or otherwise fail to comply with the provisions of these Regulations, a license is required	• Sound level limits of 60dB (day) and 35dB(night) to be observed during operations • License to emit noise/vibrations in excess of permissible levels to be acquired if necessary.
6	Environmental Management and Co-ordination (Waste Management) Regulations 2006	i. Provides for standards for handling, transportation and disposal of various types of wastes including hazardous wastes.	• Disposal of generated waste from operations under the project; • Generation of hazardous wastes such as

		ii. Requirements to ensure waste minimization or cleaner production, waste segregation, recycling or composting. iii. Provides for licensing of vehicle transporting waste. iv. Provides for the licensing of waste disposal facilities.	used oil and oily parts from servicing of equipment and vehicles.
7	Environmental Management and Co-ordination (Fossil Fuel)	Provides for emission standards for internal combustion engines.	Use of diesel-powered generators and compressors in operations of Angata Sugar Mills Limited vehicles in use by staff.
8	Environmental Management and Co-ordination (conservation of biological diversity and resources, access to genetic resources and benefit sharing) Regulations, 2006	i. Provides that a person shall not engage in any activity that may have an adverse impact on any ecosystem; lead to the introduction of any exotic species; or lead to unsustainable use of natural resources, without an Environmental Impact Assessment License. ii. Provides for the imposition of bans, restrictions or similar measures on the access and use of any threatened species in order to ensure its regeneration and maximum sustainable yield. iii. Provides for the inventory and monitoring of the status of threatened, endangered or rare species.	Project activities are within the natural ecosystem.

9	Environmental Management and Coordination (Air Quality) Regulations, 2014	i. Provides for ambient air quality tolerance limits. ii. Prohibits air pollution in a manner that exceed specified levels. iii. Provides for installation of air pollution control systems where pollutants emitted exceed specified limits. iv. Provides for the control of fugitive emissions within property boundary. v. Provides for the control of vehicular emissions. vi. Provides for prevention of dispersion of visible particulate matter or dust from any material being transported. vii. Provides for acquisition of an emission license.	Exhaust/stack emissions from equipment at the facility and company vehicles in use by staff. To also install scrubbers in all chimneys
10	The Public Health Act (Cap 242)	Provides for the prevention of the occurrence of nuisance or conditions dangerous/injurious to humans	Generation of wastes from operations under the Angata Sugar Mills Limited Facility handling, storage and disposal of waste at the Factory
11	Occupational Safety and Health Act (OSHA), 2007	i. Provides that every occupier shall ensure the safety, health and welfare at work of all persons working in his workplace ii. Provides that before any person occupies or uses any premises as a workplace, he shall apply for the	• Site registration as a workplace Safety measures are required in use of tools and machinery on sites • Protection of the workers and general public with any form of interaction with the sites is necessary.

		registration of the premises. iii. Provides that workplace shall be of sufficient size for work to be carried out with ease and shall further have the necessary free space and, having regard to the nature of the work, an adequate amount of air for each employee, the minimum permissible being ten cubic meters per person. iv. Provides that an occupier shall ensure that effective and suitable provision is made for securing and maintaining, by the circulation of fresh air in each workroom, the adequate ventilation of the room. v. Provides that an occupier shall ensure that effective provision is made for securing and maintaining sufficient and suitable lighting, whether natural or artificial, in every part of his workplace in which persons are working or passing. vi. Provides that sufficient and suitable sanitary conveniences for the persons employed in the workplace shall be provided,	

			maintained and kept clean, and effective provision shall be made for lighting the conveniences; and, where persons of both sexes are or are intended to be employed (except in the case of workplaces where the only persons employed are members of the same family dwelling there), such conveniences shall afford proper separate accommodation for persons of each sex.	
		vii.	Provides that all plant, machinery and equipment whether fixed or mobile for use either at the workplace or as a workplace, shall only be used for work which they are designed for and be operated by a competent person.	
12	The Factories and Other Places of Work (Noise Prevention and Control) Rules, 2005	i.	Rules provide for the maximum noise exposure levels for workers in places of work and for the provision of protective equipment for those exposed to high noise levels.	Noise emitted during the operation of the facility machine and equipment requires provision of PPE to workers and minimization of noise exposure to the public.
		ii.	Provides that an occupier shall also institute noise reduction Measures at the source of noise in the workplace.	

13	The Factories and Other Places of Work (Fire Risk Reduction) Rules, 2007	These rules apply to every workplace, process and operations to which the provisions of the Act apply.	The project will be involved with handling all classes of fire, hence an elaborate fire safety management system to be in place
14	Water Act 2016	Provides that a permit shall be required for any use of water from a water resource, especially where there is abstraction and use of water with the employment of works.	Use of water abstracted from the river requires an abstraction permit.
15	Water Resource Management Rules 2007	i. Provides for application by all those intending to abstract ground water. ii. Provides that where any borehole or well is intended to be equipped with a motorized pump the application shall be accompanied by a hydrogeological assessment report.	Depending on the proposed source of water for construction activities, permits may be required.
16	The Energy (Energy Management) Regulations 2012	i. Provides for the development of an energy management policy with inter alia, commitment to improve energy efficiency and conservation, and commitment to provide resources necessary to achieve energy efficiency and conservation. ii. Provides for maintenance of energy consumption records.	• Development and implementation of an Energy Management Policy by Angata Sugar Mills Limited is required since the existing complex is connected to the national grid. • Energy audits should also be carried out on the facilities to identify opportunities for improving efficiency
17	Land Registration Act, 2012 (Act No. 3 of 2012)	Provides for the registration of titles to land, to give effect to the principles and	The proposed project site is registered and has a title deed.

		objects of devolved government in land registration, and for connected purposes.	
18	The Physical and Land Use Planning Act, 2019	Provides for zoning of areas for storage, distribution and retailing of petroleum products and construction of electric power sub-stations and other infrastructure.	The Proposed Project has been approved by the County's Physical Planning Department.
19	Land Act, 2012 (Act No. 6 of 2012)	Provide for the sustainable administration and management of land and land-based resources, and for connected purposes. The Act also provides for the repeal of the Way leaves Act (Cap. 292) and the Land Acquisition Act (Cap. 295).	The proposed project site is registered and has a title deed.
20	National Construction Authority Act. (Cap.449A) National Construction Authority Regulations, 2014	Regulates construction activities and registration of contractors in Kenya.	The Project shall seek development approval from the NCA and engage approved contractor during construction phase.
21	The Standards Act, Chapter 496	Provides for establishment of minimum quality specifications, mode, materials and apparatus used in the country.	The Project shall comply with this act in packaging and measurement.
22	The Traffic Act, Cap 403	Relating to traffic on all public roads. Key provisions include registration and licensing of vehicles; driving licenses; driving and other offences relating to the use of vehicles on roads; regulation of traffic; accidents; offences by drivers other than motor vehicles and other road users. It prohibits encroachment on and damage to roads including land reserved for roads.	Many types of equipment and raw materials shall be transported through the roads to the proposed site. Their registration and licensing will be required to follow the stipulated road regulations.
23	Employment Act No 11 of 2007	Prohibition Against Forced Labor. Prohibition of child Labor.	Project proponent undertakes to abide by the requirements of the Employment Act.

2.4 Institutional Framework

The ESIA process followed for this project is consistent with the regulations in Kenya and involves consultations throughout the life cycle of the Project with a number of governmental authorities which are likely have an interest in the project. These include ministries, departments and agencies as well as regional and local agencies.

The proposed project falls directly under the jurisdiction of the Ministry of Agriculture, Livestock, Fisheries and Co-operatives. The objectives of the Ministries are attained through the actions of their respective departments and agencies. The key agencies whose mandates will be triggered by the proposed Project are summarized in the table below in relation to their respective Ministries.

Table 3: Key sector agencies

Institution	Role in Proposed Project	Project cycle stage Required
National Environment Management Authority (NEMA)	i. Issuance of EIA license. ii. Inspections and monitoring compliance with license and approvals conditions. iii. Protect public interests.	Throughout the Project Cycle
Ministry of Agriculture, Livestock, Fisheries and Co-operatives	Carryout Quality Control including Industrial Standards development.	Throughout the Project Cycle
Directorate of Occupational Health and Safety	i. Registration of the facility as a work place. ii. Enforce compliance with OSHA No. 15 of 2007. iii. Registration of the construction site as a workplace. iv. Enforcing compliance with Occupational Health and Safety Regulations at the construction site.	Throughout the Project Cycle
Kenya Sugar Board	i. Regulate, develop and promote the sugar Industry ii. Co-ordinate the activities of individuals and organizations within the industry iii. Facilitate equitable access to the benefits and resources of the industry stakeholders. iv. Finance cane development, factory rehabilitation, infrastructure development, and research through the Sugar Development Fund	Throughout the Project Cycle

2.5 International Conventions

Kenya is signatory to a number of international conventions that have been established by the United Nations or its specialized agencies to sustainably manage and/or protect the environment. The ones that should be considered for the Project are:

1) United Nations (UN) Convention on Biological Diversity 1994

The Convention on Biological Diversity (CBD) is an international legally binding treaty. The Convention has three main goals:

a. Conservation of biological diversity (or biodiversity);
b. Sustainable use of its components; and
c. Fair and equitable sharing of benefits arising from genetic resources

In other words, its objective is to develop national strategies for the conservation and sustainable use of biological diversity. It is often seen as the key document regarding sustainable development.

2) United Nations Framework Convention on Climate Change (UNFCCC)

The United Nations Framework Convention on Climate Change (UNFCCC) provides the basis for global action to protect the climate system for present and future generations. The Convention on Climate Change sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. It recognizes that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases. The Convention enjoys near universal membership, with 189 countries having ratified.

The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas (GHG) concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

Under the Convention, governments:

i. Gather and share information on greenhouse gas emissions, national policies and best practices;
ii. Launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and
iii. Cooperate in preparing for adaptation to the impacts of climate change.

3) Stockholm Convention on Persistent Organic Pollutants

Stockholm Convention on Persistent Organic Pollutants is an international environmental treaty, signed in 2001 and effective from May 2004, that aims to eliminate or restrict the production and use of persistent organic pollutants (POPs).

4) Basel Convention on the control of transboundary movements of hazardous wastes and their disposal

This is an international treaty that was designed to reduce the movements of hazardous waste between nations, and specifically to prevent transfer of hazardous waste from developed to less developed countries (LDCs). It does not, however, address the movement of radioactive waste. The Convention is also intended to minimize the amount and toxicity of wastes generated, to ensure their environmentally sound management as closely as possible to the source of generation, and to assist LDCs in environmentally sound management of the hazardous and other wastes they generate.

5) ILO Conventions

Convention Concerning the Protection of Workers against Occupational Hazards in the Working Environment due to Air Pollution, Noise, and Vibration (ILO No. 148) 1977 Article 9 of the 1977 Convention of ILO states that as far as possible, the working environment shall be kept free from any hazard due to air pollution, noise or vibration, by:

(a) Technical measures applied to new plant or processes in design or installation, or added to existing plant or processes; or, where this is not possible;
(b) Supplementary organisational measures.

ILO Convention 29 (1930) Forced Labour - Article 5: No concession to companies shall involve any form of forced or compulsory labour.
ILO Convention 105 (1957) Abolition of Forced Labour - Article 1: Not make use of any form of forced or compulsory labour
ILO Convention 138 (1973) Minimum Age - Articles 1-3: Abolition of child labour and definition of national minimum age for labour not less than 18 years (depending on occupation).
ILO Convention 87 (1948) Freedom of Association and Protection of Right to Organize - Articles 2- 11: Freedom to join organisations, federations and confederations of their own choosing; with freely chosen constitutions and rules; measures to protect the right to organize.
ILO Convention 98 (1949) Right to Organize and Collective Bargaining - Articles 1-4: Protection against anti-union acts and measures to dominate unions; established means for voluntary negotiation of terms and conditions of employment through collective agreements.
ILO Convention 100 (1951) Equal Remuneration - Articles 1-3: Equal remuneration for men and women for work of equal value.
ILO Convention 111 (1958): Discrimination (Employment and Occupation) Equality of opportunity and treatment in respect to employment and occupation; no discrimination on the basis of race, color, sex, religion, political opinion, national extraction or social origin.
ILO Convention 97 (1949) Migration for Employment - Articles 1-9: Provision of information; no obstacles to travel; provision of health care; non-discrimination in employment, accommodation, social security and remuneration; no forced repatriation of legal migrant workers; repatriation of savings.
ILO Convention 143 (1975) Migrant Workers (Supplementary Provisions) - Articles 1- 12: Respect basic human rights; protection of illegal migrants from abusive employment; no trafficking in illegal migrants; fair treatment of migrant labour.

2.6 Relevant Legal Approvals – Permit/Licenses/Certificates

The relevant approvals required for the implementation of the Project are summarized in the table below. The list is indicative and will be updated as the project design progresses.

