Environmental and Social Impact Assessment Study Report for the Proposed Extension of Butali Sugar Mills on Plots L.R. Nos. N/KABRAS/MALAVA/3134 and NORTH KABRAS/MALAVA/4204 in Manyonje area, Kakamega County.

Proponent	Firm of Experts
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Version: Final ESIA Report
Date: 07th September 2022

CERTIFICATION

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CERTIFICATION

Certification by Lead Experts

We, Envasses Environmental Consultants Limited, hereby confirm that this Environmental and Social Impact Assessment Study Report (ESIA) has been prepared by ourselves pursuant to Section 58 of the Environmental Management and Coordination Act Cap. 387 of the Laws of Kenya.

Signed for and on behalf of: **Envasses Environmental Consultants Limited**
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Designation: Chief Executive Officer

SIMON K. NZUKI, M.PHIL (Env. St.)
NEMA EIA / EA LEAD EXPERT
REGISTRATION No. 1350
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Signature: _____ Date: 8/9/2022

Certification by Proponent

We, **Butali Sugar Mills Limited**, hereby confirm that this Environmental and Social Impact Assessment Study Report (ESIA) has been submitted to NEMA with our authority as the proponent.

Signed for and on behalf of **Butali Sugar Mills Limited**

Name and title of Signatory: **Mr. Pratap Keshwala, General Manager**

Signature: _____ Date: 08/09/2022

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August 2022

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Sampling and analysis of baseline environmental media quality i.e., air, water and soil were undertaken by Polucon Services Kenya Limited. The consultants are grateful for their invaluable input in the preparation of the ESIA study report.

The staff of Envasses Environmental Consultants Limited assisted the lead consultants in data collection and analysis as well as preparation of the draft and final reports. In this regard, we thank Mr. Omar Said, Ms. Fridah Khamalishi and Ms. Rhoda Mutanu.

EXECUTIVE SUMMARY

Butali Sugar Mills Limited contracted Envasses Environmental Consultants Limited in July 2022 to prepare an Environmental and Social Impact Assessment (ESIA) Study Report for the proposed Extension of Butali Sugar Mills on Plots L.R. Nos. N/KABRAS/MALAVA/3134 and NORTH KABRAS/MALAVA/4204 in Manyonje area, Kakamega County. The ESIA is prepared pursuant to Section 58 of the Environmental Management and Coordination Act Cap. 387 of the Laws of Kenya. Processing and manufacturing industries including sugar factories are listed under the Second Schedule (9q) of the Environmental Management and Coordination Act Cap. 387 of the Laws of Kenya as high risk and should therefore undergo an ESIA Study process.

The methods used in the preparing the ESIA study report were guided by the Third Schedule of the Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003. Site visits were undertaken in July 2022 for purposes of reconnaissance, assessing the baseline and environmental risks associated with the proposed project as well as applicable environmental safeguards and standards. Environmental screening criteria was informed by the Second Schedule of the Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003. As per this Schedule the issues considered by the experts were ecological and socio-economic issues, landscape changes, land use character and water. Data collection methods included literature review, observations during site visits and photography. The stakeholder engagement strategy included a community consultative meeting and administration of questionnaires to the neighbors. Baseline environmental data was collected on ambient air, water quality and soil tests in collaboration with Polucon Services Kenya Limited.

The assessment showed that the proposed extension will have both positive and negative environmental and social impacts. The positive impacts are socio-economic in nature and include meeting the domestic demand for sugar in the Country, contribution of the project towards attainment of Vision 2030 and the Presidential Big Four Agenda, provision of market for sugarcane and consequently income to local farmers, provision of employment opportunities, income to the proponent, market for local goods and services, source of raw materials for other industrial establishments (molasses, filter mud, bagasse) and revenue to the government.

Negative impacts will occur throughout the project cycle i.e., construction, operational and decommissioning phases. At the construction phase, the negative impacts will include environmental risks of obtaining raw materials, destruction of the physical environment, water demand and effluent generation, solid waste generation and management, occupational safety and health risks, air pollution, noise pollution and increased energy demand. The proponent will mitigate the environmental risks of obtaining raw materials by sourcing materials from licensed sites as per the Environmental Management and Coordination Act Cap. 387 of the Laws of Kenya, ensure procurement of materials is based on a Bill of Quantities prepared by a Quantity Surveyor to avoid potential oversupply of materials and wastage and maximize the re-use of construction waste materials.

Construction activities will involve excavations works and clearance of vegetation cover. The proponent should retain vegetation cover in areas that will not be excavated as far as practicable, compact loose soil within the project sites, use the overburden generated during construction activity to backfill the adjacent eroded areas and replant indigenous trees in the section of the property that will not be developed to compensate for loss at construction phase. Increased water demand and effluent generation during construction phase will be mitigated by sensitizing workers on need to conserve available water, installing bio-digester in place of soak pits and ensuring compliance with the provisions of Environmental Management and Coordination (Water Quality) Regulations, 2006.

Site preparatory and construction activities will generate significant quantities of solid waste in form of biomass, overburden, domestic waste such as plastic containers and construction materials such as wood, building blocks, metal cuttings and wrappings among others. The proponent will procure the services of a NEMA licensed waste handler to dispose off the solid waste and ensure compliance with the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2006.

The workforce, visitors and neighbors to the proposed project site will be exposed to potential safety and health risks during construction and plant installation activities. The potential safety risks will be from the use of machinery, falling objects or even falls, air and noise pollution. These risks have a potential to cause disturbances, injuries, permanent disability or even death. The proponent should register the site as a workplace with the Directorate of Occupational Safety and Health Services (DOSHS), obtain insurance cover for the workforce, provide and enforce the use of Personal Protective Equipment (PPE), provide the correct equipment for the jobs assigned and train the employees on their use, ensure moving parts of machines and sharp surfaces are securely protected with guards to avoid unnecessary contacts and injuries, provide first aid services and emergency vehicle at the site, regulate the entry of visitors to the construction site by deploying adequate security measures and comply with the provisions of the Occupational Safety and Health Act (OSHA), 2007.

Air pollution during the construction phase will be in form of dust and particulate matter generated during excavations, concrete mixing activities and exhaust fumes from machinery use and Heavy Commercial Vehicles (HCVs) delivering construction materials to the site. The proponent should mitigate this impact by ensuring dust screens are installed around the project site, water sprinkled to suppress dust, stock piles of construction materials covered, adequate dust masks provided and enforcing their use as well as monitoring fugitive emissions to ensure compliance with limits set under the First Schedule of the Environmental Management and Coordination (Air Quality) Regulations, 2014.

Noise pollution during the construction phase will emanate from machinery operations and vehicles delivering materials to the site. The noise levels produced may be above the stipulated Environmental and Management Co-ordination Act (EMCA) limits and are a health hazard. The proposed mitigation measures include delivery of raw materials, excavation and construction work be limited to day time hours only between 8am to 5pm, locate machinery that are likely to produce noise as far as practical from neighboring properties, procure, provide and enforce the use of earmuffs, sensitize truck drivers to avoid unnecessary hooting and running of vehicle engines and ensure compliance with provisions of the Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009.

Energy will be required for transportation, excavation, hoisting and concreting activities during construction phase. The major forms of energy to be used will include diesel, electricity, petrol and gas. To conserve energy, the proponent should ensure maintenance of equipment is according to manufactures' instruction, site layout is efficient, procure and provide machines designed for specific work and sensitize workers on energy conservation.

At operational phase, the main environmental concerns include air and noise pollution, solid waste generation and management, increased water demand, effluent generation and management, occupational safety and health risks, community safety and health risks, fire risks and emergency, oil spills and increased energy demand.

Air pollution will mainly result in form of dusts and particulate matter emissions from stored bagasse during windy conditions, flue gases during combustion of bagasse in the boiler, juice treatment and

evaporation process, exhaust fumes from machinery and vehicles accessing the facility and odor from the Effluent Treatment Plant (ETP). Air pollution especially in form of particulate matter may reduce growth of vegetation, hamper aesthetics of the area, and cause respiratory diseases, eye irritation and visual intrusion to workers, visitors to the project site and the neighbors if it is in excess of 75 $\mu g/Nm^3$. The proponent should mitigate impacts of air pollution by planting fast growing trees along the boundary walls, installing dust screens around bagasse storage area, ensuring timely renewal of emissions license from NEMA, installing dust collectors and scrubbers within the plant and compliance with the provisions of Environmental Management and Coordination (Air Quality) Regulations, 2014.

Sources of noise pollution will include machineries during sugar production, vehicular movement in and out of the facility, loading and offloading activities and at the workshops. The excess noise levels may lead to hearing impairments to workers, visitors to the site and neighbors. The proponent should procure and provide adequate earmuffs to employees working at peak noise producing areas and enforce on their use, reduce the working hours for employees working at peak noise producing areas compared to those working in other areas, provide equipment that are properly fitted with noise reduction devices, service mechanical equipment regularly, undertake noise level monitoring in collaboration with a NEMA designated laboratory and comply with provisions of the Environmental Management and Coordination (Noise and Excessive Vibration Pollution (Control)) Regulations, 2009.

Solid waste generated during operation phase will include molasses, bagasse, fly ash and filter mud from the production process, paper, plastics, cartons, wrapping and organic wastes among others from the administration block and staff canteen, used oil, oil containers, and waste tyres and scrap metal from the workshops, and sludge from the ETP. Poor disposal of solid waste degrades environmental quality, may harbor disease causing pathogens and cause eye irritation. The proponent should therefore construct additional bagasse storage area to cater for the increased bagasse produced, amend the contractual agreement with the NEMA licensed solid waste handler to include disposal of the excess bagasse, sell of scrap metals and tyres to licensed recyclers and compliance with the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2006.

Water will be required for industrial and domestic purposes at various sections of the sugar mills. The facility sources water externally from the nearby River Chevaywa, existing borehole and internally from clean cane in form of condensate water. Currently, the management undertakes water quality sampling and analysis, and has valid water abstraction permits from Water Resources Authority (WRA) for the river and borehole. The study recommends additional mitigation measures i.e., installation of water saving systems, carry out regular inspection and maintenance of water pipes and ensuring compliance with the provisions of Environmental Management and Coordination (Water Quality) Regulations, 2006 and the Water Act, 2016.

Being an industrial development, the effluent generated will constitute a combination of domestic and industrial wastewater flows. Domestic effluent flows will be generated from sanitation facilities and general cleaning whereas industrial effluent flows will be generated from sugar production process. Waste water will be managed through the existing and a yet to be constructed Effluent Treatment Plants (ETPs). During the operational phase, the proponent should carry out regular inspection and maintenance of the ETPs, monitor quality of wastewater discharged from ETPs, ensure timely renewal of Effluent Discharge License and comply with the provisions of Environmental Management and Coordination (Water Quality) Regulations, 2006.

The operations of the plant will pose safety and health risks to workers, visitors to the site and the neighboring properties/community. This may be in the form of musculoskeletal injuries from use of machinery and equipment at the plant, exposure to high heat levels, air and noise pollution, exhaust fumes from machinery and vehicles accessing the facility, road accidents, falls and electrocution among others. The proponent should ensure provisions of appropriate Personal Protective Equipment (PPEs) to workers, put in place an effective emergency response plan, display signage warning of potential hazards at various sections of the plant, obtain insurance cover for the workers -Work Injury Benefits Act (WIBA), 2007 and compliance with provisions of Occupational Safety and Health (OSHA), 2007.

Potential sources of fire hazards to the sugar mills include flammable materials, combustion of bagasse in the boiler, juice treatment, clarification process and sugar boiling which is carried out at high temperatures, oil spills, electrical faults or operational negligence among others. Fire occurrence may lead to death, financial losses and loss of livelihoods for the workers and neighbors. The proponent should develop, clearly display and implement a fire and emergency response plan, provide adequate firefighting equipment, conduct regular fire drills, designate a fire assembly point, clearly display emergency exit points, display fire safety and warning signage at appropriate sections of the plant, ensure regular inspection and maintenance of electrical appliances, undertake annual fire audit and comply with Occupational Safety and Health Act (OSHA), 2007.

Potential oil spills may occur during servicing and maintenance of vehicles and machinery. A release of petroleum products to the environment threatens ground and surface waters thereby endangering drinking water supplies. The proponent should mitigate oil spills by providing oil spill response kits, training workers and ensuring compliance with the Used Oil Guidelines, 2017.

During operation phase of the factory, energy will be sourced from the cogeneration plant, National Grid and three standby generators. Energy will be required for running machinery at the sugar mills, steam production at the boiler and lighting. To minimize energy usage, the proponent will procure modern plant machinery, adopt renewable sources of energy to power the lighting systems in areas such as offices, install compact fluorescent lights in high use areas within the facility, keep records of power consumption to inform substantial practical guidelines for opportunities in energy efficiency, create awareness on energy consumption and carry out annual energy audits.

A decommissioning phase is possible in the event of end of project life, closure of the plant by government agencies due to non-compliance with environmental and health regulations, an order by a court of law due to non-compliance with existing regulations, natural calamities and change of user of land. Key environmental and social concerns at this phase will be economic decline, safety and health risks, waste generation and insecurity. To mitigate the impacts, the proponent will prepare and submit a due diligence decommissioning audit report to NEMA for approval at least three (3) months in advance.

In conclusion, the proposed project is considered important and beneficial to the country as it will address sugar demand, mitigate foreign exchange outflows and promote socio-economic growth of the area through increased income to farmers, employment creation and revenue to the government. Further, the project is in line with the Kakamega County Integrated Development Plan whose overall aim is to increase and expand sustainable development opportunities and build people's capacities to enable them create wealth and transform their lives for growth and prosperity.

Despite these benefits, the key environmental concerns that will result from the implementation of the proposed project include air and noise pollution, solid waste generation and management, increased water and energy demand, effluent generation, occupational safety and health risks and

fire risks and emergencies. The ESIA study proposes a suite of Environmental and Social Management and Monitoring Plans to address the anticipated negative impacts during the project cycle and improving the environmental performance of the proposed project. On the basis of a commitment by the proponent to implement the proposed mitigation measures and the Environmental Management Plans, we recommend the issuance of an EIA License as per the Environmental Management and Coordination Act Cap. 387 of the Laws of Kenya.

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LIST OF ACRONYMNS

BSML	Butali Sugar Mills Limited
CIDP	County Integrated Development Plan
CO	Carbon Monoxide
CSR	Corporate Social Responsibility
dB	Decibel
DOSHS	Directorate of Occupational Safety and Health Services
EDL	Effluent Discharge License
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Co-ordination Act
EOT	Electric Overhead Travelling
EPRA	Energy and Petroleum Regulatory Authority
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
EW	Engineering Workshop
FNSP	Food and Nutrition Security Policy
GPS	Global Positioning System
HACCP	Hazard Analysis Critical Control Point
HCVs	Heavy Commercial Vehicles
ISO	International Standard Organization
KACWASCO	Kakamega County Water and Sanitation Company Limited
KEBS	Kenya Bureau of Standards
KNBS	Kenya National Bureau of Statistics
MW	Megawatts
NCA	National Construction Authority
NEMA	National Environmental Management Authority
NGOs	Non-Governmental Organizations
OSHA	Occupational Safety and Health Act
PM	Particulate matter
PPE	Personal Protective Equipment
PPM	Parts Per Million
SDGs	Sustainable Development Goals
SRC	Steam Rankine Cycle
TCD	Tons of Sugarcane per Day
TLV/OEL	Threshold Limit Value/Occupational Exposure Limit
TOR	Terms of Reference
TPH	Tonnage Per Hour
TW	Trailer Workshop
WRA	Water Resource Authority
WTP	Water Treatment Plant

1 INTRODUCTION

1.1 Background information

Kenya produces about 660,000 tonnes of sugar annually while it imports up to 300,000 tonnes of sugar from other African countries to meet domestic demand of nearly one million tonnes (Source: Ministry of Agriculture, Livestock and Fisheries, 2019). Currently, the Country has 16 sugar factories with a combined processing capacity of 56,800 tonnes of cane per day, out of which only 12 are in operation, five of them public-owned and seven privately owned.

However, the industry has continued to face many challenges that have crippled operations of many factories, especially those publicly-owned. Furthermore, the Country is not yet self-sufficient in sugar production and continues to have a deficit of more than 200,000 tonnes each year. The gap in production provides an opportunity for investments in the sugar industry. Consequently, the proponent, Butali Sugar Mills Limited (BSML), proposes to expand their existing sugar factory to tap into the investment opportunities and assist in meeting the sugar demand in the country.

Processing and manufacturing industries including sugar factories are listed under the Second Schedule (9q) of the Environmental Management and Coordination Act Cap. 387 of the Laws of Kenya as high-risk projects. Pursuant to Section 58 of the Act, all high-risk projects listed under the Schedule should undergo an Environmental and Social Impact Assessment (ESIA) Study process. To fulfill this legal requirement, ensure sustainability of the development activities and improve its environmental performance, the proponent contracted Envasses Environmental Consultants Limited in July 2022 to carry out the ESIA Study.

1.2 Overview – Butali Sugar Mills Limited

Butali Sugar Mills Limited is an ultra-modern sugar factory established in January 2011 located in Butali-Chegulo Ward, Tande Sub-Location, Matioli Location, Kakamega County. The installed capacity of the factory is 2,500 Tonnes of Sugarcane per Day (TCD). The existing plant comprises of an administration block, sugar mills plant (mill, boiler, process house, bagging, sugar loading and sugar go-downs) (Figure 1), cane yard (loading and offloading zone), Water Treatment Plant (WTP), Effluent Treatment Plant (ETP), stores, fuel filling station, weighbridge, workshops (engineering and field/auto), staff canteen and parking area. The sugarcane is sourced from farmers in Kakamega, Bungoma, Nandi, Uasin Gishu and Trans-Nzoia Counties as shown in Table 1 below.

Figure 1: A section of the Butali Sugar Mills plant (Source: site visits, July 2022).

Table 1: Sources of sugarcane for Butali Sugar Mills Limited.

No.	County	Sub-County	Area under cane, hectares (Ha)			No. of farmers	Average farm size	% Area coverage
			Out-growers	Nucleus Estate	Total			
1.	Kakamega	Malava	7,287	0	7,287	16,812	0.40	36.51
		Navakholo	3,587	0	3,587	3,682	1.00	17.97
		Shinyalu	564	0	564	622	1.00	2.83
		Mumias East	105	0	105	156	1.00	0.53
		Lugari	4,030	0	4,030	4,527	0.80	20.19
		Likuyani	742	0	742	361	2.00	3.72
Sub-total			**16,315**	**0**	**16,315**	**26,160**	**6.2**	**81.75**
2.	Bungoma	Tongaren	293	0	293	167	1.90	1.47
Sub-total			**293**	**0**	**293**	**167**	**1.90**	**1.47**
3.	Nandi	Mosop	5,612	0	5,612	4,298	1.25	28.12
		Chepsumei	6	0	6	3	2.00	0.03
Sub-total			**5,618**	**0**	**5,618**	**4,301**	**3.25**	**28.15**
4.	Uasin Gishu	Turbo	1,873	0	1,873	1,325	1.25	9.38
Sub-total			**1,873**	**0**	**1,873**	**1,325**	**1.25**	**9.38**
5.	Trans-Nzoia	Kiminini	79	0	79	36	2.00	0.40
Sub-total			**79**	**0**	**79**	**36**	**2.00**	**0.40**
Total			**24,176**	**0**	**24,176**	**31,989**	**0.75**	**121.13**

1.3 Project location and neighbourhood

The proposed project will be located on Plots L.R. Nos. N/KABRAS/MALAVA/3134 and NORTH KABRAS/MALAVA/4204 within Butali Sugar Mills Limited. The sugar mills company is located in Manyonje area, Kakamega County, which lies between Latitude 0°30'15.12" North and 34°50'23.42" East at an elevation of 3867ft above sea level. The specific GPS Coordinates of the proposed project sites are; sugar mills plant (Latitude 0°30'09.19" North and Longitude 34°50'25.09" East at an elevation of 2176ft above sea level) and Effluent Treatment Plant (Latitude 0°30'20.72" North and Longitude 34°50'39.88" East at an elevation of 3514ft above sea level) as shown in Figure 2 below.

The proposed project sites are currently undeveloped and characterized by a flat terrain and various types of vegetation cover (Figure 3). The neighborhood comprises of residential, commercial, learning and religious institutions and farmlands. The proposed project sites neighbor Manyonje Primary School to the North, Chebwai Adventist Training Complex to the South-West and Cheptuli Primary School to the East.

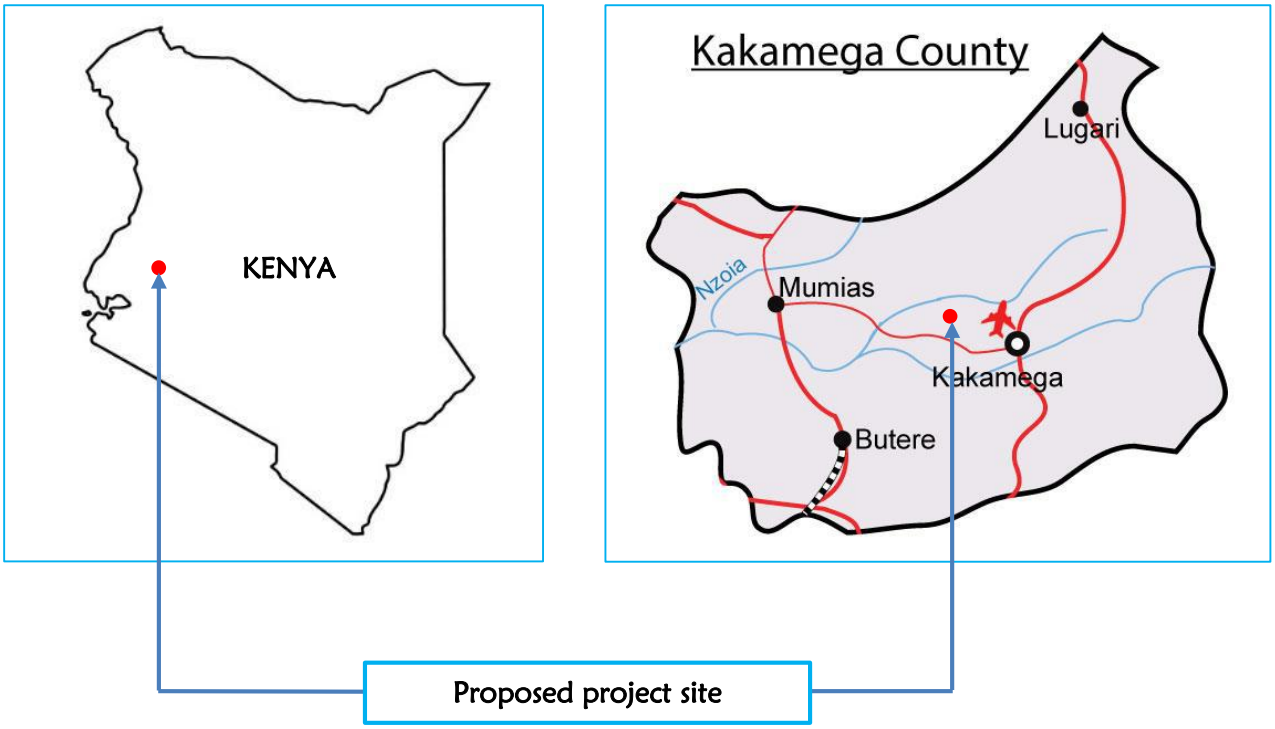


Figure 2: The location of the proposed project site (Source: Google Earth, 2022).

Figure 3: Sections of the proposed project site for the extension (above) and the Effluent Treatment Plant (Below) (Source: site visits, July 2022).

1.4 Project design and description

The proposed project will involve the extension of the existing sugar mills plant from a capacity of 2,500 Tonnes of Sugarcane per Day (TCD) to 5,000 TCD. Specifically, the proposed extension seeks to increase the size and scope of the cane yard, pre-mill and milling lines to be able to meet the new TCD. In addition, the proponent will make minor modifications to modernize equipment in the existing factory to be able to work as one with the proposed sugar mills, install a power turbine and steam boiler of capacity 12MW and 70TPH respectively to meet the increased energy demand for sugar production. Further, the proponent will extend the effluent treatment facilities to a capacity of 1,260m^3/day to manage the increased production of the wastewater flows.

The sugarcane will be sourced from local farmers and neighboring counties. Sugarcane milling will involve the following steps; cane receiving and unloading, juice extraction, juice treatment, clarification process, sugar boiling, crystallization, centrifugation, drying and packaging (Figure 4).

1.4.1 Sugarcane milling

1.4.1.1 Cane receiving and unloading

As soon as the sugar cane arrives at the factory, they are weighted at the weighbridge and offloaded at cane yard. Electric Overhead Travelling (EOT) cranes are used in the process of feeding into cane carrier.

1.4.1.2 Juice Extraction

The sugarcane is chopped by a set of rotating knives to smaller pieces then leveled by cane levelers to create uniform mat as cane gets to fibre-rizer. Cane is fiberized to produce fiber which the heavily grooved crusher rollers squeeze to produce juice. An inter rack carrier in the center conveys the cane fiber upwards against the downward flow of water as sugarcane juice is extracted. A series of mills compresses the cane fibers and separates the juice from bagasse. The initial juice is acidic and turbid. The juice is collected in swirl tank at the edge of the Mill then to raw juice tanks for storage. The sugar concentration is measured.