Table 4: Key Regulatory Approvals

Regulatory body	Permits/ licenses and certificates	Applicable	Project Phase	Remarks /Status
National Environmental Management Authority (NEMA)	EIA approval license	Yes	Prior to Construction Phase	After acceptance of final ESIA by NEMA
	Environmental acknowledgement letter/environmental compliance letter	Yes	Within 24 months of commencement of Operations	After preparation of first EMP. Renewable every year
Directorate of Occupational Health and Safety	Workplace permit / Certificate	Yes	Prior to commencement of operation	Renewable on annual basis
Kenya Sugar Board	Sugar Millers/ Jaggery License (Mill Operating License)	Yes	Prior to commencement of operation	After acceptance to operate as a sugar mill by KSB. Renewable every year
	Molasses procurement permit application/ endorsement	Yes	Prior to commencement of operation	Renewable on annual basis
Kenya Bureau of Standards (KEBS)	Quality Standardization Mark	Yes	Prior to sale of products	Renewable every 3 years

CHAPTER 3
3.0 DESCRIPTION OF THE PROPOSED PROJECT
3.1 Project description
Angata Sugar Mills Limited proposes to setup a sugar milling plant to produce sugar for local consumption. The proposed project is to bring about employment and opportunity for various groups along the supply chain. The Angata Sugar Mills Limited is owned by two different equity groups, Firethorn Holdings Limited and iCreate Investment Holdings Limited.

The proposed project will be located in Transmara West Sub-county, Narok County, on LR No. TRANSMARA / MOYOI / 195 that covers an area of 200 acres (GPS latitude -1.36507, longitude: 34.7708. The size of the site is 710 acres of land and the project budget is $33.8 Million. The factory and its auxiliaries' plants or installations will be located in about 200 acres of land.

Sugar production involves two distinct operations, processing sugar cane into raw sugar and processing the raw sugar into refined sugar.

3.2 Description of the proposed processes flow
3.2.1 Sugar Plant
The proposed Technology that will be used is the Double Sulphitation Process and the major unit operations will include: -

- **Extraction of Juice: -** The milling process occurs in two steps: breaking the hard structure of the can and grinding the cane. Breaking of the sugarcane involves passing through preparatory devices such as knives to cut the stalks into fine chips before subjecting the materials to be crushed in mills. The mills will be of modern design and equipped with turbine drive, with a special feeding device. The generated juice will then undergo the process of clarification.
- **Clarification: -** There are two main processes for clarification of juice and they include Sulphitation (Adding milk of lime and treating with sulphur dioxide) or Carbonation (Adding milk of lime and treating with carbon dioxide). Both processes have advantages of their own. In fact, combination of both is made use of to get better results. In case of use of Sulphitation process the dark-green juice from the mills will be heated to 65 to 75^{o}C and treated with phosphoric acid, Sulphur dioxide and milk of lime to remove impurities. The treated juice will be decanted and the collected clear juice will undergo further treatment.
- **Evaporation: -** The clarified juice that contains about 85% water is evaporated in a vacuum. The vacuumed product will form a syrup that will contain about 60% solids and 40% water.
- **Crystallization: -** The syrup will then be treated with sulphur dioxide before being crystallized into sugar. Crystallization will take place in a vacuum pan, where the syrup is evaporated until saturated with sugar. At this point 'seed grain' is added to serve as a nucleus for the sugar crystals, and more syrup is added as water evaporates. The growth of the crystals continue until the pan is full. Given a skilled sugar boiler (or adequate instrumentation) the original crystals can be grown without the formation of additional crystals, so that when the pan is just full, the crystals are all of desired size,

and the crystals and syrup form a dense mass known as "massecuite". The "strike" is then discharged through a foot valve into a crystallizer.

- **Centrifugation: -** The massecuite from crystallizer is drawn into revolving machines called centrifuges. The perforated lining retains the sugar crystals, which may be washed with water, if desired. The mother liquor "molasses" passes through the lining because of the centrifugal force exerted and after the sugar is "purged" it is cut down leaving the centrifuge ready for another charge of massecuite. Continuous centrifuges may purge low grades. The mother liquor separated from commercial sugar is again sent to pan for boiling and re-crystallization. Three stage of recrystallization will be adopted to ensure maximum recovery of sugar in crystal form.

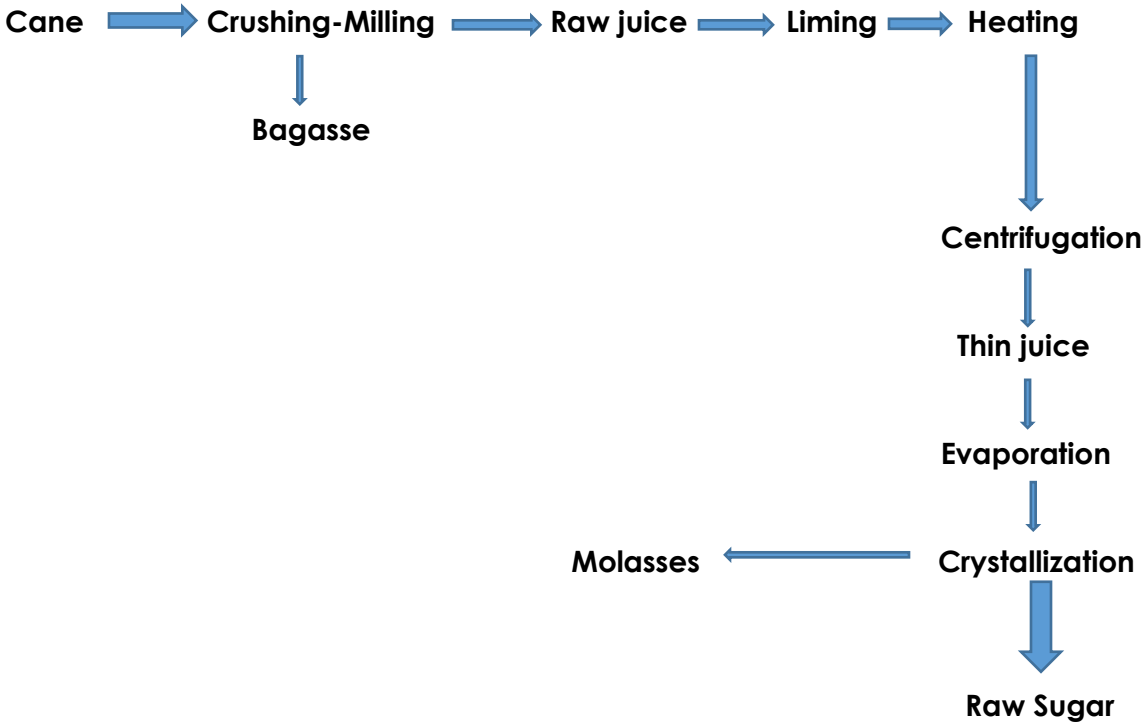


Fig. 1: Sugar production flow diagram

3.3 Preliminary Design Basis of the Angata Sugar Mills Factory

3.3.1 General

The sugar mill factory will comprise the following facilities

I. Weighbridge – two weighbridges are required for the loading and offloading of raw materials and finished products.
II. Effluent Treatment Plant – this will be used to treat the influent (waste water) generated from the production process
III. Four (4) Molasses tanks – will be used for storage of molasses
IV. Two (2) Sugar warehouses – for the storage of the finished product (sugar)
V. Retail packing section – in this area, sugar is packaged for retail sale
VI. Sugar drying and packaging – here, excess moisture from the sugar will be removed
VII. Two (2) Pan sections - Sugar crystallization process takes place in this section of the sugar plant

VIII. Evaporation section – here, diluted sugar juice becomes raw sugar and molasses in the evaporation process after a specified amount of water is removed by evaporation
IX. Two (2) Clarification sections – in this section, sugar juice is treated with phosphoric acid, Sulphur dioxide and milk of lime to remove impurities.
X. Three (3) Mill houses – this is the section of the plant where cane juice is extracted from cane
XI. General store
XII. Lab and engineering office
XIII. Switch yard/ power house
XIV. Two (2) Factory warehouses
XV. Two (2) Boiler houses
XVI. Ablution block
XVII. Turbine cooling tower
XVIII. Waste water treatment plant
XIX. Water treatment plant
XX. Water reservoir
XXI. Bagasse shed
XXII. Excess bagasse yard
XXIII. Future MBF body plant

The detailed plant layout for the proposed project is attached at the annex.

3.4 Cleaner Production

Cleaner production is the continuous design of improvements that involves the use of cleaner energy and materials, adopting of advanced technology and equipment, improved management and comprehensive utilization of natural resources. The adoption of clean production can be used to ensure that pollution sources are prevented and its generation is avoided to eliminate hazards to human health and the environment.

To ensure that the organizations' operations do not adversely affect the environment the proponent (Angata Sugar Mills Limited) will do the following interventions: -

- Keep the fuel energy clean by using non-polluting or less polluting energy and materials.
- Use a low consumption, high efficiency, non-polluting or less polluting pollution process and equipment in the sugar production process.
- Maximize the utilization of sugarcane by-products and residual waste to achieve circulation in factory including closed economy and recycling economy.
- Take precautions in each aspect of all running processes, and combine production technology, production processes, management and products with energy, material losses and other factors to achieve sustainable use of resources and economic development.

3.5 Industrial Symbiosis

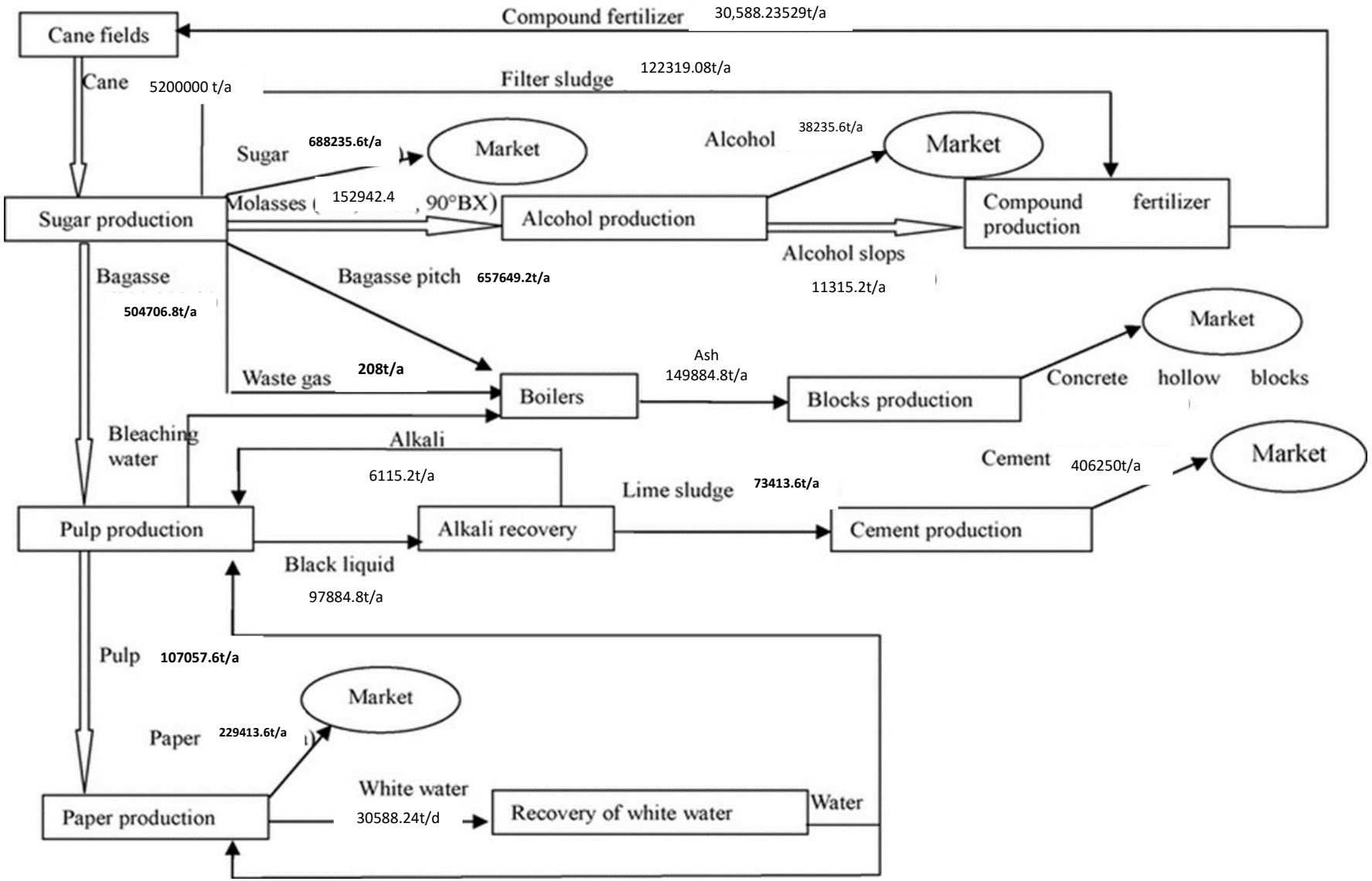
Industrial symbiosis is the process by which wastes or by-products of an industry or industrial process become the raw materials for another. Application of this concept allows materials to be used in a more sustainable way and contributes to the creation of a circular economy.

Industrial symbiosis creates an interconnected network which strives to mimic the functioning of ecological systems, within which energy and materials cycle continually with no waste products produced. This process serves to reduce the environmental footprint of the industries involved. It also allows value to be created from materials that would otherwise be discarded and so the materials remain economically valuable for longer than in traditional industrial systems. One of the promoting factors for a successful industrial symbiosis program is to comprehensively map material flows and side-streams at local and regional levels. Another crucial factor for increased industrial symbiosis activities is the development of long-term public support from the state and regional authorities for circular economy and industrial symbiosis, including comprehensive and coherent strategies supplemented with binding objectives, regulations, subsidies and other economic incentives.

Some key benefits that will result from the implementation of industrial symbiosis program include: -

- Reduce raw material and waste disposal costs
- Generate new revenue from residues and by-products
- Divert waste from landfill and reduce carbon emissions
- Open up new business opportunities
- Strengthen environmental profiles

Angata Sugar Mills Limited is also encouraged to incorporate the implementation of an Industrial Symbiosis program to be able to benefit from the advantages associated with its implantation. For the case of a sugar milling plant the industrial symbiosis program that can be implemented is demonstrated below.


Cane fields
Compound fertilizer
30,588.23529t/a
Cane
5200000 t/a
Filter sludge
122319.08t/a
Sugar
688235.6t/a
Market
Alcohol
38235.6t/a
Market
Sugar production
Molasses
152942.4
90°BX)
Alcohol production
Compound fertilizer production
Alcohol slops
11315.2t/a
Bagasse
504706.8t/a
Bagasse pitch
657649.2t/a
Market
Ash
149884.8t/a
Waste gas
208t/a
Boilers
Blocks production
Concrete hollow blocks
Bleaching water
Alkali
6115.2t/a
Cement
406250t/a
Market
Lime sludge
73413.6t/a
Pulp production
Alkali recovery
Cement production
Black liquid
97884.8t/a
Pulp
107057.6t/a
Market
Paper
229413.6t/a
White water
30588.24t/d
Paper production
Recovery of white water
Water

CHAPTER 4
4.0 CONSIDERATION OF ALTERNATIVES
4.1 Project alternative considerations
During the course of formulating the proposed project, several project alternatives were considered to ensure that the best option of project development was adopted. The consideration of alternatives is one of the more proactive approaches of environmental assessment. This process serves to enhance the project design through an examination of other feasible options instead of only focusing on the more defensive task of reducing adverse impacts of a single design. Project alternatives have been evaluated by the ESIA team to achieve project objectives while having least adverse environmental impacts. The alternatives assessed during this process include:

Alternative 1: Alternative to proposed site
Alternative 2: Alternative land use activities
Alternative 3: Alternative materials and technology
Alternative 4: Solid waste management alternatives
Alternative 5: The no project alternative

4.1.1 Alternative to proposed site
Currently, there is no other alternative site available to the proponent for the proposed development. Looking for the land to accommodate the scale and size of the project and completing official transaction on it may take a long period. In addition, it is not a guarantee that such land would be available. It is also worth noting that the said project is already underway in terms of seeking development approvals in various government departments. If NEMA approves this project report, then construction and operation of the proposed sugar factory will kick off and the following benefits will be realized:

- It will enhance commercial sugarcane production;
- The Proponent will be able to put the available agricultural land to a better use and benefit more from it;
- Employment opportunities will be created from the construction and operation phases;
- The farming community in the area will benefit as a result of industrial activities hence more revenue; and
- The land value of the proposed Project site and of the surrounding area will increase.

4.1.2 Alternative land use activities
The proposed project area is undeveloped at the moment, hence necessitating the need for the proponent to develop the said parcel of land. Alternatively, the proponent could have considered growing coffee and maize. However, the benefits of sugarcane growing outweigh the benefits of the two alternative crops. Therefore, it would be more profitable for the proponent to set up the sugar factory.

4.1.3 Alternative materials and technology
The proposed sugar factory complex will be constructed using modern, locally and internationally accepted materials and technology to achieve public health safety, security and environmental quality requirement. The structures will be made using locally sourced stones, cement, sand, metal bars and fittings that meet the Kenya Bureau of

Standards requirements. Heavy use of timber during construction is discouraged. Equipment that saves energy and time will be given first priority.

4.1.4 Solid waste management alternatives

Throughout construction and operation phases of the project will produce wastes such as soil, wood chips, metal scraps and paper wrappings among others. Wastes to be generated during operation phase are mainly domestic and industrial in nature. The Proponent is expected to observe EMCA (Waste Management Regulations, 2006). Priority will be given to reduction of wastes, recycling, and reuse. This will minimize environmental pollution.

4.1.5 The no project alternative

This option implies that the existing situation prevail i.e. no construction/development activity to take place. This option is mostly applicable in situations where the proposed project area is in ecologically sensitive areas. This implies that any slight changes/alterations or developments to the existing ecosystem and land use will result into major adverse environmental impacts. In the case of the proposed Angata Sugar Mills Limited Factory, the land is in a stable environment and therefore will not be affected by this development activity.

The No Project Option is the least preferred from the socio-economic and partly environmental perspective since if the project is not done:

- There will be no physical development to provide facilities for small industries, businesses, hotel outlets, food processing and value addition, garages, workshops, go-downs, business kiosks, etc.
- The economic benefits especially during construction i.e. provision of jobs for skilled and non-skilled workers will not be realized.
- There will be no generation of income by the developer and the Government.
- The social-economic status of Kenyans and local people would remain unchanged.
- The local skills would remain under-utilized.
- No employment opportunities will be created for Kenyans who will work in the project area.
- Discouragement for investors to produce this level of standard and affordable developments.

This is not viable since the proponent has already identified the area that is private land owned by the proponent. Construction of the proposed development will create employment to most of the youth in Narok County. If the project is stopped then the trickle-down effect of financial resources will not be felt in this area. In this respect, the "No project alternative" is not deemed appropriate.

CHAPTER 5
5.0 BASELINE ENVIRONMENTAL AND SOCIAL CONDITIONS
5.1 Project location
The project is to be set up on LR.NO TRANSMARA/MOYOI/195 in Angata Barikoi Ward, Kilgoris Constituency, Transmara West Sub-county, Narok County. Total land size is about 725 acres out of which 200 acres will host the factory.

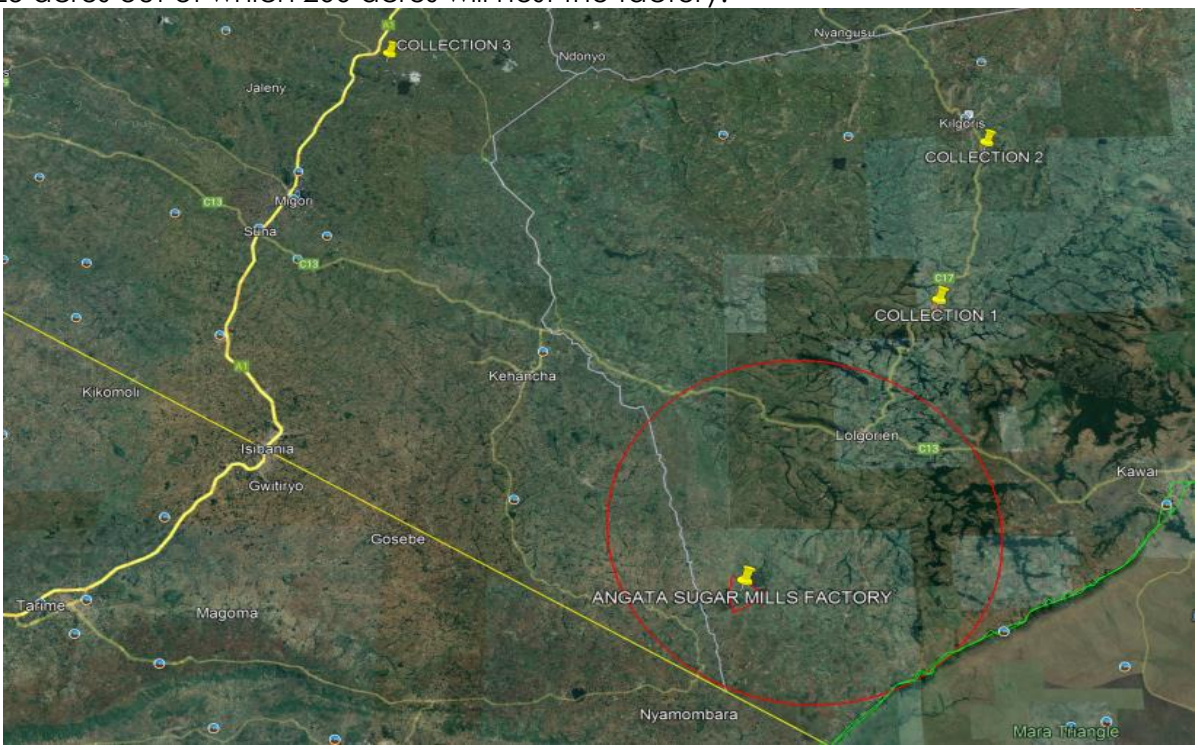


Fig. 2: Satellite map of the project area

5.2 Overview of Narok County
This section gives the background information on the socio-economic characteristics of the general Narok County as a whole and infrastructural development information that has a bearing on the development of the county. Information was mainly obtained from the Narok County Integrated Development Plan 2018-2022.

5.2.1 Population, Size and Composition
Narok County lies between latitudes 0°50' and 1°50' South and longitude 35°28' and 36° 25' East. It borders the Republic of Tanzania to the South, Kisii, Migori, Nyamira and Bomet counties to the West, Nakuru County to the North and Kajiado County to the East. The county headquarters is at Narok Town. The county covers an area of 17,933.1 Km^2 representing 3.1 percent of the total area in Kenya and hence the eleventh largest county in the country. According to the 2019 population and housing census, the population of Narok County was 1,157,873 with a population density of 65 people per km^2 and an annual growth rate of 3.3%.

5.2.2 Climate

Rainfall: -

The rainfall amount and regime are influenced by the passage of inter-Tropical Convergence Zone (ITCZ) giving rise to a bi-modal rainfall pattern. The breezes from Lake Victoria add to the moisture levels. Hailstorms are occasionally reported in the West and the highlands north of Trans Mara West Sub-County in Narok County. Rainfall is bimodal. The long rains in the study area are experienced between February and June reaching its peak in April, while the short rains are experienced between August and November. The areas which receive a lot of rainfall are the highland West and North of Kilgoris Ward. Kilgoris and Lolgorian receive a mean annual rainfall of 721.6mm.

Temperature: -

With regard to temperature, the Trans Mara West Sub-County in Narok County enjoys medium temperatures ranging from 14.8°C to 20.3°C. The highest temperatures occur in February and the lowest in June/July. This range of temperature is as a result of the influence of the high altitude in the sub-county. Other modifying factors are cool winds blowing from Lake Victoria mainly from the month of August and November and also between February and April. The annual Evaporation is estimated at 1585mm with a minimum of 100mm in June and maximum of 259mm during January.

5.2.3 Topography

The topography of Trans Mara West Sub-County comprises of two major categories, the highlands which lie between 2200 and 2500m above the sea level and the plateau which rise from 1500 to 2200m above the sea level. The highlands consist of the Osupuko, Kapune, Meguara and Shankoe Hills in Pirrar and Kilgoris Ward and Keiyan and Nkararu Hills in Keiyan Ward. The plateau covers the eastern part in Kiridoni Ward, and the southern part in Lolgorian Ward. Parts of Maasai Mara, Murgan, Soit in Kirindoni Ward, Masurura in Keiyan ward, Kerinkan, Olopikidogoe, Angata Barikoi and Lolgorian Ward also form part of the plateau. The terrain both on the highlands and on the plateau, permit agricultural and livestock activities. Crop production is concentrated on the highlands while livestock development takes place on the lower grounds on the plateau.

5.2.4 Hydrology

The area has adequate and reliable surface and underground water resources. The areas water supply includes dams, boreholes, streams and rivers. The project area is next to river ukioma which is a perennial river.

5.2.5 Biological Environment

5.2.5.1 Flora

The area has vast vegetation cover comprising of planted forests made of exotic trees as well indigenous trees which were mostly found along river banks i.e. along River Ukioma. The project area is also characterized by large maize and coffee farms as well as small agricultural fields made of sugarcane, vegetables i.e. Amaranthus and medicinal plants.

5.2.5.2 Fauna

There is presence of domestic animals such as cows, sheep, and donkeys. The wild animals found in the area are mostly rodents, snakes, lizards and a variety of birds.

5.2.6 Socio Economic Environment

5.2.6.1 Land Area and Administration

Narok County is divided into four administrative Sub-Counties. The sub-counties are further sub divided into 16 divisions, 92 locations and 182 sub locations. The county has six constituencies namely; Kilgoris, Emurua Dikirr, Narok North, Narok East, Narok South and Narok West; and 30 electoral wards. The project area lies in Trans Mara West sub-county within Kilgoris central and Kimindet Constituencies.

5.2.6.2 Ethnic groups

There is a unique characteristic in the settlement patterns, where majority of the urban population in Kilgoris town are from areas outside Narok County, i.e. the Kikuyu, Kalenjin, Luo, Gusii and the Kuria communities from the neighbouring Bomet, Nakuru, Migori and Kisii counties. These are mostly traders, farmers or professionals. Most ethnic Maasai live in the rural areas and only travel to the urban areas for business, administrative issues or social events.

5.2.6.3 Education

Narok county has a pupil teacher ratio of 33:1 and 496 primary schools with an enrolment of 175,409 pupils with 83% boys' and 73% girls' enrolment rates. The county has 61 secondary schools and a total enrolment of 13,852 students with a 20% and 15% boys' and girls' enrolment rate respectively. The affiliated youth polytechnics are a total of 8 and only one University College (Maasai Mara). In Kilgoris constituency (where Kilgoris town and Lolgorian fall under), there are 274 pre-schools, 154 primaries, 23 Secondary, 6 polytechnics and 3 tertiary colleges. From the social survey conducted by CAS Consultants Ltd. in 2016, it was established that about 77% of the town population has reached secondary school as their highest level of education. The remaining 14% has been to college and only 9% has been to the university. This means that the community has the basic life skills to make a living.