1.4.1.3 Juice Treatment

Raw juice from mills is weighed and taken to juice treatment as mixed juice. Phosphoric acid solution (diluted) is added to mixed juice to improve on phosphate content in juice to 300mg/l on minimum before it's pumped to Juice treatment for purification. Juice undergoes Lime and heat treatment. Juice is heated in 70˚C then lime is added to boost pH of juice to 8-8.5 then heated again to 103-105˚C. A flocculant is added (polyelectrolyte) for secondary flocculation.

1.4.1.4 Clarification process

The juice is flushed through flush tank to remove the air bubbles that would prevent impurity flocs from settling out rapidly. Juice is passed in the clarifier for sedimentation of the flocs formed by heating lime and the flocculant.

Clear juice flows to the trough (boxes) and pumped to the evaporators for evaporation. The mud (impurities flocculated out as outlined above) is pumped to the mud mixer tank and subsequently pumped to the vacuum filter through for filtration by vacuum filter.

1.4.1.5 Sugar boiling

1.4.1.5.1 Evaporation

Clear juice of concentration of solids (brix) of about 15% is boiled in the evaporation multiple effect of evaporators using exhaust steam in the first body of evaporators to give syrup of concentration of solids (brix) 60-65.

The syrup is transferred to the syrup tanks at the pan floor for further concentration at the single effect vacuum pans to form sugar crystals.

1.4.1.6 Crystallization

1.4.1.6.1 Pan boiling

The process is undertaken in three stages namely;

1. A pan boiling
2. B pan boiling
3. C pan boiling

1. A pan boiling

B magma (B sugar mixed with syrup or water is introduced in A pans to serve as seedling). Syrup is introduced in the pan and boiled on this foundation of B magma to obtain A massecuite (mixer of sugar crystals and molasses). The A massecuite is concentrated to a brix of 90-92 when the vacuum pan is at 259 hectolitres.

The strike is developed enough that means crystals have been developed grown to right size of sugar crystals that can be taken to the market for sell. The strike is discharged into open crystallizer tanks for further crystallization of sucrose while it's stirrer and cooled by air.

2. B pan boiling

A molasses is taken to a B pan and concentrated with brix of about 88 to 89 and the seed of icing sugar suspended in methylated spirit is introduced into the pan to initiate grain formation, this is called B massecuite graining. Grain formation is done enough for 3 strikes of B massecuite. A single strike is brought up on A – heavy molasses up to a volume of 259 hectolitres. It's then brixed to 92-93% brix and then discharged to B massecuite crystallizers where it's held to undergo crystallization on motion for 3 – 4 hours then cured in B continuous centrifugal machines to give B sugar and B heavy molasses. The B sugar is made into a paste with clear juice, water or syrup and brought back as seed in the A pan. The rest of B sugar is melted and fed with syrup in the A pan. B molasses is taken for C massecuite boiling in the C pans.

3. C pan boiling

A portion of A heavy and B molasses are taken in the proportion of 5 – 1 respectively in the C pan to make a foundation for C boiling that it's taken to the C pan for C massecuite boiling. The mixture is concentrated to a brix of about 89-90 then seed of icing sugar suspended in methylated spirit is introduced in the pan to initiate grain formation. Sufficient grain is made to give 3 finished C massecuite strikes. A single C strike is build up on B molasses to a volume of 259 hectolitres then brixed up to 94-95 and discharged into a crystallizer to undergo further crystallization of sucrose in motion that is by stirring and cooling for 36 hours then the strike is cured in C massecuite centrifugals to produce C sugar and final molasses. The C sugar is melted and pumped back into the A boiling pan. The final molasses is discharged to the final molasses tank as a by-product of the process.

1.4.1.6.2 Crystallizer

This are large tanks where A, B and C massecuites is then transferred or dropped. In the tanks, the massecuite is slowly stirred and cooled, continuing the crystallization process (crystal growth).

1.4.1.7 Centrifugation

To separate the massecuite into sugar crystals and molasses, the massecuite is added to a high-speed centrifuge. The centrifuge, which rotates at 1,000 to 2,800 revolutions per minute, contains a perforated metal cylindrical basket. During centrifugation, the molasses passes out of the lined centrifuge basket and is drawn to the outside of the centrifuge where its removed and sent to storage tanks. The sugar is retained in the lined centrifuge where High grade massecuite A is separated by batch centrifugal (high grade) while the subsequent massecuite B and C are separated by continuous centrifugal (low grade).

1.4.1.8 Drying and packaging

Sugar from batch centrifugal is dropped into a hopper which are 3 in number (multi-tray fitted with hot and cold air blowers to cool the sugar to approximately 35˚C). Sugar is graded before being kept in the silos. A set of elevators, one carries 15 Metric tonnes per hour at height of 10 metres and another carries 20 tonnes per hour sugar to silo for storage and packaging. Dust collectors collect sugar dust generated during the drying process and its returned for reprocessing.

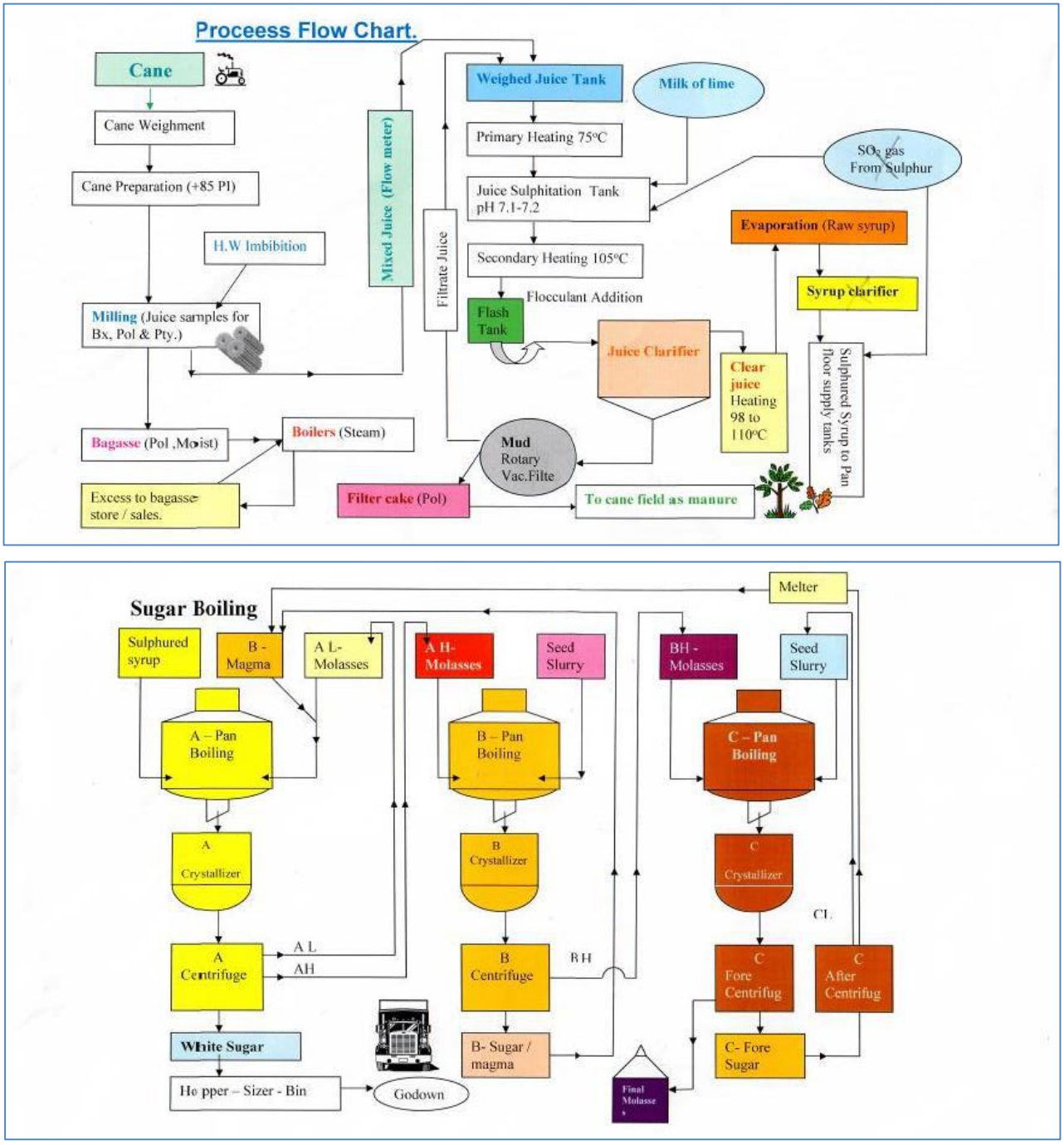


Figure 4: Process flowchart for cane sugar production (Source: Butali Sugar Mills Limited, July 2022).

1.4.2 By-Products

1.4.2.1 Molasses

Molasses is the only by-product obtained in the preparation of sugar through repeated crystallization. The yield of molasses per ton of sugarcane varies in the range of 3-3.5 %. Molasses is mainly used as raw materials for the manufacture of alcohol, yeast and cattle feed. Alcohol on turn is used to produce ethanol, rectified spirit, portable liquor and downstream value-added chemicals such as acetone, acetic acid, butanol, acetic an-hydride etc.

Currently, molasses is sold to distillers for alcohol production, agrochemicals and animal feed manufacturing companies.

1.4.2.2 Bagasse

This is a fibrous residue of cane stalk that is obtained after crushing and extraction of juice. It consists of water, fibre and relatively small quantities of soluble solids. The composition of bagasse varies based on the variety of sugarcane, maturity of cane, method of harvesting and the efficiency of the sugar mill. Bagasse is usually used in combustible in furnaces to produce steam. It is also used as a raw material for production of paper, boards, animal feeds and charcoal.

1.4.2.3 Fly ash

This is a residue output after the boiler furnace after bagasse has completely burnt out. It is used in potassium and is also used by local farmers for cultivation.

1.4.2.4 Filter mud

This is a residue output after the filtration of mud. Filter mud is very rich in phosphate and other mineral salts given out as fertilizer to the local communities of farmers. None is sold to the manufacturing company.

1.5 Study approach and methodology

1.5.1 Introduction

The methods used in the preparing the ESIA study report were guided by the Third Schedule of the Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003. The consultant prepared a scoping report and Terms of Reference (TORs) as required under Regulation 11 of the Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003 and submitted them to NEMA for consideration for approval. The scoping report and TORs were approved on 27th July 2022 and the consultants began preparation of the ESIA study report.

1.5.2 Data collection

Data collection methods included literature review, observations during site visits and photography. The stakeholder engagement strategy included a community consultative meeting and administration of questionnaires to the neighbors. Baseline environmental data was collected on ambient air, water quality and soil tests in collaboration with Polucon Services Kenya Limited. Site visits were undertaken in July 2022 for purposes of reconnaissance, assessing the baseline and environmental risks associated with the proposed project as well as applicable environmental safeguards and standards. Environmental screening criteria was informed by the Second Schedule of the Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003. As per this Schedule the issues considered by the experts were ecological and socio-economic issues, landscape changes, land use character and water (Table 2).

Table 2: Summary of the results from the screening exercise.

Criteria	Results
Ecological impacts	– Excavation will occur – No endangered species of trees and plants found at the site – No endemic species reported on site
Social-economic considerations	– Meeting the domestic demand for sugar in the Country which stands at 1.04 million tonnes – Contribution of the project towards attainment of the economic pillar of Kenya's Vision 2030 and Big Four Agenda – Provision of market for the locally produced sugarcane thus curbing post-harvest losses – Employment creation – Optimal use of land

Criteria	Results
	– Income to the proponent – Revenue to the government through taxes & licenses – No cultural or heritage issues at the site
Landscape impacts	– The proposed project will not impact significantly on the landscape of the area
Land uses	– The proposed project is consistent with the neighborhood
Water	– The construction and subsequent operations of the proposed project will increase water demand and impact on water resources

1.5.3 Baseline monitoring of environmental media

Baseline environmental data was collected on ambient air and noise levels, water quality and soil in collaboration with Polucon Services Kenya Limited. The results will be used to provide a benchmark for implementing the Environmental Monitoring Plan proposed in the ESIA report. The approaches and methods used for sampling and analysis of baseline environmental media are discussed below.

1.5.3.1 Ambient air quality monitoring

Mobile, static and active monitoring was done by use of real time gas detector-pump suction equipment LB-MS4X which integrates the main ambient gases and meteorological parameters.

The gas sensitive semiconductor sensor uses proprietary sensing material, built in automatic Correction (ABC) and interference rejection. This combination results in ppb resolution and a highly linear response. The gas sensitive electrochemical sensors generate nano-amp currents proportional to the gas concentration. Aeroqual uses low noise electronics to capture these signals resulting in low detection levels. The non-dispersive infrared sensor uses infra-red light, a narrow band-pass filter and photodiode to measure the intensity of light at the gas absorption band. The light intensity is proportional to the gas concentration.

The laser particle counter for Particulate Matter measurements uses optimized signal processing using low noise electronics added algorithms to correct for interferences. An aerosol particle counter works on the principal of either light scattering or light blocking. An aerosol stream is drawn through a chamber with a light source (either Laser Based Light or White Light). When a particle is illuminated by this light beam, it is redirected or absorbed. Light scattered by a single particle in a specific direction in relation to the original direction has a unique signature which relates to the size of the particle. This allows for sizing and counting of individual particles

1.5.3.2 Baseline noise level measurements

Noise emission survey was achieved via initial examination of existing road traffic and other noise sources of significance. Noise levels was evaluated using a Sound Level Meter Model AWA 5636 IEC 61672 – 1:2013 class 2 with a built-in ϖoctave / octave band filters which does real time 1/1 and 1/3 octave analysis was mounted on at 2.0m above ground level and at least 3.5m away from any sound reflecting surfaces at a boundary position and measurements taken at timed intervals over 10 minutes and stored in SLM's memory. The sound level meter was placed on the microphone to reduce any wind interference during measurements. The sound level meters, were within its calibration period, at the time of monitoring. In addition, the equivalent noise level (LAeq), the maximum sound pressure level (Lmax) and the minimum sound pressure level (Lmin) during that measurement period were recorded. Factors to consider such as time, duration and predictability of the noise emission, amplitude and frequency of the noise emission, nature of the source, location of noise sensitive receptors, ambient and background noise level, nature and character of the locality, presence of special acoustic characteristics and the incongruity or familiarity of the noise during noise survey and site placement were put into consideration. Furthermore, as each individual measurement was being

taken, the nature of the noise climate in the area was assessed and recorded. This comprised an auditory observation by the surveyor, as well as identifying those noise incidents which influenced the sound level meter readings during that measurement period.

1.5.3.3 Water quality sampling and analysis

Baseline water quality sampling was carried out at River Chevaywa in order to obtain an indicative baseline for the water quality. The water sample was then analyzed for drinking water in compliance with KS EAS 12:2018 specification for natural potable water. These included analysis of both physicochemical and microbiological parameters.

1.5.3.4 Soil sampling and analysis

Soil samples were obtained at the proposed project site and analyzed for PH and heavy metals including Cadmium, Chromium and Arsenic. The purpose of soil sampling and analysis was to give a general indication of the existing potential contaminants and for future monitoring of the impact of the proposed project.

1.5.4 Stakeholder mapping

Prior to commencement of the ESIA process, the consultants conducted a stakeholder mapping and analysis to determine the individual, groups and institutions that will be affected by and have an interest in the project in consultation with the proponent, the County Government and the Ministry of Interior and Coordination of National Government. The consultants then prepared a comprehensive list of all the stakeholders in consultation with the proponent and categorized them based on the basis of interest and influence (Figure 5).

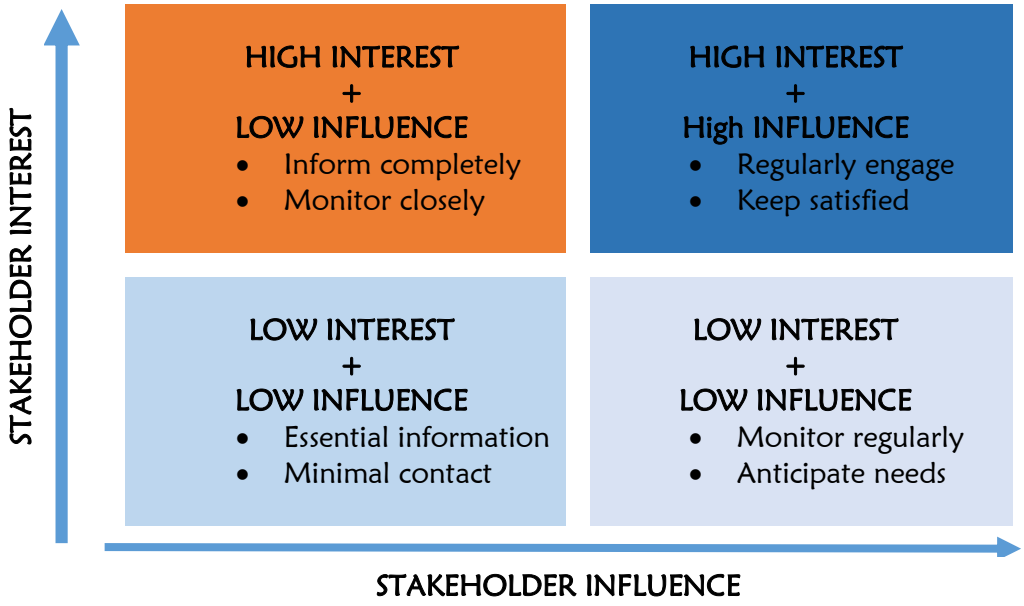


Figure 5. Stakeholder mapping considerations based on interest and influence in the proposed project.

- Low interest, low influence – those to keep informed
- High interest, low influence – those to involve and consult with
- Low interest, high influence – powerful stakeholders to engage
- High interest, high influence – partners to collaborate with

Nine key stakeholder categories were identified. These are;

1. County and National Government Representation
2. Lead Agencies and community organizations operating directly under them
3. Civil Society
4. Conservation Organisations
5. Local Community and Farmers' Associations
6. Opinion leaders including political leaders
7. Faith Based Institutions
8. Special Interest Groups
9. Media

The consultant then identified the key contact persons within the stakeholder categories who will be engaged throughout the ESIA study process. The identification of the key contact persons was done in consultation with the proponent, lead agencies, the County Government of Kakamega, Ministry of Interior and Coordination of National Government and Farmers' Associations.

Further, the consultant identified other stakeholders who may not be apparent but needed to be consulted and analyzing the role of each stakeholder in the ESIA study process as well as project implementation. Finally, the consultant determined the tools for engaging with each stakeholder including language of communication and allocation of resources to ensure meaningful participation of the stakeholders in the ESIA process.

Following the stakeholder mapping and analysis, a public consultative meeting was held on 2nd August 2022 at the proposed project site and questionnaires administered to the project site neighbors.

1.6 Project budget

The project budget was estimated at a total cost of Kenyan Shilling One Thousand Three-Hundred and Five Million only (KES 1,305,000,000). The statutory charge of 0.1% payable to NEMA is therefore KES 1,305,000. The payment is done on the e-citizen platform after receipt of an invoice from NEMA.

2 ENVIRONMENTAL SETTING OF THE PROPOSED PROJECT SITE

2.1 Introduction

Baseline conditions of the proposed project site were assessed and documented for the purposes of determining the future impacts of the proposed project on the environment and livelihoods of the local community. The baseline survey was done through literature review, site visits and baseline environmental media monitoring in collaboration with Polucon Services Kenya Limited. This section details on the findings of the survey which will form a basis for impact monitoring plans and improvement of the environmental and social performance of the proposed project during implementation.

2.2 Topography and climatic conditions

The altitudes of the county ranges from 1,240 metres to 2,000 metres above sea level. The southern part of the county is hilly and is made up of rugged granites rising in places to 1,950 metres above sea level. The Nandi Escarpment forms a prominent feature on the county's eastern border, with its main scarp rising from the general elevation of 1,700 metres to 2,000 metres. There are also several hills in the county such as Misango, Imanga, Eregi, Butieri, Sikhokhochole, Mawe Tatu, Lirhanda, Kiming'ini hills among others.

The annual rainfall in the county ranges from 1280.1mm to 2214.1mm per year. The rainfall pattern is evenly distributed all year round with March and July receiving heavy rains while December and February receives light rains. The temperatures range from 18˚C to 29˚C. January, February and March are the hottest months with other months having relatively similar temperatures except for July and August which have relatively cold spells (Figure 5). The county has an average humidity of 67%. Since the early 1960s both minimum (night) and maximum (day) temperatures have been on a warming trend throughout Kenya. Current projections indicate increases in temperature.

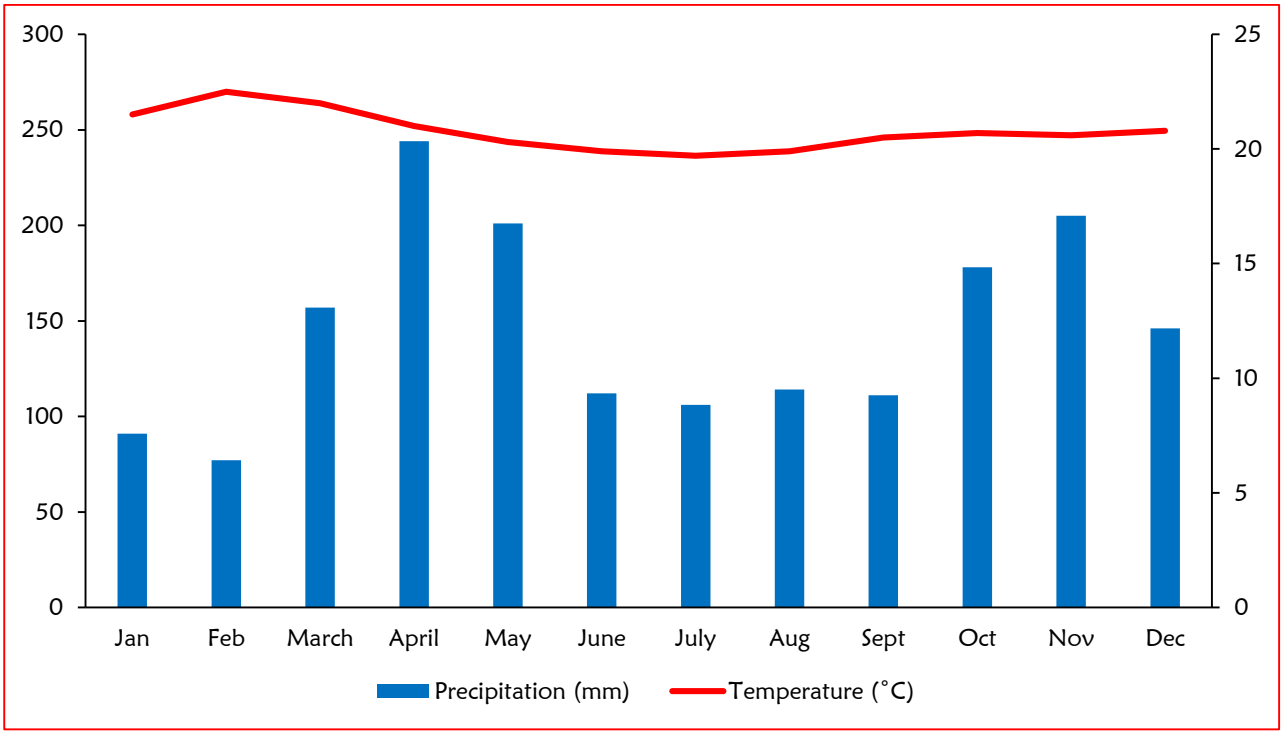


Figure 6: Annual rainfall and temperature distribution for Kakamega County in 2021 (Data Source: World Weather Online, 2022).

2.3 Demographics

According to the 2019 population and housing census report, Kakamega County has a total population of 1.87 Million people, up from 1.66 Million people as per the 2009 census. Kakamega North Sub-County where the proposed project site lies has a population of 238,330 comprised of 115,511 males and 122,814 females (KNBS, 2019). High population density, especially in urban areas is as a result of sub-division of land into uneconomical sizes, high levels of unemployment and pressure on the available infrastructural and social facilities. This calls for strategies to address these shortcomings.

2.4 Water resources

Kenya is a water stressed country with a low per capita annual freshwater endowment. Access to water and sanitation is low because of limited water resources development and ageing/dilapidated infrastructure. Access to water falls below the Sustainable Development Goal (SDG) targets of universal access. Despite increased investments and improvements in levels of access in the last 5 years, the rapid population increase, urbanization and economic growth strain the existing water resources and infrastructure and hinder efforts towards achieving the sector SDGs.

The main water service provider in the County is Kakamega County Water and Sewerage Company Limited (KACWASCO). The Company supplies water to Kakamega Town, Mumias, Navakholo, Butere, Malava and Lumakanda. Currently the water company supplies approximately 78% of the consumers mainly in the peri-urban and small towns of the county. The rural areas are mainly supplied by community water projects, NGO's, private sector actors as well as self-supply through hand dug wells, water pans, boreholes, springs and rivers. The rural water sub-sector is marred by low un-functionality rates due to poor management of the water supply projects and schemes, inefficient technologies and weak governance.