5.2.6.4 Health

The County has one of the lowest doctor-population ratios in the country at 1:100,953 as well as a high mortality rate of 60 per 1000 which is above national mortality rate of 12 per 1000 births. The main district hospitals in Narok and Trans Mara have a combined 187 bed capacity serving the total population. In Kilgoris constituency, there is one district hospital (Kilgoris town), one a sub-district hospital (Lolgorian town), one mission hospital and 13 health centres. According to the socio-economic survey conducted by CAS Consultants Ltd. in 2016, it was evident that the community living in these two towns have been in one time or the other suffered from sanitation related diseases. For both Kilgoris and Lolgorian, a cumulative 91% of the residents have been treated for Malaria, diarrhoea, stomach issues, eye infection and respiratory challenges. All these diseases in one way or the other are associated to water and sanitation. This indicates strongly about the challenges faced due to lack of sufficient water to facilitate good sanitation practices.

5.2.6.5 Agriculture

Agriculture is largely practiced in the areas surrounding the town and is the main economic activity. The main crops grown in the Angata area is characterized by large maize and coffee farms as well as small agricultural fields made of sugarcane,

vegetables i.e. Amaranthus and medicinal plants. Dairy farming is also practiced alongside crop cultivation.

CHAPTER 6
6.0 STAKEHOLDER CONSULTATIONS

Stakeholder participation during project planning, design and implementation is widely recognized as an integral part of environmental and social impact assessment for projects. It is a two-way flow of information and dialogue between project proponents and stakeholders, which is specifically aimed at developing ideas that can help shape project design, resolve conflicts at an early stage assist in implementing solutions and monitor ongoing activities. Stakeholder consultation is a process and would continue through project implementation to provide information to identified stakeholders.

6.1 Objectives of the Stakeholder Engagement

The main objective of the consultations with stakeholders is to discuss the proposed project and the associated environmental and social implications and to identify alternatives and avenues for feedback and grievance redress. Specifically, the consultations seek to achieve the following objectives:

i. Identify and categorize the stakeholders of the Project based on their level of interest and influence, and extent to which they are impacted by the project;
ii. Provide information about the proposed project and develop an effective two-way
iii. communication channel between project proponents and stakeholders;
iv. Effectively communicate key project information such as construction timelines and work schedules to stakeholders, particularly project affected communities and persons;
v. Provide opportunities for stakeholders to express their views and make inputs into the project through continuous involvement and providing feedback on their contributions;
vi. To provide and discuss with stakeholders the alternatives considered to reduce anticipated impacts;
vii. To identify and verify significance of environmental, social and health impacts;
viii. To inform the process of developing appropriate mitigation and management options; and
ix. Establish a mechanism for receiving and addressing grievances in a timely manner.

6.2 Guiding Principles of the Stakeholder Engagement Plan

The stakeholder engagement plan for the Project is in accordance with the requirements of EMCA Act 2009 (amended, 2015). The stakeholder consultation was carried out in a manner that: -

a) Targeted those most likely to be affected by the project;
b) Early enough that key issues were scoped and their effect to the project discussed;
c) Key information about the proposed project was delivered in a meaningful and in a readily understandable format and the techniques used were appropriate;
d) The engagement was a two-way so that both sides have the opportunity to exchange views and information, to listen, and to have their issues addressed;
e) Localized to reflect appropriate timeframes, context, and local languages;
f) Free from manipulation or coercion;

g) Documented to keep track of who has been consulted and the key issues raised;
h) Reported back in a timely way to those consulted, with clarification of next steps; and
i) Ongoing as required during the life of the project

6.3 Stakeholder Identification

In order to gain public views, concern and values with regard to the proposed Angata Sugar Mills Limited project, public living within and in close proximity to the project area and other key stakeholders were identified and consulted. Through this, it is anticipated that there might be possible conflicts between the key stakeholders, community members living in close proximity to the Angata Sugar Mills Limited project, interested parties, mandated government agencies, among others, would be addressed and solved at an earlier stage. Possible delays in project implementation and extra costs will be avoided.

6.4 Stakeholders Engagement Plan (SEP)

6.4.1 Overview of SEP

The goal of this Stakeholder Engagement Plan is to build an informed stakeholder support base, ownership and provide adequate stakeholder participation space and modes of communication for the successful implementation of the project. Key objectives of this Stakeholder Engagement Plan are to:

i. Identify project stakeholders and understand their interests, concerns and influence in relation to project activities;
ii. Provide stakeholders with timely information about the project;
iii. Give stakeholders the opportunity, through consultation and other feedback mechanisms, to express their opinions and concerns about the project;
iv. Assist in building strong relationships with the local community and reduce the potential for delays through the early identification of issues to be addressed as the project progresses.
v. Document practical engagement strategies, achievements and lessons learnt.

The rationale for this Stakeholder Engagement Plan (SEP) is to ensure that the stakeholders' involvement, participation and commitment in making decision in the project activities is well implemented.

Communication is critical to transmission of clear concise and factually correct information, either through inter-personal communication or communication with a group of persons.

Some of the key risks to poor communication for this phase of the project include:

a) Reduced community buy-in on critical project needs such as material sources;
b) Misinformation on project activities, impacts and outcomes resulting in disagreement and in heightened cases, demonstrations (non-violent and violent) by aggrieved communities;
c) Growing opposition to the project and its staff;
d) Increased costs and serious delays in project implementation due to stakeholder and community objections to the project.

6.4.2 Stakeholder Engagement Process

The Consultant developed a stakeholder engagement strategy which ensures that all stakeholder interfaces are managed based on their needs, interests, and influence during this assignment. The strategy focuses on both formal stakeholder engagement and day-to-day relationship management as outlined in Figure 3.

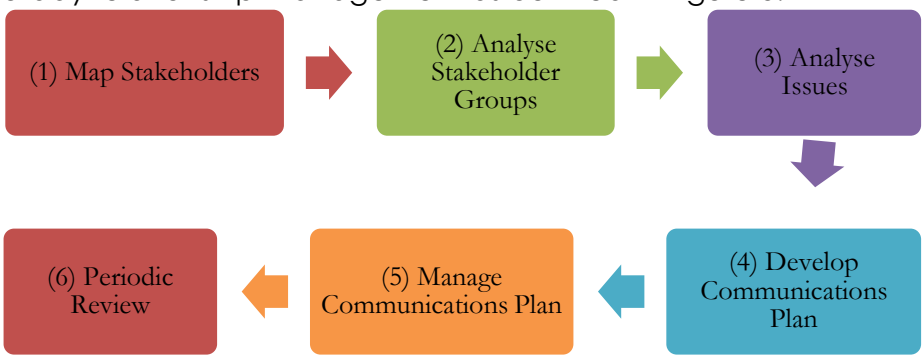


Fig. 3: Stakeholder Management Process

The benefits of this approach include:

a) Gaining a full understanding of all the stakeholders, their needs and appropriate communication channels can increase the likelihood of the project's success.
b) Having clear 'owners' and strategies for key stakeholders helps get closer to their needs and ensures that messages are consistent and appropriate.
c) It provides a structure that can then be reviewed regularly, enabling the approach to be flexed to achieve overall project success.

6.4.3 Stakeholder Consultation Process

For setting up the Angata Sugar Mills Limited project, the potential impacts and the types and needs of stakeholders, the Consultant adopts a number of levels and strategies of engagement across this spectrum using a variety of different tools as presented in the figure below.

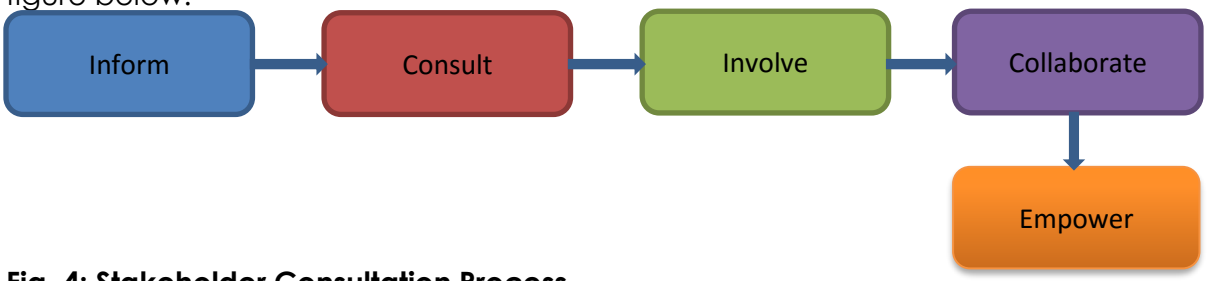


Fig. 4: Stakeholder Consultation Process

1. **Inform:** Provide stakeholders with balanced and objective information to help them understand the project, the problem, and the solution alternatives (There is no opportunity for stakeholder input or decision-making). This is done through the various stakeholder engagement meetings held.
2. **Consult:** Gather feedback on the information given. Level of input can range from minimal interaction (online surveys, etc.) to extensive. Can be a one-time or ongoing/ iterative opportunity to give feedback to be considered in the decision-making process. This is done through the various stakeholder engagement meetings held.

3. **Involve:** Work directly with stakeholders during the process to ensure that their concerns and desired outcomes are fully understood and taken into account at each stage. Final decisions are still made by the consulting organization, but with well-considered input from stakeholders through public participations.
4. **Collaborate:** Partner with stakeholders at each stage of the decision-making, including developing alternative solution ideas and choosing the preferred solution together. Goal is to achieve consensus regarding decisions. Achieved through presentations to Angata Sugar Mills Limited.
5. **Empower:** Place final decision-making power in the hands of stakeholders. This level of stakeholder engagement is rare and usually includes a small number of people who represent important stakeholder groups. A final report being submitted to Angata Sugar Mills Limited.

6.4.4 Project Stakeholder Identification Process

The Primary stakeholders consulted during the ESIA study include the following groups:

i. National Environmental Management Authority (NEMA);
ii. Directorate of Occupational Health and Safety (DOSH);
iii. Ministry of Agriculture, Livestock, Fisheries and Co-operatives;
iv. Kenya Sugar Board;
v. Narok County Government

The secondary stakeholders to be consulted include:

i. Water Resource Authority (WRA);
ii. National Government (CC, DCC, Location Chiefs);
iii. Structures next to the project site (Businesses and homesteads);
iv. Kenya Power and Lighting Company
v. Religious Leaders in the project area
vi. Any other Person of Relevance to the Project.

6.4.5 Stakeholder's Relevance to the Project

Once the above stakeholders have been identified on the ground, a further analysis will be done to better understand their relevance and the perspective they offer, to understand their relationship to the project issues and each other, and to prioritize based on their relative usefulness for this engagement. The table below outlines the overall project Stakeholder's relevance to the project.

Table 5: Stakeholder Engagement Plan

S/N	Stakeholder	Impact	Influence	Relevant Roles in the Project Context	Engagement Strategy	
					Approach	Frequency
1	Kenya Sugar Board (KSB)	High	High	Issuance of operating license to Angata Sugar Mills Limited Renewal of the operating license	Consult	Consultative Meetings
2	WRA	High	High	Provision of relevant data and licence for hydrological analysis	Consult	Consultative Meeting
3	NEMA	High	High	Approval of the ESIA Licence Approval of the Annual Audits	Consult	Consultative/ Regular Meetings
4	Directorate of Occupational Health and Safety (DOSH)	High	High	Registration of the workplace and ensuring the injured workers are compensated	Consult	Consultative/ Regular Meetings
5	Ministry of Agriculture, Livestock, Fisheries and Co-operatives (National and County Government)	High	High	Approvals for the operation of the project	Consult	Consultative/ Regular Meetings
6	Narok County Government	High	High	Integration and harmonization of design with county government development plans.	Consult	Consultative Meeting
7	National Government (County Commissioner's Office)	High	High	Mobilization of the enumerators, households, project affected persons during the socio-economic baseline survey and for public meetings. Provision of relevant documents for project implementation.	Consult	Consultative Meeting
8	KPLC	High	High	Provision of electricity to the project area.	Consult	Regular Meetings
9	Structures next to the project site (Businesses and homesteads)	Medium	Medium	Provision of harmonious working environment for the project to achieve its objectives.	Consult	Consultative Meeting
10	Religious Leaders in the project area	Low	Low	Inclusion In the project life cycle	Consult	Regular Meetings

6.4.6 The Public Consultation

The public has been consulted through five (5) consultative forums as indicated in the table below. Minutes and attendance list are attached as appendix one and two of this report.

Table 6: Summary of the Engagement Meetings Conducted

Date	Venue	Type of Meeting	No. of Participants		
			M	F	T
30/01/2023	Oldonyo-Orok Chief's Office	Public participation baraza	14	5	19
30/01/2023	Kondamet sub-location	Public participation baraza	38	15	53
31/01/2023	Ngendalel sub-location	Public participation baraza	35	2	37
31/01/2023	Angata location	Public participation baraza	31	3	34
01/02/2023	Lolgorian Police Station {OCPD's Office}	Consultative meeting	4	2	6
02/02/2023	ADC's Office	Consultative meeting	4	1	5

Stakeholder Engagement photos of the project are presented below:

6.4.7 Community Perceptions of the Project

During the consultative sessions it was evident that the community embraced the Project and are appealing to the government to let their youths be involved in the construction activities and be resettled in time.

Angata Sugar Mills Limited should ensure that all the persons living in the project area have been fully relocated and compensated for their structures.

The community has highly accepted the development of the sugar milling plant in the area based on the perceived environmental, economic and social benefits that are associated with the implementation of such project. However, it is important that all the identified negative environmental aspects be mitigated to acceptable measures.

Other information with regards to stakeholder's engagement activity are in the social reports and minutes from the meetings that are attached at the annex.

CHAPTER 7
7.0 IMPACT ANALYSIS APPROACH AND METHODOLOGY

This chapter presents the methodology used to assess the significance of impacts that may result from the proposed Angata Sugar Mills Limited project. It outlines general assessment methods and presents the criteria for determining receptor sensitivity, impact magnitude and impact significance.

7.1 Impact Assessment

The impact assessment for this study includes;

i. Identification of Potential Environmental and Social Issues and Impacts;
ii. Evaluation and interpretation of impacts; and
iii. Impact Mitigation and Control.

7.1.1 Identification of Potential Environmental and Social Issues and Impacts

The potential environmental and social impacts of the proposed project have been identified and assessed as positive/beneficial or negative/adverse. The potential impacts of the Project have been identified and described for the various phases of the Project including impacts resulting from:

1. Preparatory/planning phase activities;
2. Construction phase activities;
3. Operational phase activities; and
4. Decommissioning phase activities.

7.1.2 Evaluation and Interpretation of Impacts

The significance of each impact has been evaluated and compared with national, international as well as applicable industry standards. The methodology for evaluating an impact is outlined below:

7.1.2.1 Impact Identification Characterization

Impacts are described in terms of their characteristics, including the impact's type and the impact's spatial and temporal features (namely extent, duration, scale and frequency). The definitions of the terms used are described in Table 7.

Table 7: Terms used

Characteristic	Definition	Terms
Type	A descriptor indicating the relationship of the impact to the Project (in terms of cause and effect).	Direct - Impacts that result from a direct interaction between the Project and a resource/receptor (e.g., between occupation of a plot of land and the habitats which are affected). Indirect - Impacts that follow on from the direct interactions between the Project and its environment as a result of subsequent interactions within the environment (e.g., viability of a species population resulting from

		loss of part of a habitat as a result of the Project occupying a plot of land). Induced - Impacts that result from other activities (which are not part of the Project) that happen because of the Project. Cumulative - Impacts that arise because of an impact and effect from the Project interacting with those from another activity to create an additional impact and effect
Duration	The time period over which a resource / receptor is affected.	Temporary - (period of less than 3 years- negligible/ associated with the notion of reversibility) Short term - (period of less than 5 years i.e. production ramp up period) Long term - (period of more than 5 years and less than 15 years i.e. life of plant) Permanent - (a period that exceeds the life of plant – i.e. irreversible. Or may last for a very long time)
Extent	The reach of the impact (i.e. physical distance an impact will extend to)	On-site - impacts that are limited to the Project site. Local - impacts that are limited to the Project site and adjacent properties. Regional - impacts that are experienced at a regional scale, i.e. beyond adjacent properties, covering the metropolis and beyond. National - impacts that are experienced at a national scale. Trans-boundary / International - impacts that are experienced outside of Kenya
Scale	Quantitative measure of the impact (e.g. the size of the area damaged or impacted, the fraction of a	Quantitative measures as applicable for the feature or resources affects/ professional

	resource that is lost or affected, etc.). or the professional viewpoint of the measure of impact	viewpoint of expert as applicable for the feature or resource in terms of severity of impact measure (i.e. minor, moderate, severe)
Frequency	Measure of the constancy or periodicity of the impact	No fixed designations; intended to be a numerical value or a qualitative description
Likelihood	Characteristic that pertains to unplanned events determined either qualitatively or quantitatively estimated on the basis of experience and/or evidence that such an outcome has previously occurred.	Unlikely – The event is unlikely but may occur at some time during normal operating conditions. Possible – The event is likely to occur at some time during normal operating conditions. Likely - The event will occur during normal operating conditions (i.e., it is essentially inevitable)

7.1.2.2 Determining Impact Magnitude

Once an impact's characteristics are defined, the next step in the impact assessment phase is to assign each impact a 'magnitude'. Magnitude is typically a function of some combination (depending on the resource/receptor in question) of the following impact characteristics:

1. extent;
2. duration;
3. scale; and
4. frequency

Magnitude (from small to large) is in practice a continuum, and evaluation along the spectrum requires the exercise of professional judgement and experience. Each impact is evaluated on a case-by-case basis, and the rationale for each determination is noted. The universal magnitude designations, for negative effects, are: negligible, small, medium and large. The magnitude designations themselves are universally consistent, but the definition for the designations varies by issue. In the case of a positive impact, no magnitude designation has been assigned as it is considered sufficient for the purpose of the impact assessment to indicate that the Project is expected to result in a positive impact.

7.1.2.3 Determining Receptor Sensitivity

The other principal step necessary to assign significance for a given impact is to define the sensitivity of the receptor. There are a range of factors to be taken into account when defining the sensitivity of the receptor, which may be physical, biological, cultural or human. As in the case of magnitude, the sensitivity designations themselves are universally consistent, but the definitions for these designations will vary on a resource/receptor basis. The sensitivity of receptor used is low, medium and high as shown in Table 8: Sensitivity Criteria.

Table 8: Sensitivity Criteria

Value / Sensitivity	Low	Medium	High
Biological and Species Value / Sensitivity Criteria			
Criteria	Not protected or listed as common / abundant; or not critical to other ecosystem functions (e.g. key prey species to other species).	Not protected or listed but may be a species common globally but rare in Kenya with little resilience to ecosystem changes, important to ecosystem functions, or one under threat or population decline.	Specifically protected under Kenyan legislation and/ or international conventions.
Socio-Economic Sensitivity Criteria			
Criteria	Those affected are able to adapt with relative ease and maintain pre-impact status.	Able to adapt with some difficulty and maintain pre-impact status but only with a degree of support.	Those affected will not be able to adapt to changes and continue to maintain pre-impact status.
Physical Sensitivity Criteria			
Criteria	The resource remains unaffected and maintains pre-impact status.	Pre-impact status is temporarily altered. May be restored over time naturally or through specific interventions.	Pre impact status is permanently altered by the development. Receptor or resource is held in high-esteem by stakeholders

7.1.2.4 Assessing Significance

Once magnitude of impact and sensitivity of a receptor have been characterized, the significance can be determined for each impact. The impact significance rating was determined, using the matrix provided in Table 9.

Table 9: Impact Significance

		Sensitivity / Vulnerability of Resource / Receptor		
		Low	Medium	High
Magnitude of Impact	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major

Impact

Minor Significance

An impact of minor significance, hereafter referred to as a 'minor impact' is one where an effect will be experienced, but the impact magnitude is sufficiently small and well within accepted standards, and/or the receptor is of low sensitivity/value. The repercussions on the environment are not significant and may or may not require the application of mitigation measures.

Moderate Significance
An impact of moderate significance hereafter referred to as a 'moderate impact', will be within accepted limits and standards. Moderate impacts may cover a broad range, from a threshold below which the impact is minor, up to a level that might be just short of breaching an established (legal) limit. The repercussions on the environment are substantial but can be reduced through specific measures.
Major Significance
An impact of major significance, hereafter referred to as a 'major impact' is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. The repercussions on the environment are very strong and cannot easily be reduced.

7.1.3 Mitigation and Control
All significant impacts identified have been considered for mitigation and control through preventive, reductive/enhancement and curative strategies and control measures. Measures have been identified, described and recommendations incorporated into the proposed development to minimize or avoid the key impacts. Where the effectiveness of mitigation measures is uncertain, or depends on assumptions about operational procedures, monitoring programmes and/or operations/management procedures will define the required practice.

An Environmental and Social Management Plan (E&SMP) has been developed for the project and its facilities in accordance with the Environmental Management and Co-Ordination Act, 1999 (amended 2015). An Environmental Monitoring Plan section of the E&SMP presents detailed plans to monitor the implementation of mitigating measures and the identified impacts of the project during the construction and operation phases. The plan includes an estimate of capital and operating costs.

CHAPTER 8
8.0 POTENTIAL IMPACT IDENTIFICATION AND ASSESSMENT

This Chapter discusses potential impacts that have been identified through baseline assessments carried out in specific relation to the works/ activities anticipated.

8.1 Introduction

The ESIA serves principally to identify those impacts most likely to be significant and therefore needs to be addressed. In undertaking the ESIA, the team has drawn upon:

i. Its knowledge of sources of potential impacts associated with Angata Sugar Mills Limited project developments;
ii. An identification of the main environmental and social resources and receptors from the preliminary baseline data collection work; and
iii. The results of the initial scoping stakeholder engagement.

8.2 Project Activities of Environmental and Social Concern

8.2.1 Preparatory Phase Activities

Preparatory phase activities of environmental concern include among others:

i. Survey works and feasibility studies to determine the project's design and location setup;
ii. Stakeholder consultations;
iii. Statutory permitting activities from relevant authorize i.e. Narok County, KSB, and NEMA etc.

8.2.2 Construction Phase Activities

Construction phase activities of environmental/social concern include among others:

i. Procurement of labour;
ii. Construction of site office, work camp and storage facilities;
iii. Site preparation: vegetation clearing & topsoil removal and storage;
iv. Equipment/material/ worker transport;
v. Resource utilization;
vi. Laying of foundation works for the main construction;
vii. Supply of quarry materials to the site;
viii. Disposal of construction scrap materials;
ix. Post–construction activities including dismantling of construction work camps;
x. Road crossings; and
xi. Waste storage and disposal.

8.2.3 Operational and Maintenance Phase Activities

Operational and maintenance phase activities of environmental/social concern include:

a) Loading/offloading of raw materials and finished products;
b) General maintenance of the sugar factory;
c) Wastewater treatment, storage and disposal;
d) Solid waste generation and disposal;
e) Maintenance of machines and equipment;
f) Resource utilization; and
g) Emergency response.

8.2.4 Decommissioning Phase Activities

Decommissioning activities to potentially impact on the environment during post construction and post operational phase activities include:

a) Post construction: Dismantling of construction work camps, relocation of equipment and disposal of wastes.
b) Post operation/maintenance: Dismantling and relocation of infrastructure and waste disposal.

8.3 Evaluation of Potential Positive Impacts

The potential positive impacts from the setup of the project include: -

8.3.1 Employment Opportunities, Local Resources use and improved local economy

The project is expected to have significant social impact throughout its cycle. The different phases of the project would result to employment opportunities for the local community in Angata, priority will be given to available skilled and unskilled locals. There is also the possibility of economic growth effects that would result from the use of local goods and service opportunities within the project location. The goods and services to be utilized will include, but is not limited to, construction materials and equipment and workforce essentials such as services, safety equipment, ablution, accommodation, transportation, and other goods. Also, the injection of income into the area in the form of wages will enhance local economy and boost businesses in the area. Increased income in an area usually results in enhanced purchasing power for goods and services. The hospitality industry will also benefit from the presence of expatriates/foreign workers. This is likely to have a positive impact on local communities and have downstream impacts on household income, education, and other social aspects.

8.3.2 Availability of sugar and improved environmental protection

The proposed project is expected to help the nation to meet its high sugar demands. The country's existing sugar factories are currently not meeting the high demand, which has resulted in price fluctuation. The proposed project will therefore result in stabilized prices. The sugarcane crop also has deep roots which hold the soil particles together, hence reducing soil erosion, leading to environmental protection.

8.3.3 Improved Institutional and National Revenue and foreign exchange savings

Revenue will accrue to the Kenyan government and the County of Narok in the form of tax deductions from wages of workers and Contractor fees. Government agencies e.g., KEBS, KSB and NEMA will charge processing and permit fees, which will increase the revenue base of these institutions. In the medium to longer term, government will earn tax revenue both directly from the project and indirectly from the expanded industrial and commercial activities.

Saving of foreign exchange through reduction in sugar importation costs

8.3.4 Transfer of skills

In various stages or phases of the project there will be enhanced interaction between the experts and hired locals in their areas of expertise. Such interactions will result in skills transfer or enhancement. During stakeholder engagement meetings, it was revealed that the residents in the area have a range of skills from various fields, i.e. machinery

operators, drivers, electricians, plumbers, masons, carpenters etc. The setup of the proposed project will provide an opportunity to utilize theses skills.

8.3.5 Improvement of the area's infrastructure and land value

The setup of such projects in an area would result to the improvement of the area's infrastructure i.e. improvement of the area's drainage system, set up of water reticulation system, installation of security facilities (security lights), and set up of transportation networks. The improvement of infrastructure in an area will also lead to increase of the land value.

8.4 Evaluation of Adverse Impacts from the Proposed Project

The evaluation of the adverse environmental and social issues which could possibly arise from the implementation of the proposed project are described in Table 9 with respect to the planning/preparatory phase activities, construction phase activities, operational phase and decommissioning phases. The magnitude, sensitivity and significance rating have been determined as per Table 9 and the impact ratings are prior to mitigation being applied.