The existing sugar mills plant sources water from River Chevaywa for industrial use (Figure 6), and borehole for domestic use. The water is then treated through reverse osmosis process in the Water Treatment Plant (WTP) to render it safe for use (Figure 7). Additionally, clean cane contains approximately 70% water; thus the water is a primary source for sugar manufacturing process. The estimated water demand is 140m^3/day.

Further, the proponent undertakes water quality sampling and analysis and has valid water abstraction permits from Water Resources Authority (WRA) for the river and borehole.

Figure 7: A section of River Chevaywa flowing along the boundary wall of Butali Sugar Mills Limited (Source: site visits, July 2022).

Figure 8: The existing Water Treatment Plant (WTP) within Butali Sugar Mills Limited (Source: site visits, July 2022).

2.5 Effluent generation and management

Being an industrial development, the effluent generated will constitute a combination of domestic and industrial wastewater flows. Domestic effluent flows will be generated from sanitation facilities and general cleaning whereas industrial effluent flows will be generated from the production process. Based on the domestic water consumption of approximately 20m^3/day (10% of total water consumption), domestic effluent of 2m^3/day will be generated. This is channeled to the septic tank/soak pit system though a bio-digester is recommended. Seventy percent (70%) of the remaining water use (120m^3/day) will be generated as industrial effluent. This is channeled to the ETP for treatment (Figure 8). The treated effluent is then discharged into the nearby river downstream and the excess condensate is stored in a tank for re-use in the factory.

Further, effluent analysis results in 2022 showed compliance with the standards for treated effluent discharge into the river as per the Third Schedule of the Environmental Management and Coordination (Water Quality) Regulations, 2006 (Table 3).

Figure 9: The existing Effluent Treatment Plant (ETP) within Butali Sugar Mills Limited (Source: site visits, July 2022).

Table 3: Summary of results for effluent sample analysis from the existing ETP compared to the Third Schedule of Water Quality Regulations, 2006 (Source: Butali Sugar Mills Limited, July 2022).

Parameters	Results	EMCA Standards
pH Value	8.3	6.5 – 8.5
Total Suspended Solids mg/L	25	30 max
Total Dissolved Solids mg/L	510	1200 max
Biochemical Oxygen Demand mg/L	20	30 max
Chemical Oxygen Demand mg/L	45	50 max
Conductivity	780	-
Turbidity NTU	32.6	-
Total Alkalinity	270	-

2.6 Solid waste management

The current waste generation in the County is estimated to be 2400 tons per day, of which 68 % is from Kakamega town. Daily collection is currently between 1100-1500 tons per day. Recycling is at the moment very low or negligible. There are three main actors involved in waste collection, transportation and disposal. These include the County staff, private contracted companies through Private Public Partnership and a few youth groups involved in estate waste collection.

The County, in support of the principle of Reduce-Reuse-Recycle has initiated installation of separation at source elevated litter bins in selected market areas of the County. So far, the County has installed 106 three in one such bins on diverse and selected markets and streets. In line with EMCA, 1999, the County has put in place 9 refuse chambers on markets such as Kakamega, Butere, Khwisero, Sabatia, Mumias, Malava, Kipkaren and Matunda and has a designated disposal site at Kakamega Roasterman situated 2 km off Mumias road.

Currently, solid wastes from the facility are generated from various areas such as sugar mills plant, administration block, workshops and the ETP among others. Table 4 below shows a summary of the

facility's sources of waste, their constituents and waste management method applied for each category.

Table 4: Type of waste, source and waste management method for the facility's waste.

Type of waste	Source of waste	Major constituent(s)	Waste management
Industrial waste	Sugar mills plant	Molasses	– Sold to distillers for alcohol production, agrochemicals and animal feed manufacturing companies
		Bagasse	– Used in furnaces to produce steam – Raw material for production of briquette, paper, boards, animal feeds and ethanol – Stabilized bagasse is used in land reclamation
		Fly ash	– Used by local farmers for cultivation
		Filter mud	– Given out as fertilizer to the farmers
Domestic waste	Administration block and staff canteen	Paper, plastics, wrappings and organic wastes among others	– Contracted a NEMA licensed solid waste handler to dispose off the waste
Commercial wastes	Workshops	Used oil, oil containers, scrap metals and waste tyres among others	– Used oil is disposed by Powerex Lubricants Limited, a NEMA licensed handler
Effluent	Effluent Treatment Plant	Sludge	– Sludge is disposed to the environment

2.7 Infrastructure

2.7.1 Transport Network

The total inventory of roads in the County is at 4,451.3Km. This includes 2,236.17 Km for gravel, 1,308.90 Km for earth surface and 939.32 Km for narrow unpaved roads. The bitumen and gravel standard roads in the County stands at 307.5 Kilometres and 2,792.25 Kilometres respectively (Source: Kenya Roads Board-Road inventory and Condition survey report, 2015 and the Kakamega County infrastructure status report, 2016).

The county government has spearheaded the construction of 44.8 km and 1,700 km of bitumen and gravel roads respectively. In addition, a total of 589.5 km have been routinely maintained to ensure efficient road network. The county has undertaken the construction of bridges on major rivers and culverts across river crossings that will render most of the roads passable. So far, 15 bridges and 12 box culverts have been constructed by the County government. Further, the county has 35 km of railway line with two railway stations namely: Lugari and Butere, and three air strips, in Kakamega, Webuye and Mumias.

The proposed project site lies approximately 800metres off the Kakamega-Webuye Highway.

2.7.2 Energy Supply

The existing sugar mills plant sources power from the cogeneration plant, National Grid and standby generators. The cogeneration plant comprises of a thermal power plant generating power to the tune of 4 to 4.5MW from the turbine 8MW capacity driven by steam from the boilers. Most of the power used at the mill is from the cogeneration plant which serves two purposes i.e., generate electricity steam using waste materials obtained during industrial process and also process heat for industry itself. Advanced cogeneration systems comprising of high-pressure direct combustion Steam Rankine Cycle (SRC) systems and biomass integrated gasification combined cycle (BIG-CC) are used in order to have a significant increase in generation capacity of electricity.

The National Grid has a load of 990 KVA used only in emergencies and intermittent demands of factory during maintenance, staff houses and site offices.

There also exists three (3) diesel powered generators, two (2) have a capacity of 500KVA each while one (1) has a capacity of 1000KVA, used for start-up of the plant operations or for maintenance when the thermal power plant is shut-down.

2.7.3 Telecommunication

The proposed project area is well served with communication network including the main mobile phone services such as Safaricom, Airtel and Telkom.

2.8 Baseline environmental data

2.8.1 Ambient air quality measurements

There were detectable levels of particulate matter (PM10 & PM2.5) and Sulfur dioxide (SO_2) within the project site. Nitrogen dioxide (NO_2) and Carbon monoxide (CO) concentrations remained below detection limits (<0.005ppm&mg/m^3 respectively). The weather conditions at the time of assessment were characterized by little showers and these conditions could have contributed to the concentration recorded at the study location. However, the gaseous and particulate parameters measured were all within the stipulated standards under the First Schedule of Environmental Management and Coordination (Air Quality) Regulations, 2014 (Table 5).

Table 5: Baseline air quality measurements for the proposed project site (Source: Polucon Services Kenya Limited, August 2022).

Project site	CO (mg/m^3)	NO_2 (ppm)	SO_2 (μg/m^3)	$PM_{2.5}$ (μg/m^3)	PM_{10} (μg/m^3)
Point A	<0.005	<0.005	2.0	15.3	28.00
Point B	<0.005	<0.005	2.0	13.3	28.30
Point C	<0.005	<0.005	1.0	10.0	22.70
Point D	<0.005	<0.005	1.3	9.3	21.67
EMCA (Air Quality) Regulations, 2014	**4**	**0.2**	**80**	**75**	**100**

2.8.2 Noise level measurements

As per the results, all areas had noise levels below the recommended (<90dB (A)) limits except at the conveyor belt cane yard choppers levelers, fibrizor ground and first floors, below boiler 2-new, engineering and trailer workshops using grinder, cane testing unit machine and trailer section using grinder areas as shown in Table 6 below. Workers in these areas have the greatest risk of exposure to the effects of noise pollution. Thus, the management should put in place adequate measure to mitigate the hazard such as provision of ear muffs to all workers and enforced on their use, reducing

the working hours for employees working at peak noise producing areas compared to those working in other areas and the equipment should be fitted with noise reduction devices such as mufflers.

Table 6: Noise level measurements for the existing sugar mills (Source: Butali Sugar Mills Limited, July 2022).

No.	Workstation/Position/Activity	Measured Noise Level (LAeq)	TLV/OEL dB(A)	No. of Staff Exposed Per Shift
1.	**Pre-mills**			
i.	JCB Shovel-'shoveling'	73.3	90	1
ii.	Cane yard (loading side)	76.8	90	5
iii.	Cabin-new feed table (closed window glass)	77.6	90	3
iv.	Cabin-new feed table (open window glass)	81.5	90	3
v.	Cabin (winch old feed table)	76.9	90	1
vi.	Old feed table cane yard	75.3	90	10
vii.	Conveyor belt cane yard choppers	82.4	90	3
viii.	Conveyor belt cane yard choppers 2	84.9	90	2
ix.	Conveyors belt cane yard choppers levelers	93.3	90	1
2.	**Mills**			
i.	Fibrizor- 1st floor	93.2	90	-
ii.	Mill zero	87.4	90	1
iii.	Mill 1	86.9	90	-
iv.	Mill 2	83.9	90	-
v.	Mill 3	84.0	90	-
vi.	Mill 4	84.3	90	2
vii.	Mill logbook table	88.0	90	1
viii.	Mill control room (door open)	77.5	75	3
ix.	Mill control room (door closed)	70.1	75	3
x.	Fibrizor –ground floor	93.8	90	-
xi.	Mill entrance welding area	89.0	90	6
xii.	Mill 1 W tank near store	82.4	90	-
xiii.	Mill first aid area	78.3	90	-
xiv.	Factory store	74.9	90	1
xv.	Juice treatment ground floor	82.0	90	2
3.	**Powerhouse**			
i.	Old turbine	80.8	90	-
ii.	Turbine attendant	81.7	75	1
iii.	Electrical engineers	81.7	75	2
iv.	Turbine electrician	79.5	75	1
v.	Turbine Control room (door closed)	73.8	75	1
vi.	Turbine control room (door open)	71.9	75	1
vii.	Powerhouse entrance	76.8	90	-
viii.	11KV HT room	81.0	90	1
ix.	Superintendent's desk	75.2	90	1
4.	**Boiler**			
i.	Staff locker/first aid box	82.6	90	-
ii.	Below steam drum	86.6	90	-
iii.	Control room feed water pump	80.1	90	-

No.	Workstation/Position/Activity	Measured Noise Level (LAeq)	TLV/OEL dB(A)	No. of Staff Exposed Per Shift
iv.	Below boiler 1-old	87.1	90	-
v.	Below boiler 2-new	90.4	90	-
vi.	Inside ash machines area	86.2	90	2
vii.	Outside ash machines area	76,6	90	4
viii.	Old boiler workstation	80.4	90	5
ix.	Boiler control room (door open)	78.9	75	-
x.	Boiler control room (door closed)	72.2	75	-
xi.	New boiler workstation	80.7	75	-
xii.	Bagasse feeder roller	81.2	75	3
xiii.	Main bagasse carrier	83.4	90	3
xiv.	Top steam drum	83.6	90	1
xv.	Gauge glass	78.0	90	-
xvi.	Steam pipes to powerhouse	88.6	90	-
xvii.	Boiler compressor house	87.2	90	-
xviii.	Bagasse house control room	69.3	75	-
xix.	Return bagasse carrier feeding	75.4	90	16
5.	Process house			
i.	Evaporator's station	78.5	90	2
ii.	Clarifier station	77.2	90	3
iii.	Lime preparation area	75.8	90	1
iv.	Flocculants dosing area	80.0	90	1
v.	Pan floor	80.7	90	7
vi.	Continuous pan	83.1	90	1
vii.	Crystallizer area	82.4	90	2
viii.	High grade centrifugal	85.6	90	1
ix.	Low grade centrifugal	81.4	90	2
x.	Melter section	84.7	90	1
xi.	Hopper area	83.1	90	2
xii.	Below grader	88.3	90	45
xiii.	Check weigher	85.1	90	55
xiv.	Bag marker	83.1	90	3
xv.	1&2 kg packaging	73.8	90	15
xvi.	½ kg silo area	74.7	90	3
xvii.	Compressor house (process)	85.5	90	-
xviii.	Engineering container	76.4	90	-
xix.	Generator room (when off)	73.7	90	-
xx.	DM Plant	71.4	90	-
xxi.	Effluent Treatment Plant	66.5	90	2
xxii.	Water Treatment Plant	60.4	90	2
xxiii.	Molasses area (molasses tanker switched on)	66.4	90	1
xxiv.	Cooling towers	72.5	90	-
xxv.	Leachate area	56.7	90	9
xxvi.	Laboratory	77.7	90	-
xxvii.	Injection pump	84.2	90	-
xxviii.	Between pumps	**85.2**	90	-

No.	Workstation/Position/Activity	Measured Noise Level (LAeq)	TLV/OEL dB(A)	No. of Staff Exposed Per Shift
6.	Stores			
i.	Stores entrance	63.8	75	-
ii.	Stores reception	65.0	75	-
iii.	Stores supervisor's desks	58.9	75	-
7.	Engineering and trailer workshops			
i.	Engineering Workshop (EW)	71.4	90	-
ii.	EW using grinder	96.1	90	-
iii.	Trailer Workshop (TW)	67.1	90	3
iv.	(TW) using grinder	94.7	90	3
8.	Cane testing unit			
i.	Machines 'off'	65.2	90	-
ii.	Machines 'on'	96.5	90	-
9.	New weighbridge			
i.	New weighbridge office	60	75	4
10.	Field workshop			
i.	Transport office	62.3	75	-
ii.	Auto workshop-small vehicle repair	68.8	90	3
iii.	Trailer section	80.6	90	-
iv.	Trailer section- using grinder	97.1	90	-
v.	Trailer section-gas cutting	80.3	90	-
vi.	Tyre section	75.4	90	-
vii.	FAW section	60.8	90	-
viii.	Tractor section	64.5	90	-
ix.	Engine room	71.0	90	-
x.	Battery room	61.6	90	-
xi.	Workshop office space	61.6	90	-
xii.	Workshop store	61.9	90	-
xiii.	Bell loader 'operating'	**89.7**	90	-
11.	New fuel pump			
i.	New fuel pump	68.3	90	-
12.	Old weighbridge			
i.	Old weighbridge	64.7	75	-
13.	Offices			
i.	Time office	57.1	75	-
ii.	Gate office	54.6	75	-
iii.	Audit office	51.7	60	-
iv.	Agriculture	61.0	60	-
v.	Tracking office	56.5	60	-
vi.	New office	65.7	60	-
vii.	Reception main office	62.9	60	2
viii.	Administration Manager's office	55.7	60	-
ix.	IT Office	53.1	60	-
x.	HR Office	57.4	60	-

2.8.3 Water quality sampling and analysis

As per the results, the water does not conform to the required KS EAS 12:2018 specification for natural potable water (Table 7). Downstream community are at high risks and likely to suffer from waterborne related diseases. However, the analysis conducted by the proponent in collaboration with WRA indicate that the effluent discharged from the existing ETP conform to the specification as outlined under the Third Schedule of EMCA (Water Quality), Regulations 2006. This shows that there might be other point and non-point sources of pollution to the nearby river. Consequently, the management should put in place adequate measures for the proposed ETP to mitigate the hazards which will include monitoring the quality of effluent discharged, carrying out regular inspection and maintenance to ensure zero leakages from the ETPs and ensuring compliance with the provisions of Environmental Management and Coordination (Water Quality) Regulations, 2006.

Table 7: Baseline water quality measurements from River Chevaywa before the final discharge of the existing ETP (Source: Polucon Services Kenya Limited, August, 2022).

Test	Test Method	Results	KS EAS 12: 2018 Specification For Natural Portable Water
Physical-chemical tests			
Appearance	APHA 2110	Turbid	-
Odour	APHA 2150B	Odourless	-
Suspended matter, mg/L	APHA 2540B	Detectable	Not detectable
Colour, TCU	APHA 2120B	37	50 Max
PH@25°C	APHA 4500.H*	7.81	5.5Min -9.5 Max
Conductivity, μS/cm	APHA 2510B	789.2	2000 Max
Total dissolved solids, mg/L	APHA 2540C	436.8	1500 Max
Total hardness as $CaCO_3$, mg/L	KS05-459-2	112	600 Max
Chlorides as Cl^- mg/L	KS05-459-5	72.9	250 Max
Aluminium as Al^{3+}, mg/L	APHA 3111D	<0.02	0.2 Max
Manganese as M, mg/L	APHA 3111B	<0.01	0.1 Max
Iron as Fe, mg/L	APHA 3111B	0.02	0.3 Max
Sodium as Na^+, mg/L	APHA 3111B	82.26	200 Max
Magnesium as Mg^{2+}, mg/L	APHA 3111B	13.66	100 Max
Calcium as Ca, mg/L	APHA 3111B	41.33	150 Max
Lead as Pb, mg/L	APHA 3111B	<0.01	0.01 Max
Copper as Cu, mg/L	APHA 3111B	<0.01	1.0 Max
Flouride as F^-, mg/L	PQA/LIM/061	0.2	1.5 Max
Potassium as K, mg/L	APHA 3111B	7,94	50 Max
Sulphate as SO_4^{2-}, mg/L	APHA 4500-SO_4 B	27.42	400 Max
Residual Chlorine as Cl_2,mg/L	ISO 7393-2	<0.1	Absent
Microbiological tests			
Total Plate count @ 37°C, cfu/ml	ISO 6222	170	50 Max
Total plate count @22°C, cfu/ml	ISO 6222	190	100 Max
Total Coliform count, cfu/100ml	ISO 9308-1	13	Absent
Escherichia coli, cfu/100ml	ISO 9308-1	Not detected	Absent
Pseudomonas aeruginosa, per 100ml	ISO 16266	Absent	Absent

2.8.4 Soil sampling and analysis

Soil sampling indicated that Chromium, Arsenic, Cadmium, Sulphur, Nickel and Molybdenum, were below 0.01mg/kg. Kenya has not developed a specific environmental legislation on soil standards but relies on existing legislation on pollution such as the Environmental Management and Coordination (Water Quality) Regulations, 2006 and the Kenya Constitution 2010 to prosecute environmental crimes on soil contamination.

Table 8: Baseline soil tests for the proposed project site (Source: Polucon Services Kenya Limited, August 2022).

Test	Method	Results (mg/kg)	Soil Remediation Guideline value
pH @ 25 ^{o}C	EPA 3050B	7.36	Min 6-Max 8.5
Chromium as Cr	EPA 3050B	1.58	No guideline
Arsenic as As	EPA 3050B	<0.01	No guideline
Cadmium as Cd	EPA 3050B	<0.01	No guideline
Sulphur	EPA 3050B	<0.01	No guideline
Copper as Cu	EPA 3050B	3.33	No guideline
Zinc as Zn	EPA 3050B	3.28	No guideline
Nickel	EPA 3050B	<0.01	No guideline
Molybdenum as Mo	EPA 3050B	<0.01	No guideline

3 IDENTIFICATION OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The proposed project will have both socio-economic benefits and attendant negative environmental and social impacts. The purpose of the ESIA process is to therefore systematically assess the value of the benefits against the environmental concerns and provide measures to avoid, prevent or reduce the magnitude of the impacts. The following section provides details on these impacts and proposed mitigation measures to address the identified negative environmental and social impacts. The mitigation measures are based on the underlying principle of EIA that everyone is entitled to a clean and healthy environment and a duty to enhance and safeguard the environment.

3.1 Positive impacts of the proposed project

The proposed project will have the following benefits;

1. **Meeting the domestic demand for sugar in the Country**
   Kenya's annual sugar production in 2020 was 603,800 tonnes against the consumption of 1.04 million tonnes thus the country had to import 444,500 tonnes. Further, between May and December 2020, the Country imported 981,000 tonnes following the opening of the duty-free window to bridge a local shortage that caused a spike in prices.

   The existing sugar mills has a capacity to crush and process 2,500 TCD which will be doubled to 5,000TCD with the proposed extension thus complementing the Country's effort in reducing the sugar deficit.

2. **Contribution of the project towards attainment of Vision 2030 and the Presidential Big Four Agenda**
   The operations of the sugar mills will help in attainment of the Economic and Macro Pillar sector of Vision 2030 which is the national long-term development blueprint to create a globally competitive and prosperous nation with a high quality of life. It will also support the presidential Big Four Agenda by enhancing the local manufacturing industry to offer employment to Kenyans and reduce the trade deficit that the country is currently experiencing.

3. **Provision of market for sugarcane crops to curb post-harvest losses**
   The proposed project will provide market for sugarcane crops within Western Kenya and other regions. The availability of market will curb post-harvest losses and consequently income to local farmers. Further, availability of market provides stabilization of sugarcane prices thus preventing exploitation of farmers by brokers and middlemen.

4. **Provision of employment opportunities**
   The unemployment rate in Kenya increased to 6.6% in the first quarter of 2021, against 5.4% in the previous quarter. However, sustainable industrialization, especially in the manufacturing sector has the potential to create employment and alleviate poverty in the Country.

   The existing sugar mills has provided direct employment to 1,370 workers and indirect employment to over 30,000 sugar cane farmers. Implementation of the proposed project will further reduce the gap of unemployment within the country through provision of employment opportunities to both skilled and non-skilled personnel throughout its life cycle.

5. **Income to the proponent**
   The facility through its operations will accrue income to the proponent thus enabling expansion of business and creating more employment opportunities to the locals.

6. Market for local goods and services
   The proposed project will provide a market for goods and services during construction and operational phases. Goods include cement, sand and aggregate for construction works, sugarcane for the sugar mills which is sourced from Kakamega, Bungoma, Nandi, Uasin Gishu and Trans-Nzoia Counties while services include energy, telecommunication and environmental audits among others.

7. Source of raw materials for other industrial establishment
   Sugar manufacturing is essential in recycling of wastes thus protecting the environment. The by-products are used as source of raw materials for other industrial establishment e.g. molasses from the existing sugar mills is currently sold to distiller's company for alcohol production and bagasse is used for production of paper and briquette makings.

8. Revenue to the government
   The proposed project will generate revenue to the government through taxes, licences and fees levied on goods/ services. Through the revenues generated, the government will be capable of financing its obligations to the country.

3.2 Anticipated negative environmental and social impacts

Alongside the positive impacts, the proposed project is expected to result in a number of negative environmental and social impacts at the various stages of implementation as discussed below.

3.2.1 Negative impacts at the construction phase of the proposed project

3.2.1.1 Environmental risks of obtaining raw materials

Extension of the sugar mills plant and effluent treatment facilities, and installation of a power turbine and steam boiler will require raw materials such as steel bars, sand, cement and building blocks, among others. These materials will be sourced from the environment and will have a negative impact at their points of origin.

Recommended mitigation measures

1. Source raw materials from sites that are licensed as per the Environmental Management and Coordination Act Cap. 387 of the Laws of Kenya
2. Have a procurement plan based on the Bill of Quantities prepared by a Quantity Surveyor to avoid potential oversupply of materials and wastage
3. Re-use construction waste materials such as wood and metal cuttings which can be salvaged

3.2.1.2 Destruction of the physical environment

Construction activities will involve clearance of vegetation cover and excavations works. Sections of the proposed project sites are endowed with a number of tree species which play an important role in preventing soil erosion and habitat for other organisms among others. Therefore, clearance of the vegetation would lead to loss of these benefits. Excavation activities and other civil works will create loose soils susceptible to soil erosion that may lead to sedimentation of the nearby river, riverine vegetation and spring.

Notably, a section of the proposed project site for the extension of the sugar mills is eroded and the construction activities will exacerbate the impact. However, the proponent has constructed gabions to reduce surface run-off (Figure 9).


Figure 10: Gabions constructed within the proposed project site to prevent soil erosion (Source: site visits, July 2022).

Recommended mitigation measures

1. Retain vegetation cover in areas that will not be excavated as far as practicable
2. Compact loose soil within the project sites
3. Use the overburden generated during construction activity to backfill the eroded areas
4. Replant indigenous trees in the section of the property that will not be developed to compensate for loss at construction phase

3.2.1.3 Water demand and effluent generation

During construction, water will be required for concrete mixing, casting and curing works, drinking and sanitation purposes. The total estimated water demand per day is 10m^3 and will be sourced from the existing borehole within the site. Out of these, 10% i.e. 1m^3 will be used for domestic purposes and will generate 0.7m^3 of effluent which will need to be disposed. The rest of the water soaks into ground areas within the project site. Poor disposal of the wastewater generated has potential to pollute River Chevaywa and underground aquifers.

The workers will use the existing sanitary facilities at the project site and the effluent will be managed by the septic tank/soak pit system.

Recommended mitigation measures

1. Sensitize the workers on the need to conserve the available water resources
2. Install a bio-digester in place of the septic tank/soak pit system to manage the domestic effluent
3. Comply with the provisions of the Environmental Management and Coordination (Water Quality) Regulations, 2006

3.2.1.4 Solid waste generation and management

Site preparatory and construction activities will generate significant quantities of solid waste in form of biomass, overburden, domestic waste such as plastic containers and construction materials such as wood, building blocks, metal cuttings and wrappings among others. These will need to be disposed off appropriately as poor solid waste management can create breeding grounds for disease causing pathogens and even pollute river Chevaywa.