CHAPTER 9
9.0 Potential Impacts and Mitigation Measures

Anticipated Environmental and Social Impacts	Receptor(s)	Proposed Mitigation and Management Measures
Project site Acquisition	All institutions within the project site	i. Ensure all stakeholders are engaged in the early stage of the project. ii. Project plans and designs must be discussed and agreed by location owners. iii. All permits and necessary documentation needed for acquiring the site must be approved. iv. Prepare and implement a livelihood restoration plan which will also include compensation for potentially affected persons. v. Ensure affected persons are well informed to relocate prior to the start of construction. vi. Angata Sugar Mills Limited and the Contractor will liaise with the county to access the option of providing a toilet facility for use to prevent open defecation if necessary. vii. Disclose public information of the project.
Occupational health and safety	Angata Company Staff, contractors and consultants	i. The various contractors to be engaged will be required to comply with the Kenyan Occupational Health and Safety Policy when working within the project site. ii. The contractor will be required to provide first Aid Kits on site to treat minor ailments and cuts. However, major cases

		will be referred for treatment to well-equipped and developed hospital such as Lolgorian Level 4 General Hospital. iii. The owner as well as their various contractors will be required to provide the appropriate personal protective equipment such as safety boots and coats, hand gloves, earplugs and nose masks when carrying out their studies. Supervisors will be mandated to ensure the use of these protective devices and implement sanctions when necessary. iv. Ensure that well-trained workers will be engaged for the various construction roles.
Construction Phase Impacts		
Air Quality Deterioration	Workers/ Local communities and road users	i. Dust emissions from trucks, will be controlled and minimized by the use of designated routes in order to minimize impacts to residents, construction workers, users and institutions along the transport route. ii. Ensure vehicular speed limits of 30mph over any unpaved landscape to minimize dust generation. Material dumping will be regulated to reduce dust emissions. iii. Owners/ operators of construction equipment and vehicles will implement the manufacturer's recommend ed engine maintenance

		programmes to minimize the emission of fumes into the environment. iv. Contractor will monitor dust and remedial action will be taken whenever dust generating activities take place. v. Dust-related grievances will be investigated and managed as part of the Grievance Mechanism.
Vibration and noise nuisance	Workers/ Local communities and road users	i. The contractor should employ standard noise abatement measures and engineering best practices to ensure that the impact of these issues is minimized and reduced to acceptable limits. ii. The contractor should ensure that earthworks and other construction activities will be phased out or controlled to reduce noise generation during construction. iii. All equipment and vessels shall be operated and maintained in accordance with appropriate industry and equipment standards including specifications for noise levels and manufacturer's specifications (including regular checks and maintenance). iv. Machines in intermittent use shall be shut down in the intervening periods between works or throttled down to a minimum.

Loss of vegetation and impacts on flora and fauna	Terrestrial Flora, Fauna	i. Undertake pre-clearing survey and assessment of the flora to be impacted especially if construction will be carried out in the rainy season to help identify sensitive areas such as vegetation with active nesting. ii. The contractor will develop construction code of practice and ensure critical areas are avoided. iii. Allow an appropriate buffer distance between any construction activity and remnant native vegetation, where practicable. iv. Limit construction activities to only designated places and clearly mark out all vegetation, which will not be cleared, so that they are clearly visible as "no-go areas" to construction staff and vehicles. v. Dismantle and remove all equipment and machinery after construction from site. vi. Rehabilitate trenches and disturbed areas as soon as possible.
Sanitation/Waste Generation concerns	Soil, Roads	<u>General Waste</u> i. The contractor must appoint a waste management coordinator. The coordinator shall prepare and implement a Waste Management Plan which specifies procedures and, incorporates the existing waste management plan for the proposed project.

		This is to facilitate tracking of loads, and protocols for the maintenance of records of the quantities of wastes generated, recycled and disposed. ii. Waste remaining after implementation of the waste hierarchy measures will be collected by private waste management companies operating at the port for onward disposal. iii. Good site practices shall be implemented to avoid waste generation and promote waste minimization. <u>Construction Waste</u> i. All scraps or other solid wastes will be disposed of at the approved disposal site. ii. Excavated soils/concrete will be reused as much as possible for backfilling trenches dug during construction. iii. Contaminated soil will be considered as waste material and disposed of accordingly at the authorized Landfill Site. iv. Excavated material shall be used on site to the extent practical. <u>Hazardous Waste</u> i. All hazardous waste (e.g. oily waste) generated during construction/installation will be appropriately stored as per manufacturer's instructions. For onward recycling, treatment or

		disposal, NEMA approved hazardous waste collectors will be engaged for collection and disposal of all hazardous waste.
Labour influx issues	Local communities	ii. Angata Sugar Mills Limited will implement a labour influx management plan to holistically address labour influx issues. iii. Angata Sugar Mills Limited will implement a stakeholder engagement plan that will include: a) Informing stakeholders of increases in workforce and potential for influx. b) Engaging with local government/traditional authorities on issues, risks and opportunities regarding labour influx c) Engaging local communities to understand their concerns, raise awareness of risks and opportunities, and identify solutions to issues relating to labour influx d) Developing a feedback and grievance mechanism to collect any feedback or complaints related to labour influx associated with the project.

Occupational Health and Safety Concerns and Labour Issues	Workers	<u>Adoption of Health and Safety Policies</u> i. The contractor will be required to prepare and implement health, safety and environmental protection at the workplace to guide the construction activities in compliance with the policy of OSHA. The responsibility for implementing this policy lies directly and personally with the contractor through its workers. The policy objectives shall include the following: a) Conduct activities in the project site in accordance with relevant national and international laws and regulations on occupational health and safety. This includes The Labour Relations Act, 2007; The Work Injury Benefits Act, 2007; The Employment Act, 2007; The public Health Act (Cap 242); The Factories and other Places of Work Act (Cap 514); Building Code (2002); The World Commission on Environment and Development; The Rio Declaration on Environment and Development; establish regulatory

		and organizational framework for the efficient and effective management of occupational health, safety and environment issues; b) Maintain safe plant, machinery and equipment; c) Maintain incident and injury-free working environments; d) Prevent occupational related diseases/ illness among workers; and e) Promote and maintain a clean, healthy and hygienic environment. <u>The Contractors Occupational Health and Safety Plan (OHSP)</u> i. The contractor will be required to develop an Occupational Health and Safety Plan (OHSP), including requirements for PPE, task risk assessment, mandatory training, audit and monitoring, incident reporting etc. ii. The Contractor will apply the hazard hierarchy when planning work to avoid/eliminate risks and reduce risk to as low as reasonably practical. iii. The contractors will educate workers on its health and safety policy. Workers will therefore be required to follow the health and safety policy

		developed prior to commencement of the works. The adoption of the health and safety policy at site will serve as a precautionary measure to prevent/ minimize the possibility of accidents and reduce health associated risks. iv. The contractors will train selected workers as first aid givers and provide adequate first aid kits at the construction areas to treat minor ailments and cuts. However, major cases will be referred well developed medical hospitals such as the Lolgorian Level IV General Hospital. <u>Use of Experienced Personnel</u> i. The contractors will ensure that well-trained workers will be engaged for the various construction roles. Only drivers with the requisite licenses will be allowed to handle vehicles and earth-moving equipment within the project site. Initial training and testing in machine/ equipment handling and safe working procedures will be given to all new drivers, operators and other field workers to help minimize the occurrence of accidents on site. ii. The contractors will ensure that regular defensive driving training sessions are organized for the drivers to ensure their safety and the safety of the general public. iii. Provision of Personal Protective Equipment (PPEs).

		The contractor will ensure that workers are provided with the appropriate personal protective equipment such as safety boots, overalls, dust coats, hand gloves, earplugs and nose masks. Supervisors will be mandated to ensure the use of these protective devices and implement sanctions when necessary. <u>Phasing out of Material Movements/ Scheduling Material Movements</u> i. Movement of construction materials to site or storage areas will be carried out in phases and properly regulated to control the number of cargo vehicles coming into the project site at any given time to reduce the risk of accidents. Angata Sugar Mills Limited intends to carefully plan material movement to minimize these impacts. Materials and equipment will be transported to the sites during off peak periods. <u>Use of Equipment</u> i. All equipment to be used will be in good condition and scheduled regular maintenance will be ensured to reduce/minimize of accidents. <u>Worker Rights and Wellbeing</u> i. The Contractor will develop and implement a Human Resource Policy and plan that adheres to the requirements of the policy,

		including requirements for workers to have contracts, Workers Grievance Mechanism and develop retrenchment plans if there is a requirement for collective dismissals.
Public Health and Safety, and Security Impacts	Public/Communities	<u>Restriction of Access</u> i. Angata Sugar Mills Limited security personnel will maintain security at the proposed site to ensure that only authorized persons are allowed into the construction area. ii. The security personnel will be trained to respect the human rights of the local people. <u>Public Health /Toilet facilities</u> i. The contractor will provide mobile toilet facilities for workers during construction of the project. ii. Uncovered trenches or deep excavations will be protected using indicator linings or illustrative warning notices or wire mesh (whichever best suits the situation) to prevent fall hazards. All trenches and excavation will be covered as soon as possible. iii. As much as possible the contractor will adopt progressive opening of trenches to reduce risks to as low as reasonably practicable iv. Caution/warning signs should be placed at

		vantage points around the project site Scheduling of Work i. The contractor will analyze traffic flows and ensure that the transport of equipment is carried out during low peak periods. ii. Announcement and Notification of Work Transport of Equipment and Materials i. Traffic impacts resulting from carting of equipment and materials will be limited to the selected project roads and will be managed in line with the Traffic Management Plan to be prepared by the contractor for the movement of materials. ii. The traffic management plan will be prepared in Narok County Government in order to minimize congestion on roads within the project site. iii. All the vehicles to be used for the project and especially in transporting equipment and materials will be serviced regularly and all the drivers to be engaged/assigned would be required to hold the requisite driver's license as prescribed by the National Transport and Safety Authority (NTSA), and would be educated on public safety issues. Adequate traffic management measures will be instituted to caution the

		public and to create safety awareness. iv. Some adequate measures and conditions to be instituted by the contractor in the transport of materials include the following: a) Haulage of materials including quarry products to the project site will be limited to off-peak hours; b) Trucks transporting quarry products and other friable materials to the project site will be covered; c) Road worthy dump trucks will be used; d) Very experienced drivers will be engaged; e) Traffic wardens will monitor dump truck movements and ensure public and traffic safety; and f) Carry out regular inspections of haulage roads. In the event truck failure along haulage routes, such trucks will be towed within 24 hours.
Road crossing and traffic impact	Commercial and private vehicles	i. The contractor will be required to schedule its work such that crossing of the untarred access road is done when traffic is low to minimize inconvenience to motorists. ii. Where the untarred access road has to be blocked for work to proceed smoothly, adequate signs and

		notices will be strategically placed at diversion routes. iii. Any damaged sections of the roads will be reinstated by the contractor
Operations and Maintenance Phase Impacts		
Air Pollution	Workers and other users	i. Facility operator will incorporate the Air Quality Management Plan into standard operations. The plan will include the following: a) dust from vehicular movement b) dust from cleaning activities c) exhaust emission from vehicles and machinery d) fumes from chemicals and welding e) VOCs from fuel storage areas f) noise from operation of machinery g) monitoring ii. Regular maintenance of machinery/ equipment in accordance with manufacturers' specifications to ensure minimum levels of emission from the facility operations.

Waste Management	Workers and users	<u>Education campaigns</u> i. The facility operator will ensure proper management and disposal of waste generated and will continue to educate workers on its waste management plan. <u>Waste Collection and Disposal</u> i. The facility operator will appoint a waste management coordinator. The coordinator shall prepare and implement a Waste Management Plan which specifies procedures and, incorporates the existing waste management plan for the project. This is to facilitate tracking of loads, and protocols for the maintenance of records of the quantities of wastes generated, recycled and disposed ii. Ensure different types of waste are segregated in different containers or skip to enhance recycling of material and proper disposal of waste. iii. Ensure chemical wastes are stored, handled and disposed of in accordance with the Waste Management Regulations (2006)
Noise Nuisance	Angata Sugar Mills Limited management/ workers	i. The project operators will ensure that silent equipment (low noise versions, which may cost a little extra) are used in the project. Additionally, silencers, mufflers and other appropriate engineering control devices shall be used on the noise

		generating equipment. Where possible, electrical instead of diesel or diesel-electric moving equipment will be used. ii. Reduce noise levels through optimizing the plant's layout iii. Regular site inspections will be carried out to audit the compliance with regard to noise control. iv. The project operators will provide appropriate PPEs for workers use.
Occupational Health and Safety Concerns and Labour Issues	Angata Sugar Mills Limited factory workers and subcontractors	<u>Training in equipment and chemical handling</u> i. Risk assessments will be undertaken and avoidance / elimination of hazards prioritized to reduce the need for manual handling of chemicals. ii. The plant's operator will also ensure that workers handling fuels, chemicals, machinery and equipment are well trained. Such workers will be provided with the necessary documentations including Material Safety Data Sheet (MSDS) to serve as reference sources on the dangers and ways of handling these chemicals, fuels etc. <u>Provision of appropriate PPEs</u> i. The Angata Sugar Mills Limited operators will ensure that the Management provides workers with adequate personal protective equipment including overalls, earplugs, overalls and anticorrosive gloves etc. as their particular operations would require.

		ii. Non-conductive hand tools rated for the voltage at which live electrical work is being performed at a section will be provided. Caution/warning signs should be placed at vantage points around the site <u>Preventive Measures</u> i. The Angata Sugar Mills Plant operator will prepare comprehensive maintenance programme on commencement of operations to put in place measures to avert any serious breakdowns or failures. The required maintenance for the systems will include among others: a) Environmental incident/accident investigation; b) Routine equipment maintenance/inspection schedule; c) Annual equipment inspection and maintenance record; d) Procedure for pre-arranged repair service; e) Procedure for preventive maintenance; and f) Regular calibration of equipment. ii. The following safety precautions will be implemented to minimize danger of electrocution at the facility: a) As much as possible avoid working on live electrical parts except when de-energizing the equipment creates

		additional hazards or when the equipment must be energized to allow for testing that can only be performed live. b) Permit to work system will also be implemented for hot works, electrical works and work at height. c) Prior to initiation of hot works, it will be checked that there is no flammable material, gas or dry woodwork which could catch fire; and that surfaces which have been in contact with hydrocarbons or toxic substances are completely clean. d) Ensure that all staff working on live equipment or lines will be without conductive apparel (watches, bracelets, rings, key chains, necklaces, zippers, cloth with conductive thread, etc.) e) Provide barricades and signage for all live electrical equipment <u>Emergency Provisions</u> i. The facility operators will implement its emergency response plan (to be developed from the framework plan to be provided). The plan which will incorporate the emergency response plan set by Angata Sugar Mills Limited Company and it will include information on how all emergency situations will

		be handled including fire, mechanical failures etc. that will arise from operations to minimize any hazards to humans and the environment. Management will ensure a yearly review of the plan. <u>Housekeeping</u> i. Good housekeeping practices will be an integral part of the facility operations to maintain a well laid out working space and avert accidents resulting from slippage, fires from torn electrical wires, cobwebs etc.
Public Health, Safety and security	Angata Sugar Mills workers, Local communities, General Public	i. The design of the facilities has incorporated adequate safety and security considerations as provided in Section on project description in this ESIA Study, and the operations of the facility Plant will incorporate a scheduled inspection, monitoring and maintenance regime to avoid accidents. ii. Angata Sugar Mills limited will collaborate with its selected security personnel to maintain security of the facilities within the project site environment to ensure that only authorized persons have access to the facilities. iii. Angata Sugar Mills limited will engage private security firms and also involve key local community members in maintaining security of the facilities.

		iv. The security firm and the key community members will be hired and trained to comply with required security protocols for operations of such facilities. The security people will also be trained to respect human rights of the local people to avoid conflicts and human right abuses. v. Angata Sugar Mills limited will identify emergency scenarios and develop emergency preparedness and response plans with allocation of responsibilities to local communities and authorities, (where appropriate) vi. Angata Sugar Mills limited will organize, in collaboration with the respective local community representative members i.e. chiefs and elders and the County Government Health Department, awareness creation seminars and educational programmes for all workers and the general public on the behavioral changes required to prevent the spread of HIV/AIDS and other STDs.
Accidental Events and impacts on Terrestrial ecology and property	Local communities	i. The design of the facilities has incorporated adequate safety and security considerations as provided in the project description section of the study, to minimize potential accidents.

		ii. Angata Sugar Mills limited will develop and implement an emergency preparedness and response plan in collaboration with relevant stakeholders including relevant government authorities as it is deemed appropriate.
Sustainability of the Angata Sugar Mills Limited Project	County government of Narok / Ministry of Agriculture, Livestock, Fisheries and Co-operatives / factory workers	i. The Management of Angata Sugar Mills Limited will seek to operate profitably by implementing a system to collect appropriate user charges to cover the running and maintenance cost of its facilities. ii. The sugar factory will develop and implement an emergency response plan to handle all emergencies including fire that will arise from all its operations to minimize any hazards to humans and the environment. Management will ensure a periodic review of the plan. iii. A comprehensive maintenance programme will be put in place to avert any serious breakdowns or failures or accidents. The required maintenance for the systems will include among others: a) Environmental incident / accident investigation; b) Carry out fire response drills; c) Routine equipment maintenance/inspection schedule;

		d) Annual equipment inspection and maintenance record; e) Procedure for pre-arranged repair service; f) Procedure for preventive maintenance; g) Procedures for handling materials; iv. Coordinate with other agencies and organizations to provide technical assistance to inform activities and programs that can support the project v. Ensure resource use efficiency influencing supply chain sustainability vi. Adopt a comprehensive monitoring plan to ensure effective implementation of mitigation and management measures.
Decommissioning Phase		
Post construction phase		
Loss of jobs after preparatory and construction phases	Preparatory and construction phase workers	i. All workers to be engaged by the Contractor will be informed that their engagement is temporary and ends after construction, and that their engagement is not a guarantee for reemployment during the operational phase.
		ii. The contracts for all consultants to be involved during the preparatory and construction phase will

		clearly indicate the duration of their assignment.
Occupational health and safety	Similar to construction phase	Apply mitigation measures for construction phase
Public safety and traffic issues	Similar to construction phase	Apply mitigation measures for construction phase
Waste disposal	Similar to construction phase	Apply mitigation measures for construction phase
Air pollution	Similar to construction phase	Apply mitigation measures for construction phase
Post operation phase		
Loss of job	Operation and decommissioning phase workers	i. A retrenchment policy will be developed and included in the condition of service/service agreement for workers for them to know what they will be entitled to during retrenchment and closure of the affected company/ operator.
All other impacts	Bio-physical and social environment	i. A detailed EIA will be carried out for approval and permitting by the operator before final decommissioning of both offshore and onshore facilities to confirm all impacts and appropriate mitigation measures to be implemented

CHAPTER 10
10.0 ENVIRONMENTAL MANAGEMENT PLAN
10.1 Introduction

This section describes the proposed measures to be implemented by the project management to mitigate the negative impacts identified. It forms the Environmental Management Plan document for use in Monitoring and Evaluation as well. After identifying environmental effects, mitigation measures to lessen or compensate for potential adverse impacts are identified. An EMP for development projects provide a logical framework within which identified negative environmental impacts can be mitigated and monitored. In addition, the EMP assigns responsibilities of actions to various actors and provides a timeframe within which mitigation measures and monitoring can be done.

ESIA is an environmental management tool and EMP is its vital output providing a checklist for project monitoring and evaluation. The EMP outlined herein addresses the identified potential negative impacts and mitigation measures of the proposed project and serves as a guide for enforcement and compliance to environmental management.

The Environmental Management Plan therefore endeavors to achieve the following:

i. Compliance with legal requirements and voluntary commitments.
ii. Minimizing or preventing pollution.
iii. Continual improvement in environmental performance, including areas not subject to regulations.

It is recommended that the Project Proponent incorporates these measures gradually; prioritizing mitigation of impacts considered most significant (adverse impacts) and progress to the less severe ones in the project planning phases for the proposed project EMP.

Table 10: Environmental Management Plan for the Proposed Project

		Activity	Negative Impact	Mitigation Measure	Responsibility	Performance Indictors	Cost (KSHs)
	Design Phase						
1.		Proposed Project	Landscape visual impact	- Design of infrastructure that conforms with the project site features (topography and aesthetics)	Angata Sugar Mills Limited Design Consultant	Site infrastructure design blending with host environment	Approx. 500,000/=
2.		Proposed Project Sanitation Facilities	Soil and water contamination	- Design appropriate containments for oils/other construction chemicals and sanitary waste from the contractor's camp.	Angata Sugar Mills Limited Design Consultant	Availability of sanitary facility and paved containments in the Design	Approx. 700,000/=
3.		Proposed Project site Vegetation Cover	Removal of existing Vegetation	- Design of appropriate construction that provides for incorporation of existing vegetation	Angata Sugar Mills Limited Design Consultant	Site infrastructure incorporating existing vegetation	Approx. 200,000/=
	Pre-Construction Phase						
1.		Angata Sugar Mills Limited Project Facts	Potential lack of support From project area community	- Timely dissemination of project facts to community and stakeholders - Convening of meetings with Community and Stakeholders to carry out sensitization and disseminate project facts	Angata Sugar Mills Limited	Feedback information and forms from project area community	Approx. 500,000/=

2.		Clearing of Proposed Project site vegetation	Vegetation damage, and invasion by exotic species	- Maintain native vegetation cover by selective removal of trees which cannot be incorporated in the project design by use of manual clearing technics; This is in line with: • Environmental Management and Coordination Act (EMCA), 1999 Amended 2015	Angata Sugar Mills Limited Contractor	Existing mangroves incorporated in the Constructed Site area	Approx. 600,000/=
3.		Clearing of proposed site project vegetation	Generation of Solid Waste	- Contractor to provide strategically located solid waste collection container (skip); - Collect together all generated waste from site clearing; - Transport and dispose all waste away from site; - Liaise with the County government on suitable dumping site for spoils; This is in line with: • Environmental Management and Coordination Act (EMCA), 1999 Amended 2015, • Water Act 2012 and Public Health Act, Cap 242	Angata Sugar Mills Limited Contractor	• Presence of waste collection bins • Contract with NEMA Registered Waste Disposal Firm	Approx. 100,000/= for waste collection bins 10,000/= per month for Waste Disposal
4.		Clearing of proposed site project vegetation	Noise pollution (excess noise and vibration)	- Use of noise reduction/ hearing protection devices when working with noisy equipment; - Use of serviceable chain saws (low noise emission); - Instruct machinery operators to avoid raving of engines; - Carry out site preparation activities during the day; This is in line with:	Angata Sugar Mills Limited Contractor	• Records of machine and vehicle maintenance • Availability and use of Ear Muffs	Approx. 200,000/= for Provision of noise pollution

				• Environmental Management and Coordination Act (EMCA), 1999 Amended 2015; • Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 • OSHA Act, 2007.			
5.		Clearing of proposed site project vegetation	Sanitary and other Domestic Waste	- Provide site clearing workers with solid waste bins for their use; - Ensure site has toilet facilities; - Sensitize workers on site cleanliness and hygiene This is in line with: • Environmental Management and Coordination Act 1999 Amended 2015 • Water Act 2012 • Public Health Act, Cap 242	Angata Sugar Mills Limited Contractor	Presence of waste bins and Toilets for use by workers	Approx. 400,000/= for Provision of Sanitary and waste collection facilities.
	Construction Phase						
1		Soil Excavation at Proposed Project site	Soil Erosion	- Excavated soil is to be used for backfilling excavated areas while excess soil is disposed of off-site; - Soils are not to be left exposed to wind/water; - Soil erosion is to be reduced and river valley protection enhanced. This is in line with: • Environmental Management and Coordination Act 1999 Amended 2015 • Water Act 2012, OP 4.01 Environmental assessment - Sinking of a borehole for water abstraction at the site.	Angata Sugar Mills Limited Contractor	Ground cover in constructed areas Quality of surface water at the site and in the neighboring rivers Water abstraction permit.	Part of Construction Obligation

2.		Construction of the Proposed Project site	Air Pollution (dust, fuel and smoke emissions)	- Control speed of vehicles and Prohibit idling; - Spray water during construction; - Maintenance vehicles & equipment regularly; - Provision of dust masks for use in dusty conditions; - Use serviceable vehicles/machinery to reduce smoke; This is in line with: • Environmental Management and Coordination Act 1999 Amended 2015; • Occupational Safety and Health Act (OSHA) 2007; • Public Health Act, Cap 242	Angata Sugar Mills Limited Contractor	Records of machine and vehicle maintenance Availability and use of Noise Masks Low dust generation during construction	Approx. 500,000/= for air pollution prevention
3.		Construction of the Proposed Project site	Excess noise and vibration	- Use noise hearing protection devices when working with noisy equipment or noisy environment; - Use serviceable equipment with low noise emission; - Instruct truck/machinery operators to avoid raving engines; This is in line with: • Environmental Management and Coordination Act 1999 Amended 2015 • Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 • Occupational Safety and Health Act (OSHA) 2007 • OP 4.01 Environmental Assessment	Angata Sugar Mills Limited Contractor	Records of machine and vehicle maintenance Availability and use of Ear Muffs	Approx. 300,000/= for Provision of noise pollution
4.		Construction of the Proposed Project site	Generation of Solid Waste	- Provide communal solid waste collection containers (skip) for the collection and storage prior to appropriate disposal; - County Government/NEMA to provide waste dumping site;	Angata Sugar Mills Limited Contractor	Clean, Organized, Neat Site	Approx. 200,000/= for waste containers

				- Engage a NEMA Registered Waste Collection Firm; - Excavation activities to be done during the dry season to avoid soil erosion and siltation of streams; - Site soil to be used to backfill excavated sites; This is in line with: • Environmental Management and Coordination Act 1999 Amended 2015, • Waste Management Regulations, 2006 • Water Act 2012 • Public Health Act, Cap 24	NEMA Registered Waste Collection and Disposal Firm	Presence of waste collection receptacles Contract with NEMA Registered Waste Disposal Firm	10,000/= per month for waste collection and disposal
5.		Construction of the Proposed Project site	Generation of Liquid Waste and other Chemicals (Hazardous Waste)	- Construct a paved containment for storage of oils and other liquid chemicals being used in the construction site; - Provide containers for storage of used oils from vehicles /machines/equipment being used at the construction site; - Engage a NEMA Registered Firm for the collection, transportation and appropriate disposal of used oil; This is line with: • Environmental Management and Coordination Act 1999, Amended 2015; • Waste Management Regulations, 2006; • Water Act 2012; • Public Health Act, Cap 242; and Environmental Assessment	Angata Sugar Mills Limited Contractor NEMA Registered liquid waste/ used oil collection and Disposal Firm	Presence of a paved area for storage of oils and other chemicals Presence of used oil containers.	Approx. 400,000/= for paved containment & used oil containers. 10,000/ per month for collection and disposal of used oil.
6.		Construction of the	Risk of fire	- Provide firefighting equipment at the construction site area;	Angata Sugar Mills Limited Contractor	Performance records	Approx. 300,000/= for fire