Recommended mitigation measures

1. Procure and strategically place adequate solid waste collection bins with a capacity for segregation within the construction site
2. Procure a sizeable central solid waste collection bin with chambers to accommodate separated waste

3. Sensitize construction workers on the process of solid waste collection, segregation and proper disposal
4. Procure the services of a NEMA licensed waste handler to dispose off the solid waste
5. Comply with the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2006

3.2.1.5 Occupational safety and health risks

Machinery operations, use of construction tools and the actual construction activities are likely to expose the workforce, visitors and the neighbors to safety and health risks such as falling objects, moving machinery, falls, air and noise pollution among others. Further, delivery of construction materials by Heavy Commercial Vehicles (HCVs) will exacerbate road accidents along the access road. It is also expected that there will be accumulation of various streams of waste especially metal cut offs and construction debris may cause injuries to workers and visitors accessing the site. As a result, the above risks have the potential to cause adverse human health or loss of life.

Recommended mitigation measures

1. Register the site as a workplace with the Directorate of Occupational Safety and Health Services (DOSHS)
2. Obtain insurance cover for the workers at the site
3. Provide adequate and appropriate Personal Protective Equipment (PPE) to workers and visitors to the site and enforce on their use
4. Provide employees with correct tools and equipment for the jobs assigned and train on their use
5. Ensure moving parts of machines and sharp surfaces are securely protected with guards to avoid unnecessary contacts and injuries
6. Provide first aid services and emergency vehicle at the site
7. Erecting traffic warning signage and observing speed limits of 40km/hr along the access road
8. Regulate the entry of visitors to the construction site by deploying adequate security measures
9. Comply with the provisions of the Occupational Safety and Health Act, 2007

3.2.1.6 Air pollution

Air pollution during the construction phase will be in form of dust generated during excavations, concrete mixing activities and exhaust fumes from machinery use and HCVs delivering construction materials to the site. The most relevant pollutant considered is particulate matter because of its potentially significant increase during the construction phase. Respirable particulate matter may present respiratory diseases, cause eye irritation and visual intrusion to workers, visitors to the project site and the neighbors if it is in excess of 150 $\mu g/Nm^3$ as per the First Schedule of the Environmental Management and Coordination (Air Quality) Regulations, 2014.

Recommended mitigation measures

1. Procure, provide and enforce the use of dust masks to workers and visitors to the project site
2. Install dust screens around the project site during construction
3. Cover stock piles of construction materials to reduce dust emissions especially during windy conditions
4. Sprinkle water at the excavation areas to suppress dust
5. Use of serviceable machinery/equipment and trucks
6. Monitor fugitive emissions to ensure compliance with the limits set under the First Schedule of the Environmental Management and Coordination (Air Quality) Regulations, 2014
7. Comply with the provisions of Environmental Management and Coordination (Air Quality) Regulations, 2014

3.2.1.7 Noise pollution

The construction works, delivery of raw materials by Heavy Commercial Vehicles (HCVs) and the use of machinery may lead to high levels of noise and vibration within the construction site and the surrounding area. It should be noted that the noise produced during construction will be in keeping with the background noise emanating from the existing sugar mills.

Recommended mitigation measures

1. Delivery of raw materials, excavation and construction work should be limited to day time hours only between 8am to 5pm
2. Locate machinery that are likely to produce noise as far as practical from neighboring properties
3. Procure, provide and enforce the use of earmuffs to staff who will work within peak noise producing areas and visitors accessing the same areas
4. Sensitize truck drivers to avoid unnecessary hooting and running of vehicle engines
5. Comply with the provisions of Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009

3.2.1.8 Increased energy usage

During construction phase, energy will be required for transportation of construction materials, excavation, hoisting and concreting activities. The major forms of energy to be used will include diesel, electricity, petrol and gas. To conserve energy, there will be a need to use available energy efficiently.

Recommended mitigation measures

1. Ensure efficient site layout
2. Train workers on energy conservation
3. Ensure maintenance of plant and equipment as per the manufactures' instructions
4. Choose and use machines designed for particular activity/task
5. Develop a proper logistical transport system

3.2.2 Negative impacts at the operational phase of the proposed project

3.2.2.1 Air pollution

During the operational phase, air pollution will mainly result from dust emissions from stored bagasse during windy conditions, and crushing and milling of sugarcane, flue gases such as particulate matter, sulphur oxides and nitrogen oxides during combustion of bagasse in the boiler, juice treatment and evaporation process, exhaust fumes such as carbon monoxide, hydrocarbons, nitrogen oxides and sulfur dioxide from machinery and vehicles accessing the facility, and odor from the ETP. The most relevant pollutant considered is particulate matter because of its potentially significant increase during the operational phase. Particulate matter may reduce growth of vegetation, hampers aesthetics of the area, cause respiratory diseases, eye irritation and visual intrusion to workers, visitors to the project site and the neighbors if it is in excess of 75 $\mu g/Nm^3$ as per the First Schedule of the Environmental Management and Coordination (Air Quality) Regulations, 2014.

As per the design plan, dust collectors will be installed within the plant to collect sugar dust generated during the drying process and returned for reprocessing. Further, management measures to mitigate air pollution for the existing sugar mills include installation of scrubbers along the chimney to trap the gaseous particles and obtaining an air emission license from NEMA.

Recommended mitigation measures

1. Procure and provide adequate dust masks to workers and enforce on their use

2. Plant fast growing trees such as casuarina along the boundary wall to act as dust screens and a buffer zone between the facility and the neighbors
3. Use acceptable emission control technologies as per the Seventh Schedule of the Environmental Management and Coordination (Air Quality) Regulations, 2014. The technology to mitigate particulate matter will be mechanical collectors (dust cyclones, multicyclones) and particulate scrubbers, sulphur oxide will be wet scrubbers and nitrogen oxide will be NOx scrubbers
4. Procure and install adequate dust screens around the bagasse storage area
5. Explore the use of modern technology systems such as bio-filters and chemical scrubbers to control odors
6. Ensure timely renewal of the air emission license from NEMA
7. Develop and implement an air quality monitoring plan to ensure compliance with the limits set under the Third Schedule of the Environmental Management and Coordination (Air Quality) Regulations, 2014
8. Comply with the provisions of the Environmental Management and Coordination (Air Quality) Regulations, 2014

3.2.2.2 Noise pollution

Sugar production involves several activities that generate significant amount of noise. Sources of noise pollution include machineries during sugar production, vehicular movement in and out of the facility, loading and offloading activities and at the workshops. The noise levels and vibrations produced may be above the stipulated limits under the First Schedule Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009. This may lead to nuisance and hearing impairments to workers, neighbors and visitors to the site.

Further, noise level measurement survey was undertaken in April 2022 for the existing facility. The results indicate that the noise produced exceed the stipulated standards as per the First Schedule of the Noise Regulations, 2009.

Recommended mitigation measures

1. Procure and provide adequate earmuffs to employees working at peak noise producing areas and enforce on their use
2. Reduce the working hours for employees working at peak noise producing areas compared to those working in other areas
3. Use equipment that are properly fitted with noise reduction devices such as mufflers
4. Service mechanical equipment regularly to ensure that they are in good condition
5. Apply for and obtain license to emit noise/vibrations in excess of permissible levels as per the Fourth Schedule of Noise Regulations, 2009
6. Comply with the provisions of the Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009

3.2.2.3 Solid waste generation and management

During operations, solid waste generated will include molasses, bagasse, fly ash and filter mud from the production process, paper, plastics, cartons, wrapping and organic wastes among others from the administration block and staff canteen, used oil, oil containers, waste tyres and scrap metal from the workshops, and sludge from the ETP. Poor disposal of solid wastes degrades environmental quality and may harbor disease causing pathogens such as mosquitoes, flies and eye irritation among others thus leading to potential health challenges and even pollute River Chevaywa and the spring.

Current management measures for the wastes are shown in Table 9 below.

Table 9: Type of waste, source and waste management method for the facility's waste.

Type of waste	Source of waste	Major constituent(s)	Waste management
Industrial waste	Sugar mills plant	Molasses	– Sold to distillers for alcohol production, agrochemicals and animal feed manufacturing companies
		Bagasse	– Used in furnaces to produce steam – Raw material for production of briquette, paper, boards, animal feeds and ethanol – Stabilized bagasse is used in land reclamation
		Fly ash	– Used by local farmers for cultivation
		Filter mud	– Given out as fertilizer to the farmers
Domestic waste	Administration block and staff canteen	Paper, plastics, wrappings and organic wastes among others	– Contracted a NEMA licensed solid waste handler to dispose off the waste
Commercial wastes	Workshops	Used oil, oil containers, scrap metals and waste tyres among others	– Used oil is disposed by Powerex Lubricants Limited, NEMA licensed handlers
Effluent	Effluent Treatment Plant	Sludge	– Sludge is disposed to the environment

Notably, the amount of bagasse produced at the existing sugar mills exceeds the storage capacity. This is expected to increase with the proposed extension activities thus additional mitigation measures are recommended as summarized below.

Recommended mitigation measures

1. Construct additional bagasse storage area to cater for the increased bagasse produced
2. Amend the contractual agreement with the NEMA licensed solid waste handler to include disposal of the excess bagasse
3. Procure and strategically place adequate waste collection bins with capacity for segregation
4. Sensitize the workers on the process of solid waste collection, segregation and proper disposal
5. Sell off the scrap metals and waste tyres to recycling and tyre retreading facilities respectively
6. Comply with the provisions of the Environmental Management and Coordination (Waste Management Regulations, 2006)

3.2.2.4 Water demand

Water usage in the factory can be classified into two categories;

- External water: Used for industrial purposes i.e. condensing and cooling power turbines, mill turbines and bearings, crystallization of sulfur burners, air compressors, vacuum pumps, hot liquor pumps etc. and domestic purposes i.e. sanitation, drinking and general cleaning. Currently, the estimated water demand is 140m^3/day. The facility sources water from River Chevaywa for industrial use, and borehole for domestic use. The water is then taken through reverse osmosis process in the WTP to render it safe for use.

- Internal water: Clean cane contains approximately 70% water; thus the water is a primary source for sugar manufacturing process. The water in the form of condensate is more than sufficient for the internal process of sugar manufacturing such as condensate water used for imbibition, boiler, filter, cake washing, milk of lime preparation, movement of water at pans, molasses, dilutions, centrifugal, melting etc.

Currently, the management undertakes water quality sampling and analysis, and has valid water abstraction permits from Water Resources Authority (WRA) for the river and borehole. Additional mitigation measures are recommended as summarized below.

Recommended mitigation measures

1. Install water saving systems such as self-closing taps and low flush water toilets
2. Carry out regular inspection and maintenance of the water distribution network to ensure zero leaks and damages
3. Create awareness on water conservation
4. Comply with the provisions of Environmental Management and Coordination (Water Quality) Regulations, 2006

3.2.2.5 Effluent generation and management

Being an industrial development, the effluent generated will constitute a combination of domestic and industrial wastewater flows. Domestic effluent flows will be generated from sanitation facilities and general cleaning whereas industrial effluent flows will be generated from the production process.

Based on the domestic water consumption of approximately 20m^3/day (10% of total water consumption), domestic effluent of 2m^3/day will be generated. This is channeled to the septic tank/soak pit system though a bio-digester is recommended. Seventy percent (70%) of the remaining water use (120m^3/day) will be generated as industrial effluent. This is channeled to the ETP for treatment. The treated effluent is then discharged into the river downstream (Figure 10) and excess condensate stored in a tank for re-use in factory. Ground and surface water sources may be polluted if effluent generated is not managed in an appropriate manner.

Currently, the management has contracted a NEMA licensed waste handler, Kabet Cheptulwo, to de-sludge the septic tanks/soak pits, undertakes wastewater quality monitoring and has a valid Effluent Discharge License (EDL) for the year 2022 in compliance with the Environmental Management and Coordination (Water Quality) Regulations, 2006.

Recommended mitigation measures

1. Carry out regular inspection and maintenance of the ETP to ensure zero leaks and damages
2. Monitor the quality of Effluent discharged from the ETP and proposed bio-digester to ascertain conformity to the standards prescribed under the Third Schedule of the Environmental Management and Coordination (Water Quality) Regulations, 2006
3. Ensure timely renewal of the Effluent Discharge License once the current one expires
4. Comply with the provisions of Environmental Management and Coordination (Water Quality) Regulations, 2006

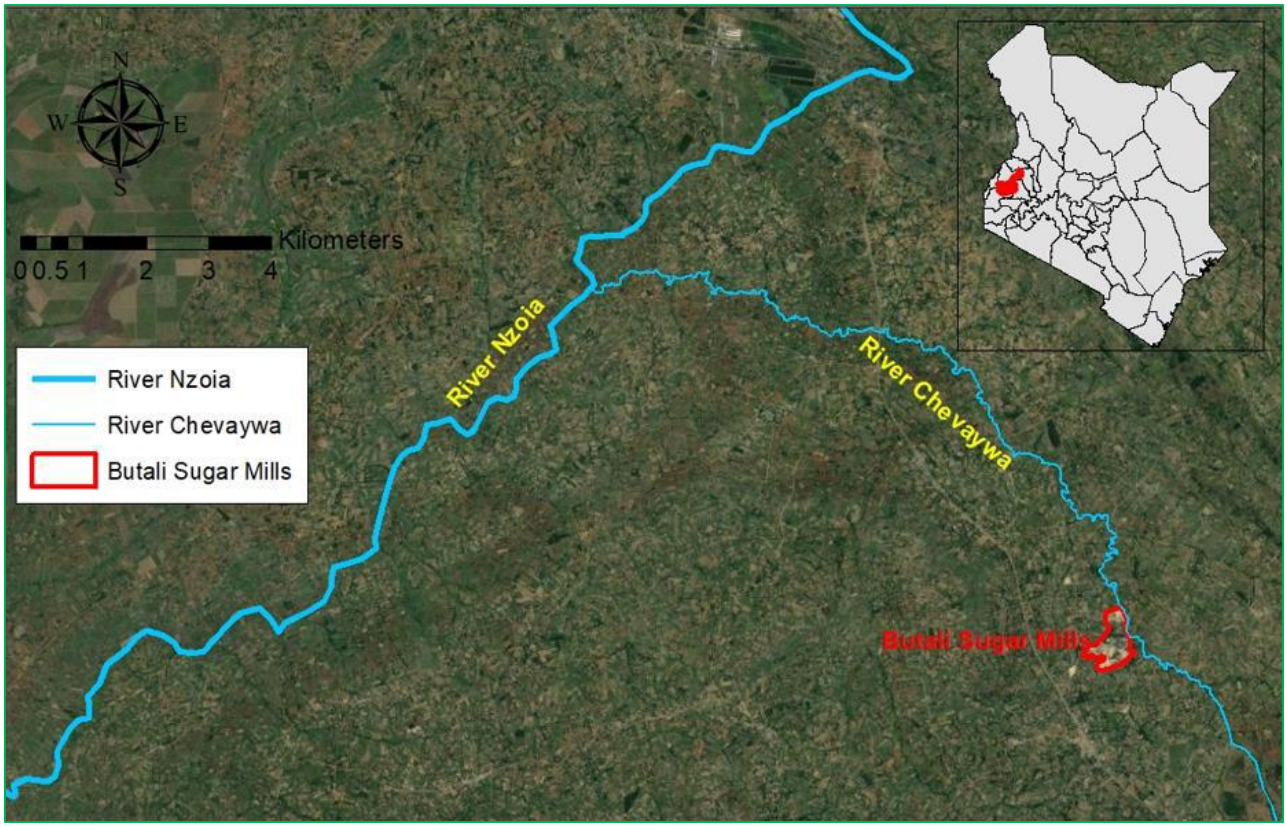


Figure 11: The ETP outlet discharging treated effluent downstream of River Chevaywa (Source: Envasses Environmental Consultants Limited, 2022).

3.2.2.6 Occupational safety and health risks

The operations of the plant will pose safety and health risks to workers, visitors to the site and the neighboring properties/community. This may be in the form of musculoskeletal injuries from use of machinery and equipment at the plant, exposure to high heat levels, air and noise pollution, exhaust fumes from machinery and vehicles accessing the facility, road accidents, falls and electrocution among others. Additionally, the sugar mills operations will require the management to follow strict health and hygiene standards, since these products can affect the health of consumers. All these risks have potential to cause injuries, permanent disability or even death and hence the management should be committed to ensuring safety and health of workers and visitors to the facility.

The existing sugar mills is registered as a workplace with Directorate of Occupational Safety and Health Services (DOSHS), has in place a safety officer, quality control department to ensure the production processes meet the Kenya Bureau of Standards (KEBS) and the Hazard Analysis Critical Control Point (HACCP) guidelines, displayed safety and health policy at strategic areas within the facility, and conducts Occupational Safety and Health audits annually.

Recommended mitigation measures

1. Ensure timely renewal of the certificate of registration of a workplace
2. Provide adequate and appropriate Personal Protective Equipment (PPEs) to workers and enforce on their use
3. Put in place an effective emergency response plan
4. Ensure the floor is kept clean and dry always to avoid accidental falls or slips
5. Display signage warning of potential hazards at various sections of the plant
6. Conduct first aid training among the workers and provide well-stocked first aid kits at different sections in the facility

7. Provide and keep an accident/ incident register
8. Obtain insurance cover for the workers as per Work Injury Benefits Act (WIBA)
9. Comply with the provisions of the Occupational Safety and Health Act, 2007

3.2.2.7 Community safety and health risks

The raw materials for the facility will be supplied by the local farmers. In some cases, farmers are likely to use pesticides to control pests and diseases. If not handled in the right way or applied in the right proportions, these pesticides may result in a number of harmful effects depending on the type of pesticide and duration of exposure such as headaches, excessive salivation, nausea, diarrhea, respiratory depression, seizures, and loss of consciousness. Additionally, some pesticides get absorbed through the leaves or roots into the plant's vascular system and get distributed to other parts of the plant. Thus, sugarcane may contain some pesticide residue even when they are properly washed and may be toxic to human health.

Recommended mitigation measures

1. The quality control chain should formulate extension services to the farmers
2. Encourage farmers to use organic farming practices
3. The farmers should be trained on integrated pests management practices

3.2.2.8 Fire risks and emergencies

Fire hazards are real threats to the sugar mills and must be accorded adequate attention and swift action in case of an outbreak. Potential sources include flammable materials, combustion of bagasse in the boiler, juice treatment, clarification process and sugar boiling which is carried out at high temperatures, oil spills, electrical faults or operational negligence among others. Fire occurrence may lead to death, financial losses and loss of livelihoods for the workers and neighbors.

Recommended mitigation measures

1. Develop, clearly display and implement a fire and emergency evacuation procedure
2. Procure and provide adequate firefighting equipment such as fire extinguishers, fire hose reels, smoke detectors, fire alarms and fire hydrants and place them strategically within the facility
3. Ensure firefighting equipment are serviced regularly by accredited fire service providers
4. Train employees on the use of fire-fighting equipment
5. Designate a fire assembly point and clearly display emergency exit points at strategic areas within the facility
6. Display fire safety and warning signage at appropriate sections of the plant
7. Ensure proper handling and storage of flammable materials
8. Plant operations should be undertaken by authorized personnel only
9. Ensure regular inspection and maintenance of electrical appliances
10. Conduct annual fire safety audit and fire drills
11. Access to the plant should be controlled to limit exposure to hazards
12. Comply with the provisions of the Occupational Safety and Health Act, 2007

3.2.2.9 Oil spills

Potential oil spills may occur during servicing and maintenance of vehicles and machinery. A release of petroleum products to the environment threatens ground and surface waters thereby endangering drinking water supplies.

Currently, the proponent has trained employees on containment and cleaning of oil spills, installed oil water interceptors at the workshop area to prevent ground water contamination and runoff,

designated a waste oil containment area and contracted a NEMA licensed waste handler, Powerex Lubricants Limited, to disposed off the used oil.

Recommended mitigation measures

1. Provide oil spill response kit to aid speedy clean-up in case of spillage
2. Train workers on containment and cleaning of oil spills
3. Comply with the Used Oil Guidelines, 2017

3.2.2.10 Energy demand

Energy will be required for running machinery at the sugar mills, steam production at the boiler and lighting. Energy during operations will be sourced from the cogeneration plant, National Grid and three standby generators.

Currently, the management undertakes annual energy audits for the existing sugar mills.

Recommended mitigation measures

1. The proponent will procure plant machinery and equipment that feature the latest technology to ensure power efficiency
2. Supplement electrical supply from the national grid with renewable energy such as solar to power the lighting system in areas such as offices and walkways
3. Install compact fluorescent lights in high use areas within the facility– they last longer and use 75% less energy than normal light bulbs
4. Keep records of power consumption to inform substantial practical guidelines for continuous improvement of consumption efficiency and identifying cost saving opportunities in energy efficiency
5. Create awareness among employees and visitors on energy conservation such as switching off lights when not in use
6. Carry out energy audits.

3.2.3 Negative impacts at possible decommissioning phase of the proposed project

A decommissioning phase is possible in the event of end of project life, closure by government agencies due to non-compliance with environmental and health regulations, an order by a court of law due to non-compliance with existing regulations, natural calamities and change of user of land. The proponent will prepare and submit a due diligence decommissioning audit report to NEMA for approval at least three (3) months in advance. For the purposes of prediction and information, the environmental and social concerns which may arise during decommissioning include;

1. Economic decline
2. Safety and health risks
3. Waste generation
4. Insecurity

3.2.3.1 Economic decline

In the event of decommissioning of the sugar mills and the auxiliary facilities, the proponent will incur huge financial loses and the employees will also lose their livelihoods. In addition, the government will lose revenue earned from the operations of the facility.

Recommended mitigation measures

1. Train employees on alternative livelihoods prior to decommissioning

2. Prepare and issue recommendation letters to employees to seek alternative employment opportunities
3. Review potential job opportunities in other ongoing contracts by the proponent and recommend the employees who qualify
4. Comply with labor laws by paying the employees their terminal dues

3.2.3.2 Safety and health risks

Safety and health risks are likely to emanate from accidental falls and cuts and injuries from machinery use. Noise and air pollution from decommissioning activities may also pose safety and health and safety risks to workers, neighbors and visitors to the site.

Recommended mitigation measures

1. Contract a licensed construction company to carry out demolitions
2. Install signage to forewarn people on ongoing demolition activities
3. Provide adequate and enforce the use of PPE throughout the demolition works
4. Avail first aid kits on site throughout the entire period
5. Ensure the process of demolition is supervised by competent personnel
6. Comply with the provisions of the Environmental Management and Coordination (Air Quality) Regulations, 2014 and (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009
7. Comply with the provisions of the Occupational Safety and Health Act, 2007

3.2.3.3 Waste generation

Demolition activities will result in generation of solid waste. The solid waste will include wood cuttings, roofing waste and building rubbles among others. If not properly managed, the solid wastes will pose safety and health risks and environmental pollution. Effluent generated from decommissioning the proposed bio-digester and ETP will also need to be disposed off appropriately.

Recommended mitigation measures

1. Contract NEMA licensed waste handler to dispose both the solid waste and effluent generated from the demolition activities
2. Recover the reusable and recyclable components of the plant
3. All recyclable materials should be collected and sent to NEMA licensed recyclers
4. Sell off the plant machinery to other sugar mills companies
5. Comply with the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2006
6. Comply with the provisions of the Environmental Management and Coordination (Water Quality) Regulations, 2006

3.2.3.4 Insecurity

Insecurity will result from the site when it's abandoned after decommissioning. Unoccupied structures within the site will act as criminal dens and the security boost that had been provided by the plant to the local community would be lost.

Recommended mitigation measure

1. The proponent should extend the tenure of contracted security firm during the decommissioning phase of the facility

3.3 Impact analysis

Potential project impacts are predicted and quantified to the extent possible. The magnitude of impacts on resources such as water and air or receptors such as people, communities, wildlife species and habitats is defined. Magnitude is a function of the following impact characteristics;

1. Type of impact (direct, indirect, induced)
2. Size, scale or intensity of impact
3. Nature of the change compared to baseline conditions (what is affected and how)
4. Geographical extent and distribution (e.g. local, regional, international)
5. Duration and/or frequency (e.g. temporary, short-term, long term, permanent)

Magnitude describes the actual change that is predicted to occur in the resource or receptor. It takes into account all the various impact characteristics in order to determine whether an impact is negligible or significant. Some impacts can result in changes to the environment that may be immeasurable, undetectable or within the range of normal natural variation. Such changes can be regarded as essentially having no impact and are characterized as having a negligible magnitude (Table 10).

1. **Negligible impact (very low) -** Where a resource or receptor would not be affected by a particular activity or the predicted effect is deemed to be imperceptible or is indistinguishable from natural background variations.
2. **Less than significant impact (Low**) - Is a minor impact where a resource or receptor would experience a noticeable effect but the impact magnitude is sufficiently low (with or without mitigation) and /or the resource or receptor is of low sensitivity. In either case, a less than significant impact must be sufficiently below applicable standard threshold limits.
3. **Potentially significant impact (moderate) -** A moderate impact that meets applicable standards but comes near the threshold limit. The emphasis for such moderate impacts is to demonstrate that the impact has been reduced to a level that is as minor as reasonably practicable so that the impact does not exceed standard threshold limits.
4. **Significant impact (high) -** One where an applicable standard threshold limit would or could be exceeded or if a highly valued or very scarce resource would be substantially affected.

Table 10: Risk and impact significance matrix for the proposed project.

Environmental impact	Magnitude of impact at construction phase	Magnitude of impact at operational phase	Magnitude of impact at possible decommissioning phase
Environmental risks of obtaining raw materials	2	0	0
Destruction of the physical environment	2	0	0
Air pollution	2	3	2
Noise pollution	2	3	2
Solid waste generation	2	3	2
Water demand	2	2	2
Effluent generation	2	2	2
Occupational safety and health risks	3	3	3
Fire risks and emergencies	0	2	0
Oil spills	0	2	0
Energy demand	0	2	0
Economic decline	0	0	3
Insecurity	0	0	2

Legend

Magnitude	Impact score
Negligible	0
Low	1
Moderate	2
High	3

3.4 Public and stakeholders' consultations and findings

3.4.1 Introduction

Public and stakeholders' participation in the ESIA process is a legislative requirement under Part 2, Section 69 (1d) of the Kenya Constitution 2010 and Regulation 17 of the Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003. The aim of public and stakeholders' consultations was to obtain and document comments, views and concerns that the neighbors and stakeholders have regarding the proposed project. For the proposed project, public and stakeholders' consultations were undertaken using two strategies i.e. administration of questionnaires and consultative meeting and specifically;

1. Administration of questionnaires to the community members and stakeholders
2. Community and stakeholder consultative meeting held on 2nd August 2022 at the project site

Brief details of the comments obtained during administration of questionnaires and consultative meeting are discussed below. The filled in questionnaires and proceedings of the meeting are annexed to this report.

3.4.2 Summary of comments obtained during administration of questionnaires

A total of 25 questionnaires were administered between 18th and 19th July 2022 and the main comments are summarized in Table 11 below. During the interviews, the local community members and stakeholders interviewed cited both positive and negative environmental and social impacts that will emanate from the proposed project. The positive impacts identified included;

1. Creation of employment opportunities
2. Provision of market for sugarcane crops
3. Enhancement of security within the area
4. Enhancement of road infrastructure within the area
5. Increased business for goods and services
6. Income to the proponent
7. Revenue to the government

The main potential negative environmental impacts cited included;

1. Noise and air pollution
2. Wastewater generation and management

Notably, the ESIA has proposed measures to ensure that the proposed project possess minimal or no environmental and social impacts cited by the local community and stakeholders. The measures proposed aim at;

- Prevention of environmental pollution
- Minimizing air and noise pollution
- Minimizing the use of environmental resources such as water

Table 11: Summary of comments obtained from neighbors and stakeholders of the proposed project.

No.	Respondents Profile			Comments
	Name	Telephone No.	ID No.	
1.	Stephen Kwalanda	0799406783	24645630	– No objection – Dust emissions due to increased bagasse production
2.	Josephine Kwalanda	-	-	– No objection – Dust emissions from stored bagasse during windy condition resulting to respiratory infections
3.	Elphas Ongaya	0712890743	8535881	– No objection – Creation of employment opportunities – Provision of market for sugarcane – Air pollution
4.	Rose Likhodio	0723306073	11739069	– No objection – Water pollution – Dust emissions from stored bagasse during windy condition
5.	Jeremiah Gideon	-	7903948	– No objection – Dust emissions from stored bagasse during windy condition
6.	Gladys Mukhwana	0790316882	-	– No objection – Creation of employment opportunities – Dust emissions from stored bagasse during windy condition – Noise pollution
7.	Celestine Mwenje	0727410771	31528682	– No objection – Air pollution
8.	Pius Mutalakhani	0795416571	37958343	– No objection
9.	Leonida Lilian	0799156397	32330799	– No objection – Creation of employment opportunities
10.	Rebecca Omusula	0704347840	34622813	– No objection – Creation of employment opportunities – Subsidization of farm inputs – Enhancement of road infrastructure within the area – Air pollution – Corrosion of iron-sheets
11.	Samson Kisiang'ani Jami	0742320416	7885840	– No objection – Creation of employment opportunities – Water pollution

No.	Respondents Profile			Comments
	Name	Telephone No.	ID No.	
				– Air pollution – Corrosion of iron-sheets
12.	Boniface Muruli	0710786633	25787128	– No objection – Provision of market for sugarcane crops – Air pollution – Destruction of the access roads by Heavy Commercial Vehicles (HCVs)
13.	Thomas Wachiya	0724888496	11738365	– No objection – Creation of employment opportunities – Reduced cases of sugarcane theft – Noise pollution and excessive vibrations – Air pollution
14.	Loise Musa Washisino	-	6303314	– No objection – Noise pollution
15.	Scovia Nangila	0797160203	37506769	– No objection – Odor from the industrial wastes – Air pollution – Changes in soil composition and fertility
16.	Catherine Mulongo	0717936270	21605944	– No objection – Increased business opportunities – Water, air and noise pollution
17.	Geoffrey Lucheli Washisino	0721341983	24252780	– No objection – Creation of employment opportunities – Dust emissions due to increased bagasse production
18.	Catherine Chivini	0706170440	21694488	– No objection – Creation of employment opportunities – Cases of insecurity – Water pollution – Destruction of the access roads by Heavy Commercial Vehicles (HCVs)
19.	Pauline Kona	0706249674	-	– No objection – Increased business opportunities – Creation of employment

No.	Respondents Profile			Comments
	Name	Telephone No.	ID No.	
				– Dust emissions from stored bagasse during windy condition – Water pollution
20.	Evaline Khanyonyi Ateru	0115417797	-	– No objection – Creation of employment opportunities – Enhancement of security within the area – Water pollution resulting to increased cases of waterborne diseases
21.	Trizah Sikolia	0701089657	21259537	– No objection – Increased business opportunities – Creation of employment opportunities
22.	Rachel Meta Amakobe	0713871204	1360693	– No objection – Creation of employment opportunities – Delays of sugarcane permit issuance – Water pollution
23.	Ethna Shinyenyi	-	-	– Increased business opportunities – Water pollution resulting to death of livestock
24.	Solomon Kokonya Munialo	0711742873	10164746	– No objection – Provision of market for sugarcane – Creation of employment opportunities – Water, air and noise pollution
25.	Phanice Aloni	0724505316	13581731	– Provision of market for sugarcane – Creation of employment opportunities – Groundwater pollution – Odor from effluent treatment plant

3.4.3 Community and stakeholder consultative meetings

The community and stakeholder consultative meeting was held on 2nd August 2022 at Butali Sugar Mills Limited premises (Figure 11). Table 12 summarizes the impacts identified by the local community and their recommended mitigation measures.

The agenda of the meeting was to;

1. Sensitize the local community on the proposed extension of the existing sugar mills and ETP
2. Document comments and concerns of the community and stakeholders with respect to the expansion of the sugar mills
3. AOB

The proceedings of the public consultation meeting are annexed in this report.

Figure 12: A section of participants during the stakeholder consultation meeting at Butali Sugar Mills Limited Premises (Source: Public Consultation meeting, August 2022).

Table 12: Impacts identified by the local community and their recommended mitigation measures.

Impact identified by the local community	Recommended mitigation measures proposed by the community
Air pollution	- Implement measures to prevent air pollution especially fly ash dust - Enhance use of water and molasses to manage dusts
Wastewater generation and management	- Implement measures to prevent water quality degradation at River Chevaywa
Provision of market for sugarcane	- Implement measures to ensure that permits are easily acquired
Employment opportunities to the locals	- Prioritizing employment opportunities to the locals
Corporate Social Responsibility (CSR)	- Initiate CSR projects such as support education of children from poor family background.

Notably, the proponent has put in place measures to address the issues raised by the local community. These include;

1. Installation of mechanical dust collectors along the chimney to trap the particulate matter.
2. Recycling of the wastewater generated from the production process.
3. Carrying out water quality sampling and analysis every quarter in collaboration with Water Resource Authority
4. Providing sanitary towels to schools, providing desks and supporting construction of wards at Chebwai Dispensary among others as part of Corporate Social Responsibility (CSR).

3.4.4 Grievances Redress Mechanism

3.4.4.1 Introduction

The affected persons by the proposed project may raise their grievances and dissatisfactions about actual or perceived impacts in order to find a satisfactory solution. These grievances, influenced by their physical, situational and/or social losses, can emerge at the different stages of the project cycle. Not only should the affected persons be able to raise their grievances and be given an adequate hearing, but also satisfactory solutions should be found that mutually benefit both the affected persons and the project. It is equally important that the affected persons have access to legitimate, reliable, transparent and efficient institutional mechanisms that are responsive to their complaints.

3.4.4.2 Grievances prevention

Grievances cannot be avoided entirely, but much can be done to reduce them to manageable numbers and reduce their impacts. This will be achieved by;

1. Providing sufficient and timely information to communities. Many grievances arise because of misunderstandings; lack of information; or delayed, inconsistent or insufficient information. Accurate and adequate information about a project and its activities, plus an approximate implementation schedule, should be communicated to the communities, especially affected parties, regularly.
2. Conduct meaningful community consultations. The project proponent should continue the process of consultation and dialogue throughout the implementation of the project. Sharing information, reporting on project progress, providing community members with an opportunity to express their concerns, clarifying and responding to their issues, eliciting communities' views, and receiving feedback on interventions will benefit the communities and the project management.
3. Overall good management of the facility will ensure a reduction in potential conflicts with the local community and other stakeholders.

3.4.5 Grievances Redress Mechanism Tool

The plant will have a prompter and efficient resolution on individual and collective complaint and provision of feedback on any grievances and dissatisfaction from stakeholders during operations. The flow chart below (Figure 12) shows a complaint and proposal consideration mechanism for the plant that provides an accessible channel for submission of complaints and feedback to stakeholders.

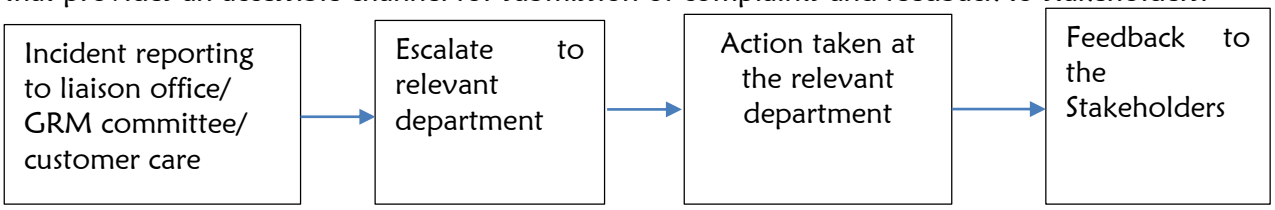


Figure 13: Grievances Redress Mechanism Tool flow chart (Source: World-Bank, 2020).

3.5 Analysis of project alternatives

Analyzing project alternatives is important as it allows the proponent to evaluate possible project options that could mitigate the environmental risks identified during the ESIA process through prevention, elimination of the risks all together or reduction of the severity of an impact. The analysis will also assist NEMA and lead agencies in decision making by either approving the project as proposed or advising the proponent on the need for a particular alternative such as an alternative site or technological and design changes. In the current proposal, the alternatives identified are discussed in detail below.

3.5.1 The 'No project' alternative

The 'No Project' alternative has the advantage of retaining the status quo, meaning that the predicted environmental impacts will not occur and is ideally the best-case scenario for mitigation. This alternative is however not viable owing to the fact that retaining the status quo denies the proponent a viable investment opportunity and thereby income generation translating into profits, denies the local community employment opportunities and also denies both the County and National Government revenue.

Therefore, the 'No project' alternative is not considered viable in the light of the benefits and deprivations of the project.

3.5.2 The "Yes Project" alternative

This option envisages that the proposal will be implemented. It was considered as the most viable because of the following reasons;

- Meeting the domestic demand for sugar in the Country
- Contribution of the project towards attainment of the economic pillar of Kenya's Vision 2030 and Big Four Agenda
- Provision of market for the locally produced sugarcane thus curbing post-harvest losses
- Utilization of solid wastes
- Employment creation
- Optimal use of land
- Income to the proponent
- Revenue to the government through taxes & licenses

3.5.3 Alternative project site

An alternative site could be considered for the proposed project if the proposed project would present serious environmental challenges that cannot be effectively managed. However, the proposed mitigation measures are considered adequate to minimize the impacts to levels that do not warrant significant environmental damage. In addition, there is availability of adequate piece of land for the development. This alternative is therefore not viable.

4 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

4.1 Introduction

The preceding section has analyzed and identified the potential environmental and social impacts of the proposed project as well as the mitigation measures to address the impacts. Under this section, three Environmental and Social Management Plans (ESMPs) are proposed to guide the proponent in implementing the mitigation measures. These are ESMPs for the construction, operational and possible decommissioning phases. Each of the ESMP is organized into five sections comprising of the environmental concerns, recommended mitigation measures, implementing party, timeframe and a budget. The strategies for mitigation include preventing the impact from occurring in the first place, minimizing the impact, taking corrective action where impact occurs among others. The overall focus is to ensure that the project complies with the substantive EIA Principle of ensuring the right to a clean and healthy environment during the entire project cycle.

4.2 Environmental and Social Management Plan for the construction phase

For the construction phase ESMP (Table 13), the main environmental issues include environmental risks of obtaining raw materials, destruction of the physical environment, increased water and energy demand and effluent generation, solid waste generation and management, occupational safety and health risks, air and noise pollution.

4.3 Environmental and Social Management Plan for the operational phase

The main environmental concerns at this phase include air and noise pollution, solid waste generation and management, water demand, effluent generation and management, occupational safety and health risks, community safety and health risks, fire risks and emergencies, oil spills and energy demand (Table 14).

4.4 Environmental and Social Management Plan for the decommissioning phase

The decommissioning ESMP is important in the event of end of project cycle, natural calamities and non-compliance with environmental and health regulations among others. The key issues of concern at this stage will be the economic decline, safety and health risks, waste generation and insecurity (Table 15)

Table 13: Environmental and Social Management Plan for the construction phase of the proposed project.

Environmental concerns	Recommended mitigation measures	Implementing party	Timeframe	Cost (KES)
Environmental risks of obtaining raw materials	Source raw materials from sites that are licensed as per the EMCA Cap. 387 of the Laws of Kenya	Proponent/ contractor	Throughout construction	Nil
	Procure quantities of construction materials in line with the Bill of Quantities	Proponent/ contractor	Throughout construction	Nil
	Re-use construction waste materials such as wood and metal cuttings which can be salvaged	Proponent/ contractor	Throughout construction	Nil
Destruction of the physical environment	Retain vegetation cover in areas that will not be excavated as far as practicable	Proponent/ contractor	Throughout construction	Nil
	Compact loose soil within the project sites	Proponent/ contractor	During construction	Nil
	Use the overburden generated during construction activity to backfill the eroded areas	Proponent/ contractor	During construction	Nil
	Replant indigenous trees in the section of the property that will not be developed to compensate for loss	Proponent/ contractor	During construction	TBD
Water demand and effluent generation	Sensitize the workers on the need to conserve available water resources	Proponent/ contractor	Throughout construction	Nil
	Install a bio-digester in place of the septic tank/soak pit system to manage the domestic effluent	Proponent/ contractor	During construction	100,000
	Comply with the provisions of Environmental Management and Coordination (Water Quality) Regulations, 2006.	Proponent/ contractor	Throughout construction	Nil
Solid waste generation and management	Procure and strategically place adequate solid waste collection bins with a capacity for segregation within the construction site	Proponent/ contractor	Prior to commencement	100,000
	Procure a sizeable central solid waste collection bin with chambers to accommodate separated waste	Proponent/ contractor	Prior to commencement	100,000
	Sensitize construction workers on the process of solid waste collection, segregation and proper disposal	Proponent/ contractor	Throughout construction	Nil
	Procure the services of a NEMA licensed waste handler to dispose off the solid waste	Proponent/ contractor	Throughout construction	Tender

Environmental concerns	Recommended mitigation measures	Implementing party	Timeframe	Cost (KES)
	Comply with the provisions of Environmental Management and Coordination (Waste Management) Regulations, 2006	Proponent/ contractor	Throughout construction	Nil
Occupational safety and health risks	Register the site as a workplace with the Directorate of Occupational Safety and Health Services (DOSHS)	Proponent/ contractor	Prior to commencement	5,000
	Obtain insurance cover for the workers at the site	Proponent/ contractor	Prior to commencement	1,000,000
	Provide adequate and appropriate Personal Protective Equipment (PPE) to workers and visitors to the site and enforce on their use	Proponent/ contractor	Throughout construction	200,000
	Provide employees with correct tools and equipment for the jobs assigned and train on their use	Proponent/ contractor	Throughout construction	Nil
	Ensure moving parts of machines and sharp surfaces are securely protected with guards to avoid unnecessary contacts and injuries	Proponent/ contractor	Throughout construction	Nil
	Provide first aid services and emergency vehicle at the site	Proponent/ contractor	Throughout construction	1,000,000
	Erect traffic warning signage and sensitize drivers to observe speed limits along the access road	Proponent/ contractor	During construction	20,000
	Regulate the entry of visitors to the construction site by deploying adequate security measures	Proponent/ contractor	Throughout construction	Nil
	Comply with the provisions of the Occupational Safety and Health Act, 2007	Proponent/ contractor/	Throughout construction	Nil
Air pollution	Procure, provide and enforce the use of dust masks to the workers and visitors to the project site	Proponent/ contractor	Throughout construction	200,000
	Install dust screens around the project site	Proponent/ contractor	Throughout construction	1,000,000
	Cover stock piles of construction materials to reduce dust emissions especially during windy conditions	Proponent/ contractor	Throughout construction	Nil
	Sprinkle water at the excavation areas to suppress dust	Proponent/ contractor	Throughout construction	Nil
	Use of serviceable machinery/equipment and trucks	Proponent/ contractor	Throughout construction	Nil

Environmental concerns	Recommended mitigation measures	Implementing party	Timeframe	Cost (KES)
	Monitor fugitive emissions	Proponent/ contractor	Quarterly	30,000
	Comply with the provisions of Environmental Management and Co-ordination (Air Quality) Regulations, 2014	Proponent/ contractor	Throughout construction	Nil
Noise pollution	Delivery of raw materials, excavation and construction work should be limited to day time hours only between 8am to 5pm	Proponent/ contractor	Throughout construction	Nil
	Locate machinery that are likely to produce noise as far as practical from neighboring properties	Proponent/ contractor	Throughout construction	Nil
	Procure, provide and enforce the use of earmuffs to workers who will work within peak noise producing areas and visitors accessing the same areas	Proponent/ contractor	Throughout construction	200,000
	Sensitize truck drivers to avoid unnecessary hooting and running of vehicle engines	Proponent/ contractor	Throughout construction	Nil
	Comply with the provisions of Environmental Management and Coordination (Noise and Excessive Vibration Pollution (Control)) Regulations, 2009	Proponent/ contractor	Throughout construction	Nil
Increased energy usage	Ensure efficient site layout	Proponent/ contractor	Throughout construction	Nil
	Train workers on energy conservation	Proponent/ contractor	Throughout construction	Nil
	Ensure maintenance of plant and equipment as per the manufactures' instructions	Proponent/ contractor	Throughout construction	Nil
	Choose and use machines designed for particular activity/task	Proponent/ contractor	Throughout construction	Nil
	Develop a proper logistical transport system	Proponent/ contractor	Throughout construction	Nil

Table 14: Environmental and Social Management Plan for the operational phase of the proposed project.

Environmental concerns	Recommended mitigation measures	Implementing party	Timeframe	Cost (KES)
Air pollution	Procure and provide adequate dust masks to workers and enforce on their use	Proponent	Throughout operations	200,000
	Plant fast growing trees such as casuarina along the boundary wall to act as dust screens and a buffer zone between the facility and the neighbors	Proponent	Throughout operations	TBD
	Use acceptable emission control technologies as per the Seventh Schedule of the Environmental Management and Coordination (Air Quality) Regulations, 2014	Proponent/ contractor	During operation	500,000
	Procure and install adequate dust screens around the bagasse storage area	Proponent	During operation	500,000
	Explore the use of modern technology systems such as bio-filters and chemical scrubbers to control odors	Proponent	During operation	200,000
	Ensure timely renewal of the air emission license from NEMA	Proponent	Annually	100,000
	Develop and implement an air quality monitoring plan	Proponent	Throughout operations	50,000
	Comply with the provisions of Environmental Management and Coordination (Air Quality) Regulations, 2014.	Proponent	Throughout operations	Nil
Noise and excessive vibration pollution	Procure and provide adequate earmuffs to employees working at peak noise producing areas and enforcetheir use	Proponent	Throughout operations	200,000
	Reduce the working hours for employees working at peak noise producing areas compared to those working in other areas	Proponent	Throughout operations	Nil
	Use equipment that are properly fitted with noise reduction devices such as mufflers	Proponent	Throughout operations	Nil
	Service mechanical equipment to ensure that they are in good condition	Proponent	Monthly	50,000
	Apply for and obtain license to emit noise/vibrations in excess of permissible levels	Proponent	Annually	50,000
	Comply with the provisions of Environmental Management and Coordination (Noise Regulations, 2009	Proponent	Throughout operations	Nil

Environmental concerns	Recommended mitigation measures	Implementing party	Timeframe	Cost (KES)
Solid waste generation and management	Construct additional bagasse storage area to cater for the increased bagasse produced	Proponent	Prior to operations	TBD
	Amend the contractual agreement with the NEMA licensed solid waste handler to include disposal of the excess bagasse	Proponent	Throughout operations	Nil
	Procure and strategically place adequate waste collection bins with capacity for segregation	Proponent	Throughout operations	100,000
	Sensitize the workers on the process of solid waste collection, segregation and proper disposal	Proponent	Throughout operations	Nil
	Sell off the scrap metals and waste tyres to recycling and tyre retreading facilities respectively	Proponent	Throughout operations	Nil
	Comply with the provisions of Environmental Management and Coordination (Waste Management) Regulations, 2006	Proponent	Throughout operations	Nil
Water demand	Install water saving systems such as self-closing taps and low flush water closets	Proponent	During construction	50,000
	Carry out regular inspection and maintenance of the water distribution network to ensure zero leaks and damages	Proponent	Monthly	20,000
	Create awareness on water conservation	Proponent	Throughout operations	Nil
	Comply with the provisions of Environmental Management and Coordination (Water Quality) Regulations, 2006.	Proponent	Throughout operations	Nil
Effluent generation and management	Carry out regular inspection and maintenance of the ETP to ensure zero leaks and damages	Proponent	Monthly	20,000
	Monitor the quality of Effluent discharged from the ETP and proposed bio-digester	Proponent/ NEMA	Quarterly	30,000
	Ensure timely renewal of the Effluent Discharge License once the current one expires	Proponent	Annually	50,000
	Comply with the Water Quality Regulations, 2006	Proponent	Throughout operations	Nil
	Ensure timely renewal of the certificate of registration of a workplace	Proponent	Annually	5,000

Environmental concerns	Recommended mitigation measures	Implementing party	Timeframe	Cost (KES)
Occupational safety and health risks	Provide adequate and appropriate Personal Protective Equipment (PPEs) to workers and enforce on their use	Proponent	Throughout operations	200,000
	Put in place an effective emergency response plan	Proponent	Throughout operations	20,000
	Ensure the floor is kept clean and dry always to avoid accidental falls or slips	Proponent	Throughout operations	Nil
	Display signage warning of potential hazards at various sections of the plant	Proponent	Throughout operations	30,000
	Conduct first aid training among the workers and provide well-stocked first aid kits at different sections in the facility	Proponent	Bi-annually	100,000
	Provide and keep an accident/ incident register	Proponent	Throughout operations	Nil
	Obtain insurance cover for the workers as per Work Injury Benefits Act (WIBA), 2007	Proponent/ Contractor	Throughout operations	Tender
	Comply with the provisions of the Occupational Safety and Health Act, 2007	Proponent	Throughout operations	Nil
Community safety and health risks	The quality control chain should formulate extension services to the farmers	Proponent	Throughout operations	Nil
	Encourage farmers to use organic farming practices	Proponent	Throughout operations	Nil
	The farmers should be trained on integrated pests management practices	Proponent	Bi-annually	TBD
Fire risks and emergencies	Develop, clearly display and implement a fire and emergency response action plan	Proponent	Prior to operations	20,000
	Procure and provide adequate firefighting equipment such as fire extinguishers, fire hose reels, smoke detectors, fire alarms and fire hydrants and place them strategically within the facility	Proponent	Prior to operations	300,000
	Firefighting equipment should be serviced by accredited fire service providers	Proponent	Quarterly	TBD
	Train employees on the use of fire-fighting equipment	Proponent	Bi-annually	30,000
	Designate a fire assembly point and clearly display emergency exit points at strategic areas within the facility	Proponent	Prior to operations	Nil

Environmental concerns	Recommended mitigation measures	Implementing party	Timeframe	Cost (KES)
	Display fire safety and warning signage at appropriate sections of the plant	Proponent	Prior to operations	20,000
	Ensure proper handling and storage of flammable materials	Proponent	Throughout operations	Nil
	Plant operations should be undertaken by authorized personnel only	Proponent	Throughout operations	Nil
	Ensure regular inspection and maintenance of electrical appliances	Proponent	Monthly	50,000
	Conduct fire safety audit and fire drills	Proponent	Annually	100,000
	Access to the plant should be controlled to limit exposure to hazards	Proponent	Throughout operations	Nil
	Comply with the provisions of Occupational Safety and Health Act, 2007	Proponent	Throughout operations	Nil
Oil spills	Provide oil spill response kit to aid speedy clean-up in case of spillage	Proponent	During operations	30,000
	Train workers on containment and cleaning oil spillage	Proponent	Throughout operation	Nil
	Comply with the Used Oil Guidelines, 2017	Proponent	Throughout operations	Nil
Increased energy demand	The proponent will procure plant machinery and equipment that feature the latest technology to ensure power efficiency	Proponent	During construction	In project costs
	Supplement electrical supply from the national grid with renewable energy such as solar to power the lighting system in areas such as offices and walkways	Proponent	Immediate	100,000
	Install compact fluorescent lights in high use areas within the facility	Proponent	Immediate	5,000
	Keep records of power consumption	Proponent	Throughout operations	Nil
	Create awareness among employees and visitors on energy conservation such as switching off lights when not in use	Proponent	Throughout operations	Nil
	Conduct energy audits	Proponent	Once every three years	30,000

Table 15: Environmental and Social Management Plan for the decommissioning phase of the proposed project.