		Proposed Project site		- Contractor staff to be sensitized on firefighting equipment use; - No burning of materials is to be permitted at the site. This is in line with: • Occupational Safety and Health Act (OSHA) 2007; • Public Health Act, Cap 242;		Presence of Fire Extinguishers at construction site	extinguishers
7		Construction of the Proposed Project Site	Potential pollution of Surface and Groundwater	- No disposal of domestic waste at the project site; - Provision of used oil containers at a central point; - Use of waste bins/proper wastes management; - Pave parking area for trucks and direct drainage to containment; - Analysis of water at the site area 2 times year This is in line with; • Environmental Management and Coordination Act (EMCA), 1999 Amended 2015; • Public Health Act Cap 242;	Angata Sugar Mills Limited Contractor	Water Quality Report Waste Presence of Bins	Approximately 50,000/- for communal waste containers 200,000/- Per year.
8.		Construction of the Proposed Project site	Safety of Workers and other visitors to construction site	- Use of construction site barrier tapes to isolate the site(working) area to bar intruders from accessing the area in case of a dropping object; - Appropriate head, hand and foot protection (PPE) during the manual clearing of vegetation and construction activities; - Adopting ergonomic work flow designs that fit physical tasks to employees and not vice versa. Maintain work productivity; - Construction site visitors require appropriate safety Gear. This is in line with:	Angata Sugar Mills Limited Contractor	Workers have Safety Gear Medical records Emergency contacts for Hospital and Police available	Approx. 300,000/= for safety gear

				• Occupational Safety and Health Act (OSHA) 2007; • Environment Management and Coordination Act (EMCA), 1999 Amended 2015; • Public Health Act Cap 242			
9.		Construction of the Proposed Project site	Working at heights	- Testing of structures for integrity prior to undertaking work; - Implementation of fall protection including induction on climbing techniques and use of fall protection measures,	Angata Sugar Mills Limited Contractor	Medical Records and Training records Availability and use of proper PPE	Approx. 500,000/= for special safety equipment
				- Provision of harnesses and scaffolds for working at heights; - Inspection, maintenance, and replacement of fall protection equipment; - Use of helmets and other protective devices that are going to mitigate against scratches, bruises; lacerations and head injuries due to dropping objects; - Provide first aid facilities at the site; This is in line with: • Occupational Safety and Health Act (OSHA) 2007; • Public Health Act Cap 242		Availability of Fall Protection Equipment at the Construction Site	
10.		Construction of the Proposed Project site	Health issues of construction workers and Community	• Occupational Safety and Health Act (OSHA) 2007	Angata Sugar Mills Limited Contractor Ministry of Health NGOs and Donor Agencies	Pamphlets on Health Matters Records of disease incidences/ prevalence	500,000/= for sensitization and provision of condoms. Health facility

					Local Administration		cost to be determined
11.		Construction of the Proposed Project site	Community misconceptions	- Awareness creation amongst the Community on project facts; - Community issues to be responded to promptly; - Project progress reports and monitoring reports to be prepared and recommendations implemented;	Angata Sugar Mills Limited Local administration Local Leaders	Records of Meetings with Community Records of community issues recorded and responses.	Approx. 100,000/= for convening meetings
12.		Construction of the Proposed Project site	Increase in social vices/ Security Concerns	- Conduct Information Education and Communication; (IEC) amongst the community and the project staff; - Hold meetings between Contractor Staff and Community; - Have regular police patrols at the beginning of project development; - Collect information on persons coming into the project area to settle during project implementation.	Angata Sugar Mills Limited Ministry of Education Local Police Local Administration Local Leaders	Meeting reports Police records on project area security	Approx. 300,000/= for convening meetings

13.		Construction of the Proposed Project site	Surface run off and sedimentation from construction activities	- Construction of effective drainages and culverts; - Plant soil binding grasses and other native plants This is in line with: • Environmental Management and Coordination Act 1999 Amended 2018; • Water Act 2012	Angata Sugar Mills Limited Contractor	Surface runoff water impact protection facilities in the project area	Construction Obligation
14.		Construction of the Proposed project site	Sanitary facilities for construction workers	- Installation of appropriate sanitary facilities; - Having a monitoring programme for the septic tanks to ensure no overflow takes place This is in line with: • Environment Management & Coordination Act (EMCA), 1999 Amended 2015; • Waste Management Regulations, 2006	Angata Sugar Mills Limited Contractor	Presence of Toilet Facilities for Workers and Visitors to the Construction site	Construction obligation
15.		Construction of the Proposed Project site	Dangers of having Child Labour issues arising	- Contractor to be strictly advised not to engage any underage persons (under 18 years of age) to perform any form of work at the site during construction - Contractor will be required to comply with the Employment Act, 2007 This is in line with: • Employment Act, 2007	Angata Sugar Mills Limited Contractor	List of workers that does not contain underage persons	Construction Obligation
	Operational Phase						

1.		Operation of Proposed Project Facility	Maintenance of facilities Working at heights	- Use of protective devices to mitigate against injury; - Provide first aid facilities at the site; This is in line with • Occupational Safety and Health Act (OSHA) 2007	Angata Sugar Mills Limited Site manager	Use of Proper PPE and Equipment Handouts on safety	Approx. 200,000/=
2.		Operation of Proposed Project Facility	Risk of Fire	- Sensitization of Workers on Fire Safety Risks; - No burning of any materials near or in the site This is in line with: • Occupational Safety and Health Act (OSHA) 2007; • Environmental Management and Coordination Act 1999 Amended 2018;	Angata Sugar Mills Limited site manager County government	Handouts on Fire Hazards and Safety	Routine Site Operation Activity
3.		Operation of Proposed Project Facility	Pollution of surface water and Waste management	- Ensure solid waste is collected and appropriately disposed of; - Ensure that used oil from trucks are not released to the ground; - Used oil is to be put into containers and appropriately disposed of by a NEMA approved agent; - Provision of used oil containers for use by truck drivers; This is in line with: • Environment Management and Coordination Act (EMCA), 1999 Amended 2018; • Water Act 2012; • Public Health Act Cap 242;	Angata Sugar Mills Limited site manager	Presence of solid waste container Containers for storage of used oil recovered from trucks	Approx. 20,000/= for Provision of used oil containers
4.		Operation of Proposed Project Facility	Angata Sugar Mills Limited proposed project Site	- Provision of communal solid waste containers (skip); - Provision of secured solid waste collection containment where waste container (skip) is to be placed;	Angata Sugar Mills Limited site manager	Waste Collection and Disposal Reports	Approx. 20,000/= for Waste Containers 10,000/=

			Solid Waste Management during Operation	- Regular disposal waste depending rate fill up. This is In line with: • Environment Management and Coordination Act (EMCA), 1999 Amended 2015; • Waste Management Regulations, 2006; • Water Act 2012; • Public Health Act Cap 242.		Presence of Waste Bins	per month for waste disposal by NEMA Approved Firm
5.		Operation of Proposed Project Facility	Health issues of Facility Workers, Truck Drivers and Community	- Sensitize workers and community on sexually transmitted diseases especially STIs and HIV/AIDS which is spread through socialization and unprotected sex; - Provide workers and community with condoms. - Encourage Workers, Truck Drivers and Community to go for HIV Testing and Counselling in order to live a productive life; This is in line with: • Public Health Act Cap 242; • Occupational Safety and Health Act (OSHA) 2007	Angata Sugar Mills Limited Ministry of Health Local Administration	Presence of a HIV Programme at the Facility Records of disease incidences/ prevalence (URTI, HIV/AIDS, Water Borne Diseases etc.	100,000/= for sensitization and provision of condoms.
6.		Operation of Proposed Project Facility	Monitoring and Evaluation of the effectiveness of project Mitigations	Implementation of monitoring of facility operations and success of proposed mitigations - Health Trends (URTI, Malaria, STIs and HIV/AIDS); - Livelihood and socio-economic status of project area community; - Community perception on the sugar milling plant	Angata Sugar Mills Limited site manager Local Administration	Quarterly Reports on Facility performance	Routine Operation of the Facility
	Decommissioning Phase						

1.		Decommissioning of Proposed Project Facility	Air Pollution (dust, smoke, fuel emissions)	- Control of demolition vehicle speeds; - Prohibition of idling of vehicles; - Water is to be sprayed on building undergoing demolition during decommissioning o reduce dust emission; - Regular maintenance of vehicles and equipment; - Provision of dust masks for use in dusty conditions. - Use of serviceable vehicles and machinery to avoid excessive smoke emission These is in line with: • Environmental Management and Coordination Act 1999 Amended 2018; • Occupational Safety and Health Act (OSHA) 2007	Angata Sugar Mills Limited Decommissioning Contractor	Decommissioning Records	Approx. 200,000/= for nose protection equipment (dust masks)
2.		Decommissioning of Proposed Project Facility	Noise pollution	- Noise reduction/ hearing protection devices when working with noisy equipment; - Use of serviceable equipment with low noise level; - Instruction to truck/machinery operators to avoid raving engines; - Use of noise protection (ear muff) during demolition; This is in line with: • Environmental Management and Coordination Act 1999 Amended 2015; • Occupational Safety and Health Act (OSHA) 2007.	Angata Sugar Mills Limited Decommissioning Contractor	Decommissioning Records	Approx. 200,000/= for noise pollution mitigation

3.		Decommissioning of Proposed Project Facility	Potential To Injury Workers	- Use of appropriate head, hand and feet protection (PPE) during demolition of structures - Adopting ergonomic work flow designs that fit physical tasks to employees and not vice versa while maintaining a balance with productivity; This is in line with: • Occupational Safety and Health Act (OSHA) 2007	Angata Sugar Mills Limited Decommissioning Contractor	Availability of appropriate gear/ Records Use of Proper PPE	Approx. 200,000/= for PPE and other safety equipment
4.		Decommissioning of Proposed Project Facility	Working At heights	- Use construction site barrier tape to isolate the site to guard site visitors from accidents and injuries; - Implement a fall protection program that includes training in climbing techniques and use of fall protection measures, Provide Harnesses	Angata Sugar Mills Limited Decommissioning Contractor	Availability of appropriate Safety Gear/Records Proper use of PPE	Approx. 100,000/= for PPE and other safety equipment
				- Use of helmets and other protective devices to mitigate against injury, - Provide first aid facilities at the site This is in line with: • Occupational Safety and Health Act (OSHA) 2007			

CHAPTER 11
11.0 CONCLUSION AND RECOMMENDATIONS
11.1 Conclusion

Angata Sugar Mills Limited is fully aware of its responsibility to sound environmental practices, and will undertake this project in compliance with Kenyan laws and in accordance with good international industry practice. The construction activities and operation of the facilities will satisfy the relevant local environmental protection laws and international conventions.

The major potential environmental and social risks and impacts associated with the proposed project have been identified and duly assessed in this ESIA Report. The major environmental, safety risks and impacts associated with the Project during both construction and operation stages include noise nuisance, air pollution, water pollution, erosion and accretion, occupational health/safety risks, sanitation problems, traffic impacts/public safety concerns, solid waste generation/disposal problems, and security risks.

Mitigation and management measures for the identified impacts have been recommended and will be implemented in order to minimize significant adverse effects. An environmental monitoring programme to help detect changes arising from the predicted adverse impacts and to help maintain environmental quality within acceptable guidelines has also been prepared for implementation. A stakeholder engagement program and grievance redress mechanism will be implemented to ensure that stakeholder concerns and grievances are managed effectively to minimize potential conflicts during project implementation.

The implementation of the proposed project will significantly improve the supply of sugar in the country at large, as it will increase availability. The activities of cultivating and processing of sugarcane will not in any way affect the existing land use practices in the project area. In any case, it will open the project area to more development opportunities and optimize land use thereby improving the livelihoods and wellbeing of the local community. The project is also expected to have significant social impact throughout its cycle e.g. creation of employment for the local community, utilization of local material resulting in the growth of the local economy, boosting of the local business e.g. Hospitality industry, improvement of infrastructure i.e. of roads (feeder road systems), water points, healthcare facilities, schools etc.

Generally, stakeholders are willing to participate in project implementation where necessary to help ensure that the project is implemented in an environmentally friendly and socially acceptable manner to the benefit of the county and the country at large. However, the local communities and PAPs expect that appropriate measures will be put in place to address the issues that they raised which is captured in the stakeholder's report. The proponent is also required to comply with all the relevant authorities that govern its operations i.e. NEMA, KSB, DOSHS, KEBS, and WRA etc.

11.2 Recommendations

Described below are the recommendations for the prevention and mitigation of adverse impacts of the proposed Angata Sugar Mills Factory.

- The Ministry of Agriculture, Livestock, Fisheries and Co-operatives should intensify Agricultural extension services to the farmers with a view to improving quantity and quality of the sugarcane;
- The proposed construction of the sugar factory complex should implement the ESMP as designed by this study;
- The proponent shall apply for Water abstraction permits from WRA;
- The construction of the proposed Sugar factory complex should be carried out in accordance with approved designs and plans;
- The locals to participate and fully benefit from the construction and operation of the proposed factory; and
- Regular sampling and analysis of waste water from factory should be carried out periodically to check on its toxic and pollution levels.