Environmental concerns	Recommended mitigation measures	Implementing party	Timeframe	Cost (KES)
Economic decline	Train employees on alternative livelihoods	Proponent	Prior to decommissioning	50,000
	Prepare and issue recommendation letters to employees to seek alternative employment opportunities	Proponent	Prior to decommissioning	Nil
	Review potential job opportunities in other ongoing contracts by the proponent and recommend the employees who qualify	Proponent	Prior to decommissioning	Nil
	Comply with labor laws by paying the employees their terminal dues	Proponent/ workers	Prior to decommissioning	Nil
Safety and health risks	Contract a licensed construction company to carry out demolitions	Proponent	During decommissioning	Tender
	Install signage to forewarn people on ongoing demolition activities	Proponent/ contractor	Throughout the decommissioning	30,000
	Provide and enforce the use of PPE to workers and visitors	Proponent/ contractor	Throughout the decommissioning	200,000
	Avail first aid kits on site	Proponent/ contractor	Throughout the decommissioning	16,000
	Ensure the process of demolition is supervised by competent personnel	Proponent/ contractor	Throughout the decommissioning	Nil
	Comply with the Air and Noise Regulations gazetted in 2014 and 2009 respectively	Proponent/ contractor	Throughout the decommissioning	Nil
	Comply with the provisions of the Occupational Safety and Health Act, 2007	Proponent/ contractor	Throughout the decommissioning	Nil
Waste generation	Contract NEMA licensed waste handler to dispose both the solid waste and effluent generated from the demolition activities	Proponent/ contractor	Throughout the decommissioning	Tender
	Recover the reusable and recyclable components of the plant	Proponent/ contractor	Throughout the decommissioning	Nil
	All recyclable materials should be collected and sent to NEMA licensed recyclers	Proponent/ contractor	Throughout the decommissioning	Nil

Environmental concerns	Recommended mitigation measures	Implementing party	Timeframe	Cost (KES)
	Sell off the plant machinery to other sugar mills companies	Proponent/ contractor	Throughout the decommissioning	TBD
	Comply with the Waste Management and Water Quality Regulations, 2006	Proponent/ contractor	Throughout the decommissioning	Nil
Insecurity	Extend the tenure of contracted security firm during the decommissioning phase of the facility	Proponent/ contractor	Throughout the decommissioning	Tender

5 ENVIRONMENTAL MONITORING PLANS

5.1 Introduction

A suite of Environmental Monitoring Plans is required to ensure full and systematic implementation of the Environmental Management Plan. It entails assessment of environmental performance of the proposed project by documenting, tracking and reporting any changes in environmental parameters in space and time. The objective of the monitoring plans is to enhance the environmental performance of the project by providing data and information on compliance with legislative standards and determining the levels of deviation from the values obtained during the baseline monitoring. This in turn informs the corrective measures if any that need to be implemented to comply with the legislative standards. For the proposed project, seven monitoring plans are proposed. These are;

1. Air quality monitoring plan
2. Noise monitoring plan
3. Solid waste monitoring plan
4. Wastewater quality monitoring plan
5. Domestic water quality monitoring plan
6. Occupational safety and health monitoring plan
7. Energy monitoring plan

5.1.1 Air quality monitoring plan

5.1.1.1 Introduction

At construction phase, air pollution will emanate from dust during excavations, concrete mixing activities and exhaust fumes from machinery use and HCVs delivering construction materials to the site. At operational phase, sources of air pollution will include dust emissions from stored bagasse during windy conditions, crushing and milling of sugarcane, flue gases such as particulate matter, sulphur oxides and nitrogen oxides during combustion of bagasse in the boiler, juice treatment and evaporation process, exhaust fumes such as carbon monoxide, hydrocarbons, nitrogen oxides and sulfur dioxide from machinery and vehicles accessing the facility and odor from the ETP. Air pollution above acceptable limits are toxic to ecological systems and to human health. The purpose of the air quality monitoring plan is to ensure the concentrations air emissions from the construction and subsequent operations of the facility are within the stipulated standards set under the Environmental Management and Coordination (Air Quality) Regulations, 2014. In addition, the results will be used to evaluate if the adopted air pollution controls and management are effective.

5.1.1.2 Monitoring parameters

The parameters to be monitored for sugar manufacturing plants and boilers are listed under the Fourth Schedule of Air Quality Regulations, 2014 and the stipulated standard specified targets for the purpose of environmental monitoring and protection are stipulated under the Third Schedule of the Air Quality Regulations, 2014 (Table 16). The proponent will also monitor fugitive emissions whose standard specified target values are stipulated in the First Schedule of the Air Quality Regulations, 2014 (Table 17).

5.1.1.3 Monitoring location

Air quality monitoring should be carried out within the project site at construction phase, and at the furnace chimney, boilers and sugar mills plant at operational phase.

5.1.1.4 Monitoring frequency

Air quality sampling and analysis will be carried out in collaboration with a NEMA designated laboratory on a quarterly basis.

Table 16: Ambient air quality tolerance limits for sugar manufacturing plants and boilers as per the Third Schedule of the Environmental Management and Coordination (Air Quality) Regulations, 2014.

Industry	Opacity	Particulate (Dust) PM10 (mg/Nm³)	Sulphur oxides (mg/Nm³)	Nitrogen oxides (mg/Nm³)	Carbon monoxide (mg/Nm³)	Carbon dioxide (mg/Nm³)	Hydrocarbon (mg/Nm³)	Hydrogen Sulphide (mg/Nm³)	Dioxins /Furans
Sugar Manufacture	-	(< 8.7 mw input boiler): 150	2000	Liquid fuels: 460 ppm	-	-	-	-	-
	-	(>8.7 mw input boiler): 100	-	Solid fuels: 750 ppm	-	-	-	-	-
Boilers	*	50	*	*	*	*	*	*	*

Table 17: Ambient air quality tolerance limits for fugitive emissions as per the First Schedule of the Environmental Management and Coordination (Air Quality) Regulations, 2014.

Pollutant	Time weighted average	Industrial area
Sulphur oxides (SO_x)	Annual Average*	80 $\mu g/m^3$
	24 hours**	125 $\mu g/m^3$
Oxides of Nitrogen (NO_x)	Annual Average*	80 $\mu g/m^3$
	24 hours	150 $\mu g/m^3$
Nitrogen Dioxide	Annual Average	150 $\mu g/m^3$
	24 hours	100 $\mu g/m^3$
Suspended Particulate Matter (SPM)	Annual Average	360 $\mu g/m^3$
	24 hours	500 $\mu g/m^3$
Respirable particulate matter (< 10μm) (RPM)	Annual Average*	70 $\mu g/m^3$
	24 Hours**	150 $\mu g/Nm^3$
$PM_{2.5}$	Annual Average	35 $\mu g/m^3$
	24 Hours	75 $\mu g/m^3$
Lead (Pb)	Annual Average*	1.0 $\mu g/Nm^3$
	24 hours**	1.5 $\mu g/m^3$
Carbon monoxide/ Carbon dioxide	8 hours	5.0 mg/m^3
	One hour	10 mg/m^3
Hydrogen Sulphide	24 hours**	150 $\mu g/m^3$
Non methane hydrocarbons	Instant Peak	700ppb
Total VOC	24 Hours**	600 $\mu g/m^3$
Ozone	One hour	200 $\mu g/m^3$
	8 hour (Instant Peak)	120 $\mu g/m^3$

5.1.2 Noise monitoring plan

5.1.2.1 Introduction

Potential sources of noise pollution will emanate from construction activities, machinery use during sugarcane production, vehicular movement in and out of the facility, loading and offloading activities, and at the workshop areas. Noise may lead to hearing impairments which will reduce the workmanship of the employees. The purpose of noise monitoring plan is to therefore ascertain the extent of the impact due to the construction and subsequent operation of the sugar mills in compliance with the Environmental Management and Coordination (Noise and Excessive Vibrations pollution) (control) Regulations, 2009. Noise levels will be measured in dB (A) as stipulated in the Noise Exposure Standards (Schedules) as shown in Table 18 – 21 below.

Table 18: Maximum permissible levels for construction sites as stipulated under the Second Schedule of Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009.

Zone		Maximum Noise Level Permitted (Leq) in db(A)	
		Day	Night
(i)	Health facilities, educational institutions, homes for disabled etc.	60	35
(ii)	Residential	60	35
(iii)	Areas other than those prescribed in (i) and (ii)	75	65

Table 19: The Maximum permissible intrusive noise levels as stipulated under the First Schedule of Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009.

Zone		Sound Level Limits dB (A) Leq, 14 h		Noise Rating Level (NR) Leq, 14 h	
		Day	Night	Day	Night
A	Silent Zone	40	35	30	25
B	Place of worship	40	35	30	25
C	Residential: Indoor Outdoor	45 50	35 35	35 40	25 25
D	Mixed Residential (with some commercial and places of entertainment)	55	35	50	25
E	Commercial	60	35	55	25

Day: 6.01 a.m. – 8.00 p.m. (Leq, 14 h) Night: 8.01 p.m. – 6.00 a.m. (Leq, 10h)

Table 20: The guidelines for International Ambient Noise Levels (World Bank and World Health Organization Noise Permissible Levels)

Receptor	Maximum allowable Leq (hourly) in dB(A)			
	World Bank		World Health Organization	
	Day time 0700-2200 Hrs	Night time 2200-0700 Hrs	Day time 0700-2200 Hrs	Night time 2200-0700 Hrs
Residential, Institutional and Educational	55	45	50	45
Industrial and Commercial	70	70	85	85

Table 21: The Occupational Health and Safety Exposure Limits for Noise Emissions

Sound Level dB(A)	Maximum Permitted Duration (hours/day)
80	16
85	8
90	2
100	1
105	0.5
110	0.25
115	1/8
>115	0
Hearing Protectors (Ear Mufflers)	
Sound Level dB(A)	Maximum Class of Hearing Protectors
85-95	C
96-105	B
106 and over	A

5.1.2.2 Monitoring location

Noise monitoring should be carried out within the project site at construction phase, and at the sugar mills plant sections, boilers and workshops at operational phase.

5.1.2.3 Monitoring frequency

Noise monitoring should be done on a quarterly basis in collaboration with a NEMA designated laboratory. Noise levels will be measured in dB (A).

5.1.3 Solid waste monitoring plan

5.1.3.1 Introduction

Solid waste will emanate from construction activities and during the operational phase of the proposed project. Poor disposal of the waste will cause odour problems, environmental pollution and therefore a health risk to the workers, visitors to the facility and neighbors. The purpose of the monitoring plan is to therefore ensure solid waste is managed in such a way that it protects both the public health and the environment.

5.1.3.2 Monitoring frequency

The frequency of solid waste monitoring will differ from the collection to the disposal stage in order to ensure reduced odours and accumulated heaps of waste. Table 22 describes the outline for which the activity will be monitored but can be adjusted depending on the amount generated.

Table 22: Sample outline for solid waste monitoring plan.

Activity	Frequency	Critical levels (Tons)	Target	Responsibility
Collection	Daily			
Storage	Daily			
Management	Daily			
Disposal	Weekly			

5.1.3.3 Monitoring strategy

The solid waste monitoring plan will document the collection, storage and disposal of solid waste from the proposed project. There is need to code each of the collection points, note the capacity and critical levels, frequency of disposal and the personnel and contractor responsible. In addition,

it will be important to characterize the waste streams at the collection points to inform investments in segregation infrastructure.

5.1.3.4 Indicator of success

Indicators of success will include timely collection and disposal of waste by the contractors, waste disposal tracking documents and certificates issued at the disposal sites in case of hazardous waste.

5.1.4 Waste-water quality monitoring plan

5.1.4.1 Introduction

The proponent should put in place a consistent wastewater quality monitoring plan targeting the quality of effluent discharging from the Effluent Treatment Plant (ETP) and proposed bio-digester. The objective of the monitoring plan is to provide data and information to improve water quality and management of the effluent in order to comply with the standards prescribed under the Third Schedule of the Environmental Management and Coordination (Water Quality) Regulations, 2006.

5.1.4.2 Monitoring parameters

Effluent from the Effluent Treatment Plant (ETP) and proposed bio-digester should be monitored pursuant to the Third Schedule of the Environmental Management and Coordination (Water Quality) Regulations, 2006 (Table 23).

Table 23: Water quality monitoring parameters and the standards prescribed under the Third Schedule of Environmental Management and Coordination (Water Quality) Regulations, 2006.

Parameter	EMC (Water Quality) Regulations, 2006 Standards
Biological Oxygen Demand; mg/l	30max
Total Suspended Solids; mg/l	30max
pH value	6.5-8.5
Total Coliforms; count/100ml	1000/100ml
Temperature; ºC	±3
Chemical Oxygen Demand; mg/l	50max
Colour/Dye/Pigment; Hazen Units	15
Total Phosphorous; mg/l	2 Guideline value
Organic Nitrogen as N	2 Guideline value
Nitrate; mg/l	100max
Flow	-

5.1.4.3 Monitoring location

Effluent sampling should target the last discharge point of the Effluent Treatment Plant (ETP) and the proposed bio-digester.

5.1.4.4 Monitoring frequency

The frequency of wastewater monitoring should be quarterly in collaboration with a NEMA designated laboratory.

5.1.4.5 Indicator of success

Apart from implementing measures to meet the legal standards, obtaining an EDL from NEMA will also form part of the indicators of success of the water quality monitoring plan.

5.1.5 Domestic water quality monitoring plan

5.1.5.1 Introduction

Domestic water quantity and quality monitoring will involve keeping records of water quantities abstracted from River Chevaywa and the borehole, consumption by the facility and analysis of its

quality based on the standards prescribed by the First Schedule of the Environmental Management and Coordination (Water Quality) Regulations, 2006. Quantities will be recorded as river/borehole discharge, against plant production and discharge in m^3/time period.

5.1.5.2 Monitoring parameters

The water quality monitoring parameters and the specified target values to be monitored for domestic use are stipulated under the First Schedule of the Environmental Management and Coordination (Water Quality) Regulations, 2006 (Table 24).

5.1.5.3 Monitoring location

Domestic water sampling should be carried out at River Chevaywa and the borehole.

Table 24: Water quality monitoring parameters and standards for sources of domestic water as per the First Schedule of the Environmental Management and Coordination (Water Quality) Regulations, 2006.

Parameter	Guide value (Max allowable)
pH Value	6.5-8.5
Suspended solids	30 mg/L
Nitrate NO_3	10 mg/L
Ammonia NH_3	0.5 mg/L
Nitrite NO_2	3 mg/L
Total Dissolved Solids	1200 mg/L
E. Coli colonies count/100ml	Nil
Fluoride	1.5 mg/L
Phenols	Nil
Arsenic	0.01 mg/L
Cadmium	0.01 mg/L
Lead	0.05 mg/L
Selenium	0.01 mg/L
Copper	0.05 mg/L
Zinc	1.5 mg/L
Alkyl benzyl sulphonates	0.5 mg/L
Permanganate value	1.0 mg/L

5.1.5.4 Monitoring frequency

Domestic water sampling and analysis should be undertaken once per month in collaboration with a NEMA designated laboratory.

5.1.6 Occupational safety and health monitoring plan

5.1.6.1 Introduction

Potential safety and health risks during construction and subsequent operational phases will emanate from the use of machinery, noise and air pollution, exposure to high heat levels, potential fire outbreaks and explosions. All these have a potential to cause injures, permanent disability or even death to workers, neighbors and visitors to the site. The purpose of health and safety monitoring plan is to assess existing controls alongside potential health and safety risks in order to develop an effective plan of action and to ensure compliance with Occupational Safety and Health Act, 2007.

5.1.6.2 Monitoring strategy

The proponent should be committed to ensuring, as far as is reasonably practicable, the health and safety of the workers, visitors to the site and neighbors is not put at risk during the construction phase and from the operations of the plant. This will be achieved by;

- Conducting occupational safety and health reviews and reports.
- Hazard identification by analyzing activities that can be an immediate threat or cause harm over a period of time.
- Ensuring that all accidents and incidents occurring at the site are promptly reported and investigated.
- Keeping statistics of accidents, incidents and dangerous occurrences and ensuring that reportable cases are filed with the health, safety and environment officer.
- Administration of safety awareness and motivation scheme.
- Routine inspections of the facility and equipment.
- Visual inspection as well as interviewing key personnel to identify areas of improvement.
- Undertaking and reviewing of fire, energy and risk assessment reports.
- Review of safety awareness, fire drills and fire safety training requirements.
- Evaluation of the effectiveness of health and safety training to the workforce.
- Action plans related to significant findings of the risk assessment.
- Having emergency evacuation plans and emergency routes and safety signage among others.
- Assessment of risks involving hazardous substances i.e. receipt, storage & handling.

The responsibility for implementing this monitoring plan will be vested in the Department of Occupational Safety and Health Services and overall the management.

5.1.6.3 Indicator of success

The ideal indicators of success will include zero accidents and fatalities and reduction in the number of incidents and accidents at the site.

5.1.7 Energy monitoring plan

5.1.7.1 Introduction

The proposed development will exert an extra demand on energy mainly electricity for powering machine and equipment and for lighting purposes. The aim of the monitoring plan is to inform substantial practical guidelines for continuous improvement of consumption efficiency and identifying cost saving opportunities in energy efficiency.

5.1.7.2 Monitoring frequency

The monitoring frequency should be conducted once every three years by an energy expert certified by Energy and Petroleum Regulatory Authority (EPRA).

5.1.7.3 Monitoring strategy

Energy consumption should be monitored through power bills from the Kenya Power and the fuel consumption by the standby generators and other machinery on a monthly basis.

5.1.8 Soil monitoring plan

5.1.8.1 Introduction

Sampling and analyzing soil can provide useful information about the physical, chemical and biological condition of soil in a particular location. This information plays important role in solving soil-related problem or determine the extent of soil contamination for a remediation plan.

5.1.8.2 Monitoring parameter

The soil parameters to be monitored include moisture content, PH value, available nutrients such as Nitrogen and Phosphorus and heavy/trace metals. Although Kenya has not developed a specific environmental legislation on soil standards, it relies on existing legislation on pollution such as the Environmental Management and Coordination (Water Quality) Regulations, 2006 and the Kenya Constitution 2010 to prosecute environmental crimes on soil contamination.

5.1.8.3 Monitoring frequency

The soil monitoring frequency should be conducted at-least once every three years by an expert in collaboration with NEMA designated laboratory.

6 GOVERNANCE FRAMEWORK

6.1 Introduction

The Third Schedule of EIA/EA Regulations requires that environmental guidelines and standards which include Kenya government policies and strategies, national legislation and the institutional arrangements to render them should be incorporated in an ESIA report. The legal and institutional frameworks provide important safeguards for protection and conservation of fragile environments and vulnerable communities and enhance the implementation of the Environmental and Social Management Plans. Under this section, the ESIA will therefore review the applicable sets of laws, and institutions which environmental compliance requirements for the proposed project.

6.2 Policy Framework

6.2.1 National Environment Policy, 2013

The National Policy aims to provide a framework for an integrated approach to sustainable management of Kenya's environment and natural resources. In particular, it proposes to strengthen:

- Legal and institutional framework for good governance
- Integrate environmental management with economic growth, poverty reduction and improving livelihoods
- Research and capacity development
- Promote new environment management tools
- Promote collaboration and cooperation and partnerships in environment management
- Promote domestication, co-ordination and maximization of benefit from Strategic Multilateral Environment Agreements

Chapter 5 of the Policy discusses Environmental Stewardship and part 5.5 elaborates on industrialization and environment. Chapter 6 of the policy elaborates on environmental quality and health and the need to ensure a clean and health environment for all. The relevant policy statements for the proposed project include: 1) Develop and implement environmentally-friendly industrialization policy; 2) Develop and promote use of strategic environmental assessment in the industrial development plans, policies and programmes; and 3) Promote Resource Efficient and Cleaner Production (RECP) technologies, including best available techniques and applications.

6.2.2 National Food and Nutrition Security Policy, 2011

The Food and Nutrition Security Policy (FNSP) provides an overarching framework covering the multiple dimensions of food security and nutrition improvement. It has been purposefully developed to add value and create synergy to existing sectoral and other initiatives of government and partners. It recognizes the need for multi-public and private sector involvement, and that hunger eradication and nutrition improvement is a shared responsibility of all Kenyans. The policy and associated actions will remain dynamic to address contextual changes and changing conditions over time. This policy is framed in the context of basic human rights, child rights and women's rights, including the universal 'Right to Food'. The broad objectives of the FNSP are; to achieve good nutrition for optimum health of all Kenyans, increase the quantity and quality of food available, accessible and affordable to all Kenyans at all times and to protect vulnerable populations using innovative and cost-effective safety nets linked to long-term development.

6.2.3 Hazard Analysis and Critical Control Point (HACCP) Guidelines

The Hazard Analysis and Critical Control Point (HACCP), is a prevention-based food safety system. HACCP systems are designed to prevent the occurrence of potential food safety problems. This is achieved by assessing the inherent risks attributable to a product or a process and then determining the necessary steps that will control the identified risks. Essentially, HACCP is a system that identifies and monitors specific foodborne hazards (biological, chemical, or physical properties) that can

adversely affect the safety of the food product. This hazard analysis serves as the basis for establishing critical control points (CCPs). Critical Control Points (CCPs) identify those points in the process that must be controlled to ensure the safety of the food. Further, critical limits are established that document the appropriate parameters that must be met at each CCP. Monitoring and verification steps are included in the system, again, to ensure that potential risks are controlled. The hazard analysis, critical control points, critical limits, and monitoring and verification steps are documented in a HACCP plan. Seven principles have been developed which provide guidance on the development of an effective HACCP plan.

6.2.4 The National Industrialization Policy, 2012

Under Kenya vision 2030 and the Big Four Agenda, the manufacturing sector has been identified as the key driver for economic growth and development due to its immense potential in job and wealth creation, and its high potential to the realization of the Sustainable Development Goals (SDG). This policy framework focuses on value addition for both primary and high valued goods; and linkages between industrial sub-sectors and other productive sectors to drive the industrialization process and aims at providing strategic direction for the sector growth and development.

6.2.5 The National Health Policy 2014 - 2030

The goal of the Policy is to attain the highest possible standard of health in a responsive manner. The health sector aims to achieve this goal by supporting equitable, affordable, and high-quality health and related services at the highest attainable standards for all Kenyans. This Policy has six objectives which include; to eliminate communicable conditions, to halt and reverse the rising burden of non-communicable conditions and mental disorders, to reduce the burden of violence and injuries, to provide essential healthcare, to minimize exposure to health risk factors and to strengthen collaboration with private and other sectors that have an impact on health. This policy takes into account the functional responsibilities between the two levels of government (county and national) with their respective accountability, reporting and management lines. It proposes a comprehensive and innovative approach to harness and synergise health services delivery at all levels.

6.2.6 The National Water Services Strategy, 2004

This strategy was prepared so as to ensure sustainable access to adequate and affordable water and sewage services to all Kenyans through rehabilitated and expanded water supply and sewage systems and through efficient, responsive institutions. It aims to increase the urban and rural water supply from current coverage, reduce the unaccounted for water due to both technical and social losses and to increase the urban and rural water borne sewage collection, treatment and disposal coverage.

6.2.7 The National Land Policy, 2009

The National Land Policy guides the country towards efficient, sustainable and equitable use of land for prosperity and posterity. The Mission of the Policy aims at: promoting positive land reforms for the improvement of the livelihoods of Kenyans through the establishment of accountable and transparent laws, institutions and systems dealing with land. The overall objective of the Policy is 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. Specifically the policy offers a framework of policies and laws designed to ensure the maintenance of a system of land administration and management that will provide: a) All citizens with the opportunity to access and beneficially occupy and use land; b) Economically viable, socially equitable and environmentally sustainable allocation and use of land; c) Efficient, effective and economical operation of land markets; d) Efficient and effective utilization of land and land-based resources; and e) Efficient and transparent land dispute resolution mechanisms. Sustainable land use practices are key to the provision of food security and attainment of food self-sufficiency.

6.2.8 Kenya Vision 2030

The Kenya Vision 2030 is the national long-term development blueprint to create a globally competitive and prosperous nation with a high quality of life by 2030 in a clean and secure environment. It aims to transform Kenya into a newly industrializing middle-income country. The Vision is anchored on the economic, social, and political pillar. The proposed project falls under the economic pillar which aims to achieve an economic growth rate of 10% per annum and sustaining the same until 2030 in order to generate more resources to address the Sustainable Development Goals.

6.2.9 Kakamega County Integrated Development Plan 2018-2022

The overall aim of the County Integrated Development Plan (CIDP) is to increase and expand sustainable development opportunities and build people's capacities to enable them create wealth and transform their lives for growth and prosperity in line with the Kenya's Vision 2030, Big Four Agenda and the Sustainable Development Goals.

6.2.10 United Nations Sustainable Development Goals, 2015

The Sustainable Development Goals (SDGs) were adopted by all United Nations Member States in 2015 as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030. SDG 3 focuses on good health and well-being, SDG 6 focuses on clean water and sanitation by providing safe drinking water for all through investing in adequate infrastructure, providing sanitation facilities and encouraging hygiene. Protecting and restoring water-related ecosystems is also essential. SDG 7 focuses on affordable and clean energy by investing in solar, wind and thermal power and improving energy productivity. SDG 8 focuses on promoting sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all, through supporting development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encouraging the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services. SDG 9 focuses on building resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation. SDG 13 focuses on climate action in line with the infrastructure and transport sector. Butali Sugar Mills Limited supports the strategic development of Kenya thus facilitating growth of the local, national and regional economies.

6.3 Legislative Framework

6.3.1 The Constitution of Kenya, 2010

The Constitution of Kenya 2010 is the supreme law of the land. Under Chapter IV, article 42 provides for the right to a clean and healthy environment for all. Further, Chapter V of the Constitution deals with Land and Environment. Specifically, Part 2 elaborates on the obligations of the proponent in respect to protection of the environment and enforcement of environmental rights.

Relevance to the proposed project

- The proponent is entitled to a fair administrative decision-making process from NEMA and other State organs.
- The proponent must ensure that the development is carried out in an ecologically, economically and socially sustainable manner.
- The proponent should ensure that construction and operations of the facility do not infringe on the right to a clean and healthy environment for all.

6.3.2 The Climate Change Act, 2016

The Climate Change Act provides a regulatory framework for the development, management, implementation and regulation of mechanisms to enhance climate change resilience and low carbon development for the sustainable development of Kenya. It provides for mainstreaming of climate

change responses into development planning, decision making and implementation as well as resilience and adaptation in all governance sectors.

The United Kingdom hosted the 26th United Nations Climate Change Conference of the Parties (COP26) in Glasgow on 31st October – 13th November 2021. The summit brought parties together to accelerate action towards the goals of the Paris Agreement and the UN Framework Convention on Climate Change. It was the first since COP21 that expected parties to make enhanced commitments towards mitigating climate change; the Paris Agreement requires parties to carry out a process colloquially known as the 'ratchet mechanism' every five years to provide improved national pledges. The goals of the summit was to secure global net zero carbon emissions by 2050 and keep 1.5°C within reach, adapt to protect communities and natural habitats, mobilize finance and work together to deliver.

Relevance to the proposed project

- The proponent should develop a Climate Change Action Plan and implement measures to ensure low carbon footprint at the project area through incorporating low carbon technologies in order to reduce emission intensity.
- The proponent should install renewable energy infrastructure for lighting, energy efficient machines and ensure compliance with the Environmental Management and Coordination (Air Quality) Regulations, 2014.
- The proponent should support the local communities in climate change adaptation measures through investments in capacity building in agriculture, forestry and conservation among others as part of Corporate Social Responsibility (CSR).

6.3.3 The Environmental Management and Co-ordination Act (EMCA) Cap. 387 of the Laws of Kenya

The Act is the framework environmental law and aims to improve the legal and administrative co-ordination of the diverse sectoral initiatives in the field of environment so as to enhance the national capacity for its effective management. The Act harmonizes the sector specific legislations touching on the environment in a manner designed to ensure greater protection of the environment in line with the National Environment Policy, 2013.

Relevance to the proposed project

Section 58 of the Act requires proponents of a development likely to have deleterious effects on the environment to prepare and submit an EIA report to NEMA for consideration for decision making. This ESIA report is prepared to comply with the provisions of this section.

Regulations under the EMCA Cap. 387 of the Laws of Kenya

To operationalize EMCA, several Regulations have been gazetted since its enactment in 1999 and its amendment in 2015. These relevant ones are;

1. **Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003**

   These Regulations guide the preparation of EIA including how experts should conduct the EIA process and guidelines and standards to be met by the reports. The Regulations were reviewed in 2016 to align them to the Kenya Constitution 2010. They were also recently amended (2019) to address challenges that have been reported since they were gazetted. This report complies with the provisions of these Regulations.

2. **Environmental Management and Coordination (Water Quality) Regulations, 2006**
   These Regulations address the challenges of pollution of water resources and conservation. It consists of VI parts and eleven schedules dealing with protection of sources of water for domestic use to miscellaneous provisions. For the proposed development, the proponent and contractor should implement measures to prevent water pollution from construction activities and effluent discharge at operational phase. Once the facility is operational, the proponent should apply for and obtain an Effluent Discharge Licence from NEMA.

3. **Environmental Management and Coordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009**
   These Regulations were enacted pursuant to the provisions of Section 42 (3) of EMCA. One of the key objectives of the Regulations is to facilitate the sustainable utilization and conservation of resources on river banks, lake shores, and on the seashore by and for the benefit of the people and community living in the area. The proponent should comply with the provisions of this Regulations.

4. **Environmental Management and Coordination (Waste Management) Regulations, 2006**
   The Regulations focus on the management of solid waste, industrial waste, hazardous waste, pesticides, toxic substances and radioactive substances. In compliance with these Regulations, the proponent should ensure proper solid waste disposal throughout the project cycle and procure the services of a NEMA licensed contractor for solid waste management.

5. **Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009**
   These Regulations were gazetted to manage noise levels to levels that do not cause a disturbance to the public. The operations at the facility during construction and operations are likely to generate noise above the acceptable limits. Appropriate PPE should be provided to employees.

6. **Environmental Management and Coordination (Air Quality) Regulations, 2014**
   These regulations were aimed at controlling, preventing and abating air pollution to ensure clean and healthy ambient air. The activities of the proposed project will have a potential to pollute the air from construction works, dust emissions during crushing and processing of sugarcane, and stored bagasse during windy conditions, flue gases during sugar and briquette manufacture and exhaust fumes from machinery at the plant and vehicles. The proponent should undertake quarterly air quality monitoring, and apply for and obtain air emission license from NEMA.

6.3.4 Sugar Act, 2001

In April 2002, the Sugar Act of 2001 was enacted by parliament to define roles of major stakeholders in sugarcane industry including millers, sugarcane farmers and out-growers' organization. In addition, the act provides for the regulation of the cultivation of sugarcane and any other sugar-producing crop, the manufacturing, refining, marketing and disposal of sugar and its by-products. Further, Kenya Sugar Board is established under this Act as a body corporate and shall, among other things, regulate, develop and promote the sugar industry, license sugar mills and register millers.

Relevance to the proposed project

The proponent should comply with the provisions of this Act.

6.3.5 The Agriculture and Food Authority Act, 2013

It's an Act of Parliament to provide for the consolidation of the laws on the regulation and promotion of agriculture generally, to provide for the establishment of the Agriculture, Fisheries and Food Authority, to make provision for the respective roles of the national and county governments in agriculture excluding livestock and related matters in furtherance of the relevant provisions of the Fourth Schedule to the Constitution and for connected purposes.

Relevance to the proposed project

The proponent should comply with the provision of this Act.

6.3.6 Crops Act, 2013

It's an Act of Parliament to consolidate and repeal various statutes relating to crops; to provide for the growth and development of agricultural crops including the sugar sub-sector and for connected purposes.

Relevance to the proposed project

The proponent should comply with the provision of this Act.

6.3.7 Crops (Sugar) (General) Regulations, 2020

These Regulations implement the Crops Act, 2013. They guide the conduct of sugarcane millers, growers and out-growers.

Relevance to the proposed project

The proponent should comply with the provisions of this regulations i.e. regulation 18 (1) which requires the miller to develop and submit a sugarcane development plan to the Authority and the respective County Government and regulation 19 (2), which requires the miller to ensure that they have adequate milling capacity in accordance with the sugarcane development plan developed and submitted in accordance with Regulation 18.

6.3.8 Crops (Sugar) (Imports, Exports and By-Products) Regulations, 2020

These regulations were gazetted on 17th July 2020 aimed at regulating the import and export of sugar and by-products.

Relevance to the proposed project

In line with regulation 4 of the Crops (Sugar) (Imports, Exports and By-Products) Regulations, 2020, all persons intending to import brown sugar shall comply to the procedures for Importation of Brown Sugar and any other procedures as may be issued by the Authority from time to time.

6.3.9 The Food, Drugs and Chemical Substances Act, 2013

This Act states in part that:

Any person who sells any food that:

(a) Has in or upon it any poisonous or harmful substance; or

(b) Is unwholesome or unfit for human consumption; or

(c) Consists in whole or in part of any filthy, disgusting, rotten, decomposed or diseased substance or foreign matter; or

(d) Is adulterated,

Shall be guilty of an offence

Relevance to the proposed project

All the workers should frequently disinfect themselves while in the facility and undergo medical examination.

6.3.10 The Occupational Safety and Health Act, 2007

The OSHA, 2007 commenced on 26th October 2007. It is an Act of Parliament to provide for the safety, health and welfare of workers and all persons lawfully present at workplaces. Although the OSHA, 2007 repealed the Factories and Other Places of Work Act Cap. 514 of the Laws of Kenya, it inherited all the subsidiary legislation issued under Cap. 514. Examples of subsidiary legislation inherited include:

- Docks Rules L.N. 306 of 1962
- Eyes Protection Rules L.N. 44 of 1978
- Building Operations and Works of Engineering Construction Rules L.N. 40 of 1984
- Electric Power Special Rules L.N. 340 of 1979
- First Aid Rules L.N. 87 0f 1964
- Cellulose Solutions Rule L.N. 87 of 1964
- Health and Safety Committee Rules L.N. 31 of 2004
- Medical Examination Rules L.N. 24 of 2005
- Noise Prevention and Control Rules L.N. 25 0f 2005
- Fire Risk Reduction Rules L.N. 59 0f 2007
- Hazardous Substances Rules L.N. 60 of 2007

Relevance to the proposed project

Butali Sugar Mills Limited is registered as a workplace with the Directorate of Occupational Safety and Health Services. Moreover, the proponent should provide the workers with adequate and appropriate PPE and enforce their use at work.

6.3.11 Public Health Act, 2012

The Act aims at prohibiting activities that may be injurious to the general public. It outlines the responsibilities for the County Government to maintain a safe and clean environment by controlling the development activities during the construction and subsequent operational phases.

Relevance to the proposed project

The proponent should ensure compliance with the Act by providing clean, healthy and safe environment during construction and subsequent operation of the sugar mills.

6.3.12 The Water Act, 2016

The Constitution acknowledges access to clean and safe water as a basic human right and assigns the responsibility for water supply and sanitation service provision to the 47 established counties. The purpose of the 2016 Water Act is to align the water sector with the Constitution's primary objective of devolution. The Act establishes several organs to ensure development and sustainable use of water resources. These include the Water Resources Authority (WRA), the Water Sector Trust Fund (WSTF), Water Resources Users Associations (WRUAs), Water Services Providers (WSPs) and Water Works Development Agencies among others.

Relevance to the proposed project

The Water Act provides for the management, conservation, use and control of water resources and for the acquisition and regulation of rights to use water, to provide for the regulation and management of water supply and sewerage services. The proponent has valid water abstraction permits for River Chevaywa and the borehole.

6.3.13 The Energy Act, 2019

It's an Act of Parliament to consolidate the laws relating to the production, supply and use of energy and for connected purposes.

Relevance to the proposed project
The proponent is required to ensure that the energy supplied is consumed in accordance to the provisions of the Act and energy audits carried out after every three years.

6.3.14 The National Construction Authority Act, 2014
The Act aims at improving and regulating the construction industry in Kenya. The NCA is mandated to clear builders and contractors as a way of eliminating rogue contractors in Kenya and malpractices in the building and construction industry. The authority is tasked with the responsibility of inspecting construction and building projects around the country to ensure high quality of work and close projects posing health risks and collapse hazards.

Relevance to the proposed project
The proponent will ensure compliance with the provisions of the Act throughout the construction process.

6.3.15 The Physical and Land Use Planning Act, 2019
The Act provides for the planning, use, regulation and development of land and for connected purposes. It was enacted to ensure that every person engaged in physical and land use planning shall promote sustainable use of land and livable communities which integrates human needs in any locality. The Act allows the County Government to prepare a local physical and land use development plan in respect of a city, municipality, town or unclassified urban area.

Relevance to the proposed project
The proponent should also obtain approvals of the plans for plant and operational licenses from the County Government of Kakamega.

6.3.16 The Occupiers Liability Act Cap. 34
The Act regulates the duty that an occupier of premises owes to his visitors in respect of dangers due to the state of the premises or to things done or omitted to be done on them.

Relevance to the proposed project
The act requires that the occupier warn the visitors of the likelihood of dangers within his premises to enable the visitor to be reasonably safe.

6.3.17 The County Government Act, 2012
The new constitution grants County Governments the powers to grant or to renew business licenses or to refuse the same. To ensure implementation of the provisions of the new constitution, the County Governments are empowered to make by-laws in respect of all such matters as are necessary or desirable for the maintenance of health, safety and well-being of the general public.

Relevance to the proposed project
The Act gives right to access private property at all times by the County Government officers and servants for inspection purposes.

6.4 Institutional arrangements

To implement the above legal framework, the government has established a number of institutions with varying mandates of implementation. These include;

1. The National Environment Management Authority to implement the Environmental Management and Coordination Act and associated Regulations.
2. The Sugar Directorate to implement the Agriculture and Food Authority Act and subsidiary legislation.
3. The Directorate of Occupational Safety and Health Services to implement the Occupational Safety and Health Act alongside the subsidiary legislation.
4. The Water Resources Authority to implement the Water Act.
5. The County Government of Kakamega to implement the County Government Act, its by-laws, the Public Health Act, the Physical and Land Use Planning Act and the Occupiers Liability Act.

7 CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

The proposed project is considered important and beneficial to the country as it will address sugar demand, mitigate foreign exchange outflows and promote socio-economic growth of the area through increased income to farmers, employment creation and revenue to the government. Further, the project is in line with the Kakamega County Integrated Development Plan whose overall aim is to increase and expand sustainable development opportunities and build people's capacities to enable them create wealth and transform their lives for growth and prosperity.

Despite these benefits, the key environmental concerns that will result from the implementation of the proposed project include air and noise pollution, solid waste generation and management, increased water and energy demand, effluent generation, occupational safety and health risks and fire risks and emergencies. The ESIA study proposes a suite of Environmental and Social Management and Monitoring Plans to address the anticipated negative impacts during the project cycle and improving the environmental performance of the proposed project.

7.2 Recommendations

The main recommendation of the ESIA is the need for concerted implementation of the Environmental Management and Monitoring Plans by the proponent. The specific key ones include;

1. Procure and provide adequate PPEs to workers and enforce on their use
2. Use acceptable emission control technologies as per the Seventh Schedule of the Environmental Management and Coordination (Air Quality) Regulations, 2014. The technology to mitigate particulate matter will be mechanical collectors (dust cyclones, multicyclones) and particulate scrubbers, sulphur oxide will be wet scrubbers and nitrogen oxide will be NOx scrubbers
3. Procure and install adequate dust screens around the bagasse storage area
4. Ensure timely renewal of the air emission license from NEMA
5. Reduce the working hours for employees working at peak noise producing areas compared to those working in other areas
6. Use equipment that are properly fitted with noise reduction devices such as mufflers
7. Apply for and obtain license to emit noise/vibrations in excess of permissible levels as per the Fourth Schedule of Noise Regulations, 2009
8. Construct additional bagasse storage area to cater for the increased bagasse produced
9. Amend the contractual agreement with the NEMA licensed solid waste handler to include disposal of the excess bagasse
10. Monitor the quality of Effluent discharged from the ETP and proposed bio-digester
11. Ensure timely renewal of the Effluent Discharge License once the current one expires
12. Ensure timely renewal of the certificate of registration of a workplace
13. Procure and provide adequate firefighting equipment such as fire extinguishers, fire hose reels, smoke detectors, fire alarms and fire hydrants and place them strategically within the facility
14. Conduct annual fire safety audit and fire drills
15. Comply with the provisions of the Environmental Management and Coordination (Water Quality) Regulations, 2006
16. Comply with the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2006
17. Comply with the provisions of the Environmental Management and Coordination (Air Quality) Regulations, 2014
18. Comply with the provisions of the Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009
19. Comply with the provisions of the Occupational Safety and Health Act, 2007
20. Comply with the Used Oil Guidelines, 2017

On the basis of a commitment by the proponent to implement the proposed mitigation measures and the Environmental Management Plan, we recommend the issuance of an EIA License as per the Environmental Management and Coordination Act Cap. 387 of the Laws of Kenya.

8 REFERENCES

1. County Government of Kakamega, (2018). *Kakamega County Integrated Development Plan, 2018-2022*.
2. Government of Kenya (2019). 2019 Kenya Population and Housing Census, Kenya National Bureau of statistics.
3. Government of Kenya Policies
   - National Environment Policy, 2013
   - National Food and Nutrition Security Policy, 2011
   - Hazard Analysis and Critical Control Point (HACCP) Guidelines
   - The National Industrialization Policy, 2012
   - National Health Policy, 2014 – 2030
   - National Water Services Strategy, 2004
   - National Land Policy, 2009
   - Kenya Vision 2030
   - United Nations Sustainable Development Goals, 2015
4. Republic of Kenya Statutes:
   - Environmental Management and Coordination (Air Quality) Regulations, 2014
   - Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003
   - Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulation, 2009
   - Environmental Management and Coordination (Waste Management) Regulations, 2006
   - Environmental Management and Coordination (Water Quality) Regulations, 2006
   - Environmental Management and Coordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009
   - Environmental Management and Coordination Act Cap 387 of the Laws of Kenya
   - Environmental Management and Coordination Act No. 8 of 1999 (Rev. 2015)
   - The Constitution of Kenya, 2010
   - The Climate Change Act, 2016
   - The Agriculture and Food Authority Act, 2013
   - Crops Act, 2013
   - Crops (Sugar) (General) Regulations, 2020
   - Crops (Sugar) (Imports, Exports and By-Products) Regulations, 2020
   - The Food, Drugs and Chemical Substances Act, 2013
   - The County Government Act, 2012
   - The Energy Act, 2019
   - The Occupational Safety and Health Act, 2007
   - The Occupiers Liability Act, 2012
   - National Construction Authority Act, 2014
   - The Physical and Land Use Planning Act, 2019
   - The Public Health Act, 2012
   - The Water Act, 2016

9 LIST OF ANNEXURES

1. Copy of Title Deed for the proposed extension of sugar mills plant for Butali Sugar Mills Limited
2. Copy of Title Deed for the proposed extension of Effluent Treatment Plant for Butali Sugar Mills Limited
3. Copy of Certificate of Incorporation for Butali Sugar Mills Limited
4. Copy of Pin Certificate for Butali Sugar Mills Limited
5. Copy of the layout of the expansion of the factory and Effluent Treatment plant
6. Copy of sugar process flowchart
7. Copy of single Business Permit for the existing Butali Sugar Mills
8. Copy of certificate of registration of a workplace from DOSHS for the existing Sugar Mills
9. Copies of KEBs Certification for the existing sugar mills
10. Copy of EDL for the existing Effluent Treatment Plant
11. Copy of approval of the scoping report and Terms of Reference for the ESIA study
12. Copies of the baseline monitoring reports for ambient air, water quality and soil tests
13. Letters of Invitation and Evidence of Receipt by the stakeholders and community for the public consultative meeting
14. Copy of the public consultative meeting programme
15. Proceedings of the public consultative meeting held at the project site on 2nd August 2022
16. Copy of the public consultation attendance list
17. Copies of the public consultation questionnaires
18. Copies of the Bill of quantities
19. Copy of NEMA practicing license for the firm, Envasses Environmental Consultants Limited
20. Copy of NEMA practicing license for Lead Expert, Mr. Simon Nzuki
21. Copy of NEMA e-citizen payment receipt

1. Copy of Title Deed for the proposed extension of sugar mills plant for Butali Sugar Mills Limited

REPUBLIC OF KENYA

THE LAND REGISTRATION ACT

(*No.* 3 *of* 2012, *section* 108)

THE REGISTERED LAND ACT

(*Chapter* 300) (REPEALED)

Title Deed

Title Number N/KABRAS/MALAVA/3134

Approximate Area 2.53HA

Registry Map Sheet No. 15

This is to certify that BUTALI SUGAR MILLS LIMITED

is (are) now registered as the absolute proprietor(s) of the land comprised in the above-mentioned title, subject to the entries in the register relating to the land and to such of the overriding interests set out in section 28 of the Land Registration Act (No. 3 of 2012) as may for the time being subsist and affect the land.

GIVEN under my hand and the seal of the KAKAMEGA District Land Registry this 1ST day of FEBRUARY, 20 21

Land Registrar

Book 253

(To be completed only when the applicant has paid the fee of Sh. 125)

At the date stated on the front hereof, the following entries appeared in the register relating to the land:

EDITION: 1
OPENED: 2.8.2005

PART A—PROPERTY SECTION

REGISTRATION SECTION	EASEMENTS, ETC.	NATURE OF TITLE
N/KABRAS/MALAVA		
PARCEL NUMBER		
3134		
APPROXIMATE AREA 2.53 Ha. (TWO POINT FIVE THREE HACTARES)		ABSOLUTE
REGISTRY MAP SHEET No.		
15		

S/DIVISION OF 1464

PART B—PROPRIETORSHIP SECTION

ENTRY NO.	DATE	NAME OF REGISTERED PROPRIETOR	ADDRESS AND DESCRIPTION OF REGISTERED PROPRIETOR	CONSIDERATION AND REMARKS	SIGNATURE OF REGISTRAR
3	16.6.2009	BUTALI SUGAR MILLS LIMITED			
5	1.2.2021	TITLE	DEED ISSUED		

PART C – ENCUMBRANCES SECTION

ENTRY NO.	DATE	NATURE OF ENCUMBRANCE	FURTHER PARTICULARS	SIGNATURE OF REGISTRAR

Land Registrar

REPUBLIC OF KENYA

THE LAND REGISTRATION ACT

(*No.* 3 *of* 2012, *section* 108)

THE REGISTERED LAND ACT

(*Chapter* 300) (REPEALED)

Title Deed

2887567

MLS/TD/02/A2/02 No.

GPK (SP) 7164—600m—16/2017

2. Copy of Title Deed for the proposed extension of Effluent Treatment Plant for Butali Sugar Mills Limited

REPUBLIC OF KENYA

THE LAND REGISTRATION ACT

(*No.* 3 *of* 2012, *section* 108)

THE REGISTERED LAND ACT

(*Chapter* 300) (REPEALED)

Title Deed

Title Number NORTH KABRAS/MALAVA/4204

Approximate Area 0.6 HA.

Registry Map Sheet No. 15

This is to certify that BUTALI SUGAR MILLS LIMITED

NO. C111864 £ £

£ £ £

£ £ £ £

is (~~are~~) now registered as the absolute proprietor(~~s~~) of the land comprised in the above-mentioned title, subject to the entries in the register relating to the land and to such of the overriding interests set out in section 28 of the Land Registration Act (No. 3 of 2012) as may for the time being subsist and affect the land.

GIVEN under my hand and the seal of the

...KAKAMEGA.....District Land Registry

this....27TH.....day of.....MAY....., 20 ..22..

.....
Land Registrar

ETP

ETP.

(To be completed only when the applicant has paid the fee of Sh. 125)

At the date stated on the front hereof, the following entries appeared in the register relating to the land:

EDITION: 1
OPENED: 12.2.2013

PART A—PROPERTY SECTION

REGISTRATION SECTION	EASEMENTS, ETC.	NATURE OF TITLE
NORTH KABRAS/MALAVA		
PARCEL NUMBER		
4204		
APPROXIMATE AREA 0.6 Ha. (ZERO POINT SIX OF A HECTARE)		ABSOLUTE
REGISTRY MAP SHEET No.		
15		

PART B—PROPRIETORSHIP SECTION

SUB-DIV. OF 3637

ENTRY NO.	DATE	NAME OF REGISTERED PROPRIETOR	ADDRESS AND DESCRIPTION OF REGISTERED PROPRIETOR	CONSIDERATION AND REMARKS	SIGNATURE OF REGISTRAR
6.	26.5.2022	BUTALI SUGAR MILLS LIMITED	NO.C 111864		
7.	27.5.2022	TITLE	DEED	ISSUED	*252

ETP

PART C—ENCUMBRANCES SECTION

ENTRY NO.	DATE	NATURE OF ENCUMBRANCE	FURTHER PARTICULARS	SIGNATURE OF REGISTRAR
				G.O. Nyangweso 252

G.O. Nyangweso 252
Land Registrar

ETP

REPUBLIC OF KENYA

THE LAND REGISTRATION ACT

(*No.* 3 *of* 2012, *section* 108)

THE REGISTERED LAND ACT

(*Chapter* 300) (REPEALED)

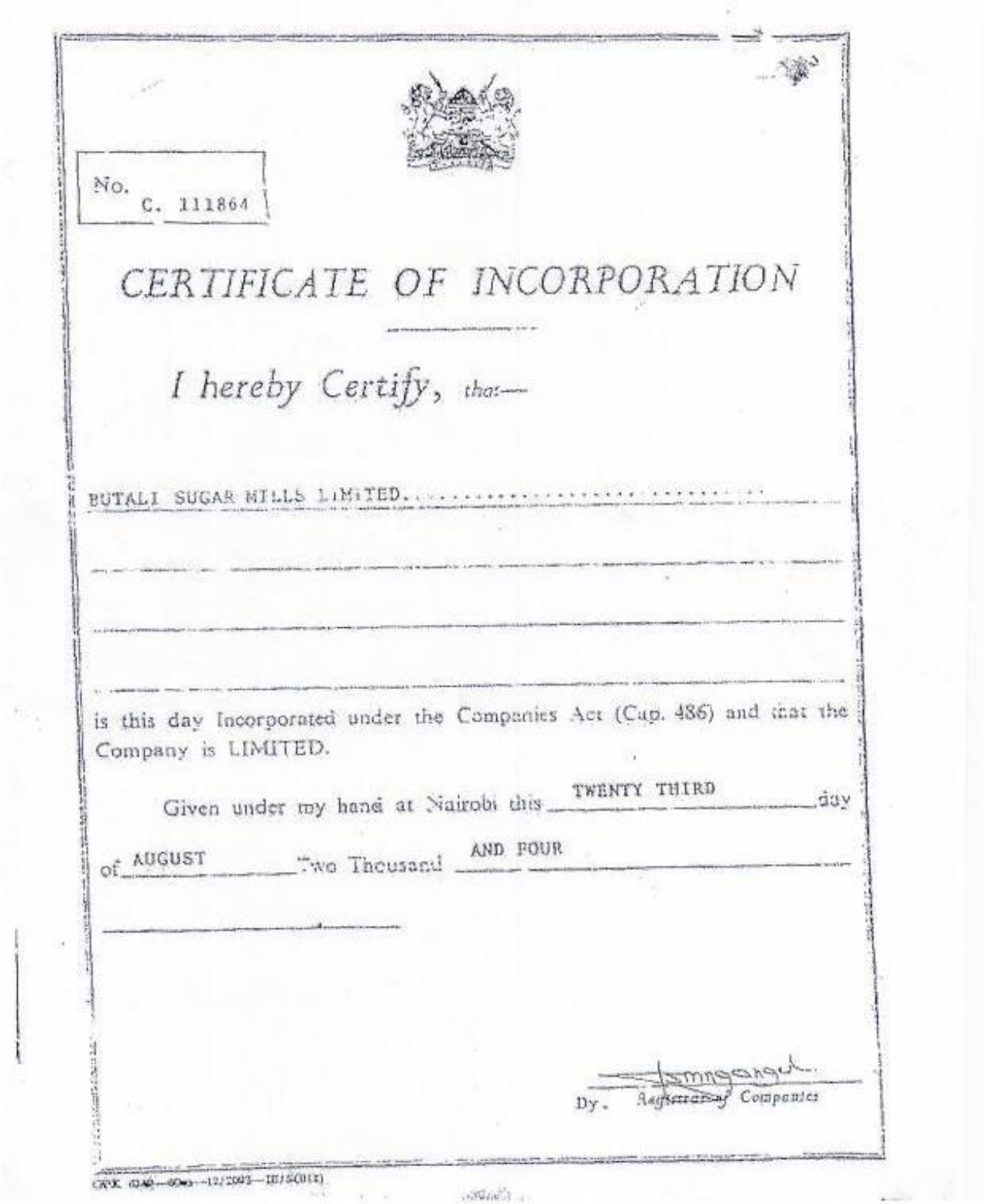
Title Deed

MLS/TD/02/A2/02 No. 4070411

ETP

GPK (SP) 7331—1m—05/2019

3. Copy of Certificate of Incorporation for Butali Sugar Mills Limited



No. C. 111864

CERTIFICATE OF INCORPORATION

I hereby Certify, that—

BUTALI SUGAR MILLS LIMITED

is this day Incorporated under the Companies Act (Cap. 486) and that the Company is LIMITED.

Given under my hand at Nairobi this TWENTY THIRD day of AUGUST Two Thousand AND FOUR

Dy. Registrar of Companies

4. Copy of Pin Certificate for Butali Sugar Mills Limited

KENYA REVENUE AUTHORITY

www.kra.go.ke

PIN Certificate

For General Tax Questions
Contact KRA Call Centre
Tel: +254 (020) 4999 999
Cell: +254(0711)099 999
Email: callcentre@kra.go.ke

Certificate Date : 14/10/2016

Personal Identification Number
P051163287C

This is to certify that taxpayer shown herein has been registered with Kenya Revenue Authority

Taxpayer Information

Taxpayer Name	BUTALI SUGAR MILLS LIMITED
Email Address	FINANCE@BUTALISUGAR.CO.KE

Registered Address

L.R. Number :	**Building :** BUTALI SUGAR COMPANY
Street/Road : KAKAMEGA - WEBUYE ROAD	**City/Town :** MALAVA
County : Kakamega	**District :** Kakamega North District
Tax Area : Butali	**Station :** LTO*
P. O. Box : 1400	**Postal Code :** 50205

Tax Obligation(s) Registration Details

Sr. No.	Tax Obligation(s)	Effective From Date	Effective Till Date	Status
1	Income Tax - Company	21/09/2004	N.A.	Active
2	Value Added Tax (VAT)	01/10/2005	N.A.	Active
3	Income Tax - PAYE	01/07/2005	N.A.	Active

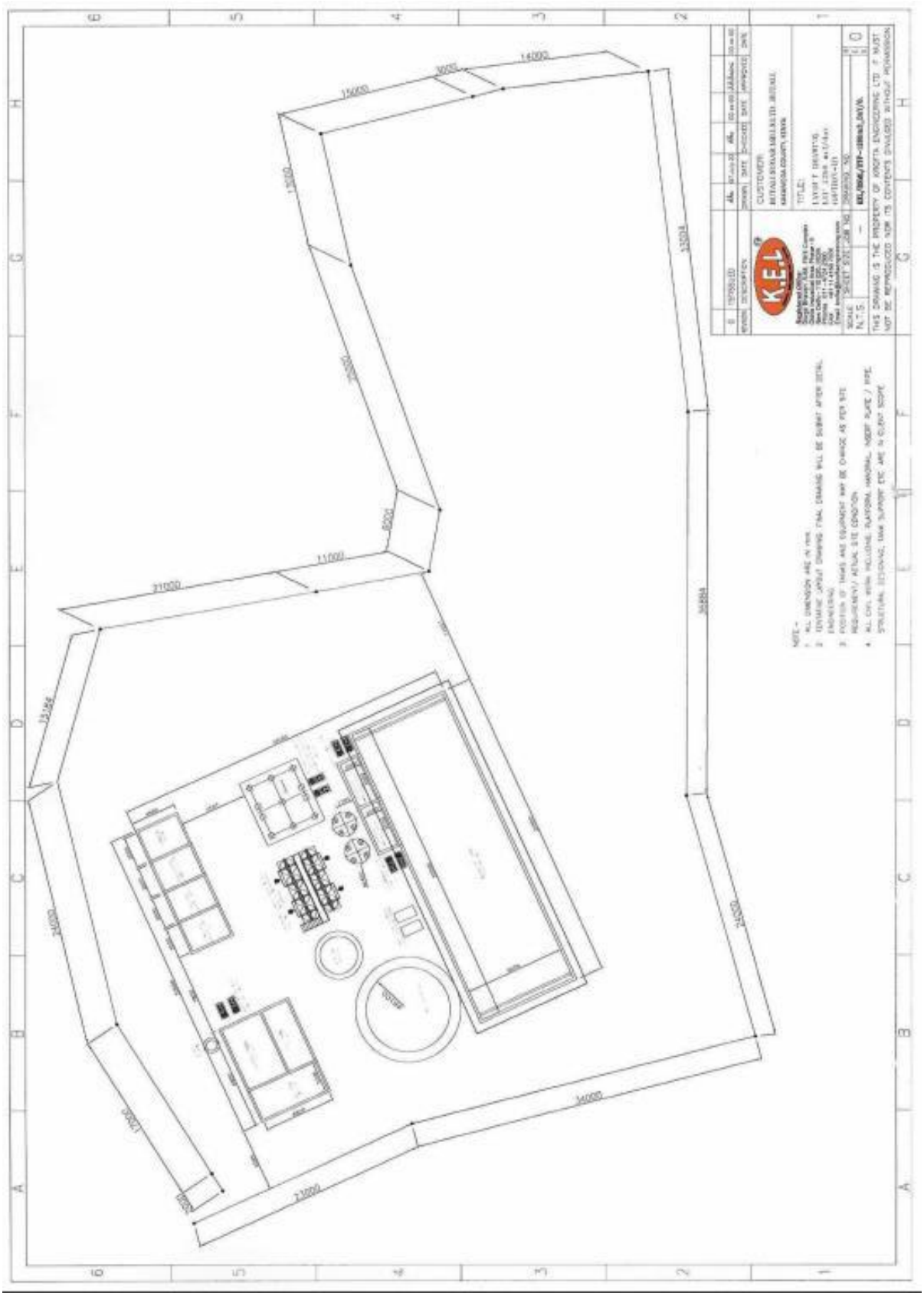
The above PIN must appear on all your tax invoices and correspondences with Kenya Revenue Authority. Your accounting end month is December unless a change has been approved by the Commissioner-Domestic Taxes Department. The status of Tax Obligation(s) with 'Dormant' status will automatically change to 'Active' on date mentioned in "Effective Till Date" or any transaction done during the period. This certificate shall remain in force till further updated.

* The station is subject to change based on the verification done by Commissoner.

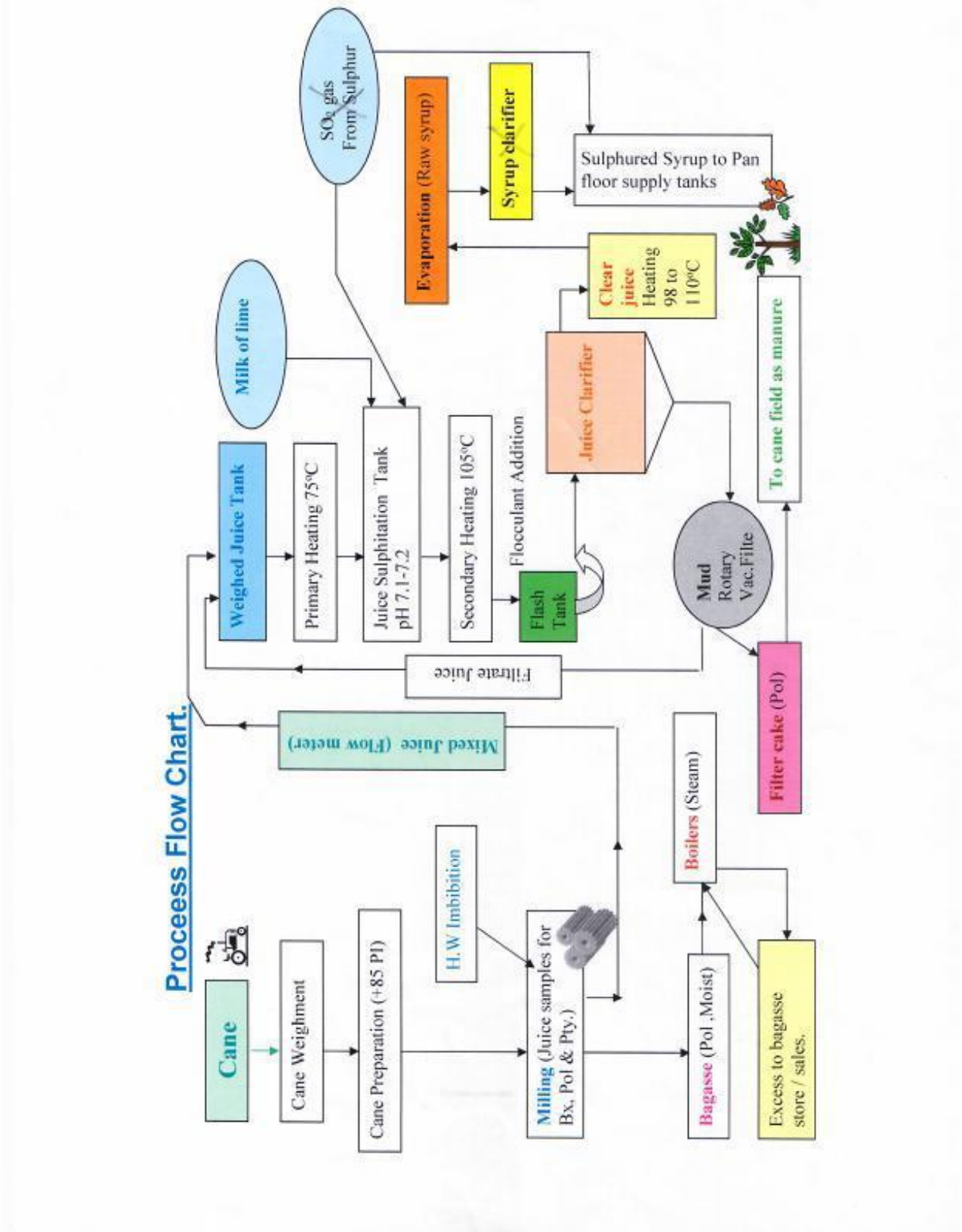
Disclaimer : This is a system generated certificate and does not require signature.

NAIROBI,Gatundu District,BARINGO, P.O.BOX 4545, GPO LTO.Tel 789676676

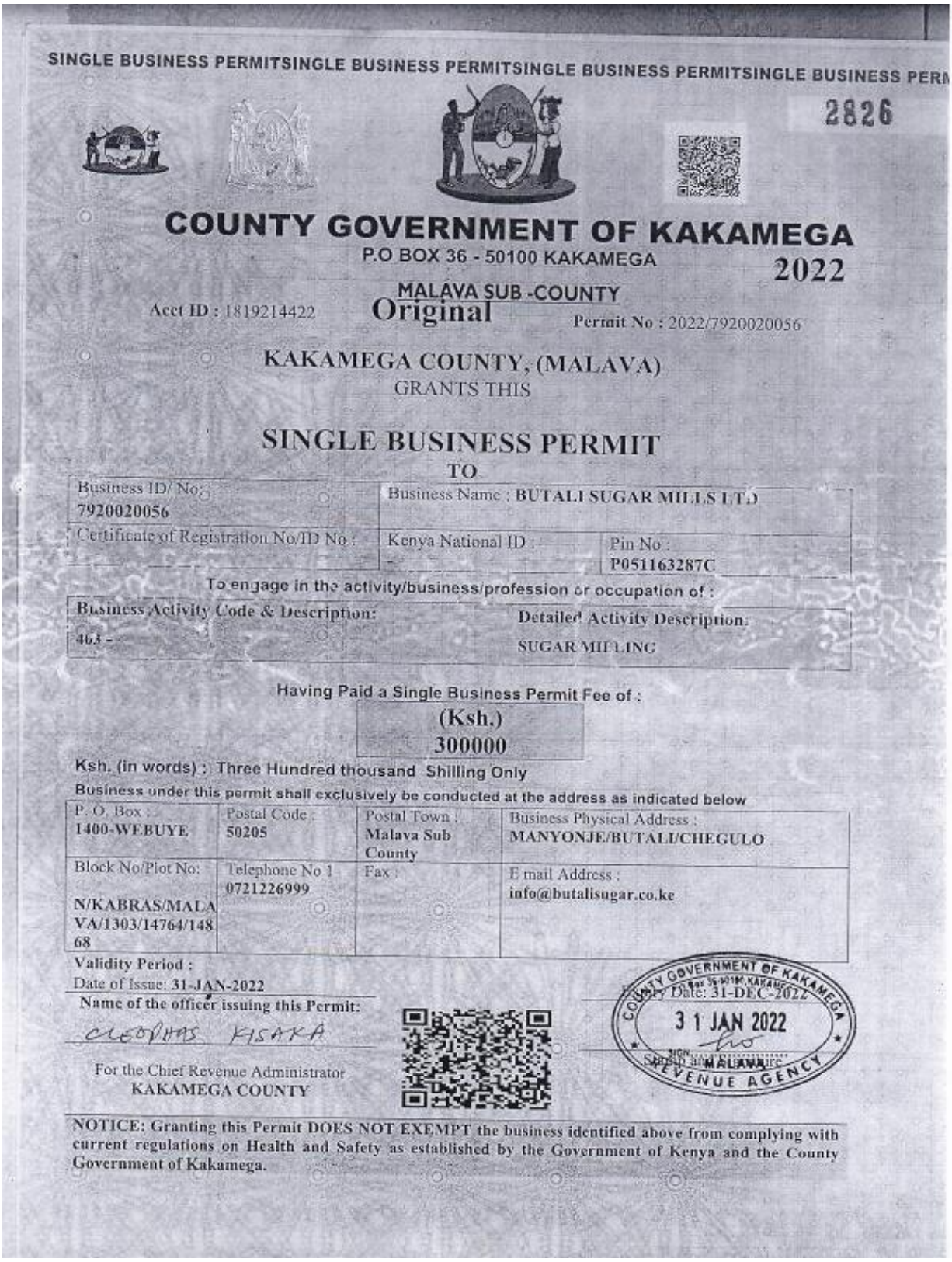
5. Copy of the layout of the expansion of the factory and Effluent Treatment plant



6. Copy of sugar process flowchart



7. Copy of single Business Permit for the existing Butali Sugar Mills



SINGLE BUSINESS PERMITSINGLE BUSINESS PERMITSINGLE BUSINESS PERMITSINGLE BUSINESS PERM

2826

COUNTY GOVERNMENT OF KAKAMEGA

P.O BOX 36 - 50100 KAKAMEGA

2022

MALAVA SUB -COUNTY

Acct ID : 1819214422 **Original** Permit No : 2022/7920020056

KAKAMEGA COUNTY, (MALAVA)

GRANTS THIS

SINGLE BUSINESS PERMIT

TO

Business ID/ No:	Business Name : BUTALI SUGAR MILLS LTD	
7920020056		
Certificate of Registration No/ID No :	Kenya National ID :	Pin No :
-	-	P051163287C

To engage in the activity/business/profession or occupation of :

Business Activity Code & Description:	Detailed Activity Description:
463 -	SUGAR MILLING

Having Paid a Single Business Permit Fee of :

(Ksh.)
300000

Ksh. (in words) : Three Hundred thousand Shilling Only

Business under this permit shall exclusively be conducted at the address as indicated below

P. O. Box :	Postal Code :	Postal Town :	Business Physical Address :
1400-WEBUYE	50205	Malava Sub County	MANYONJE/BUTALI/CHEGULO
Block No/Plot No:	Telephone No 1	Fax :	E mail Address :
N/KABRAS/MALAVA/1303/14764/14868	0721226999		info@butalisugar.co.ke

Validity Period :

Date of Issue: 31-JAN-2022

Date: 31-DEC-2022

Name of the officer issuing this Permit:

CLEOPHAS KISAKA

For the Chief Revenue Administrator
KAKAMEGA COUNTY

COUNTY GOVERNMENT OF KAKAMEGA
31 JAN 2022
MALAVA
REVENUE AGENCY

NOTICE: Granting this Permit DOES NOT EXEMPT the business identified above from complying with current regulations on Health and Safety as established by the Government of Kenya and the County Government of Kakamega.

8. Copy of certificate of registration of a workplace from DOSHS for the existing Sugar Mills

DOSH 22

S. No. 0008540

Certificate No 0008540-02-22-R
Date of Issue 03-Feb-22
Date Of Expiry 29-Jan-23

REPUBLIC OF KENYA

THE OCCUPATIONAL SAFETY AND HEALTH ACT, 2007

CERTIFICATE OF REGISTRATION OF A WORKPLACE

I hereby certify that the workplace named below has been duly registered in pursuance of sections 44/45(6) of the Occupational Safety and Health Act, No. 15 of 2007

Name of Occupier: BUTALI SUGAR MILLS LTD

Address: P. O. Box 1400 - 50205 WEBUYE

Plot No.: N/K/M 303 Street/Road: CHEBWAI RD

Town: BUTALI County: KAKAMEGA District: KAKAMEGA

Nature of Work: MANUFACTURE OF SUGAR

Reg. Fee: KShs. 2000 **OSH Fund: KShs.** 3000

for Director of Occupational Safety and Health Services

NOTE

This Certificate is valid only in respect of the Occupier and Workplace named above

This Certificate is issued under, and solely for the purposes of the Occupational Safety and Health Act and is without prejudice to the requirements of any other legislation relating to the workplaces

9. Copies of KEBs Certification for the existing sugar mills

ORIGINAL FORM STA/2 (R.4)

EBS KEBS KEBS KEBS KEBS KEBS KEBS KEBS KEBS KEBS KEBS KEBS KEBS KEBS KEBS KEBS KEBS KEBS KEBS KEBS KEB

PERMIT TO USE THE STANDARDIZATION MARK

THE STANDARDS ACT (CAP. 496 OF THE LAWS OF KENYA)

PERMIT IS GRANTED TO :

NAME OF FIRM: BUTALI SUGAR MILLS LTD.

POSTAL ADDRESS: P.O BOX 1400 WEBUYE

PHYSICAL ADDRESS: KAKAMEGA WEBUYE ROAD

TELEPHONE NO.: 07717676/7

FAX NO. : 020-2631169

E-MAIL ADDRESS: butalisugar@africaonline.co.ke

STANDARDIZATION MARK NO. : 10498

EFFECTIVE FROM: 2021-02-15

EXPIRES ON.: 2023-02-14

DATE OF ISSUE: 2021-03-10

to use the standardization mark specified in the first row hereunder upon and in respect of the commodity and brand specified in the second and third rows there of, which commodity, conform to the standard specification in the fourth row.

1 STANDARDIZATION MARK	KEBS STANDARDIZATION MARK
2 DESCRIPTION OF THE COMMODITY UPON WHICH THE STANDARDIZATION MARK IS TO BE USED	BROWN SUGAR
3 BRAND NAME	BUTALI SUGAR
4 STANDARD SPECIFICATION (Number and Title)	KS EAS 749 :2010 East African Standard Specification for Brown Sugars

NOTE: 1. EVERY PERMIT HOLDER SHALL PAY AN ANNUAL FEE IN RESPECT OF EACH PERMIT GRANTED OR RENEWED

2. THIS PERMIT IS ISSUED SUBJECT TO THE CONDITIONS SET OUT OVER LEAF

MANAGING DIRECTOR / AUTHORIZED OFFICER

KENYA BUREAU OF STANDARDS

KEBS KEBS KEBS KEBS KEBS KEBS KEBS KEBS KEBS

Kenya Bureau of Standards

Cert-01

10. Copy of EDL for the existing Effluent Treatment Plant

Form B (r.17(1))

Serial No: .....

nema

mazingira yetu | ubai wetu | wajibu wetu

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

EFFLUENT DISCHARGE LICENSE

License No : NEMA/WQ/EDL/10948

Application Reference No: NEMA/WQ/EDA/10875

OFFICIAL USE:

This is to certify that the application for discharge to aquatic environment received from (name of applicant)

Butali Sugar Mills LTD of 1400 Webuye

(address) to the National Environmental Authority in accordance with the Environmental Management and Co-ordination (Water Quality) Regulations, 2006 for

Effluent Treatment Plant

(facility) located at **North/Kabras/Malava/303** (locality and district) to

discharge effluent to **River Chebaywa** has been evaluated and a license is hereby issued for discharge, subject to attached conditions.

Expiry date 12/31/2022

Dated : **1/14/2022**

Signature

(Seal)

Director General

The National Environment Management Authority.

P.T.O.

ISO 9001: 2015 Certified

11. Copy of approval of the scoping report and Terms of Reference for the ESIA study

nema

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY

Mobile Lines: 0724-253 398, 0723-363 010, 0735-013 046
Telkom Wireless: 020-2101370, 020-2183718
Incident Lines: 0786-101100, 0741-101100

P.O. Box 67839, 00200
Popo Road, Nairobi, Kenya
E-mail: dgnema@nema.go.ke
Website: www.nema.go.ke

NEMA/TOR/5/2/461

27th July, 2022

Head of Administration
Butali Sugar Mills Limited
P.O Box 1400 - 50205
WEBUYE, KENYA

RE: TERMS OF REFERENCE (TOR) FOR ENVIROMENTAL IMPACT ASSESSMENT FOR THE PROPOSED EXTENSION OF BUTALI SUGAR MILLS ON PLOTS L.R. NO. N/KABRAS/MALAVA/3134 AND NORTH KABRAS/MALAVA/4204 IN MANYONJE AREA, KAKAMEGA COUNTY

We acknowledge the receipt of your TOR for the above subject.

Pursuant to the Environmental Management and Coordination Act, 1999, the Environmental (Impact Assessment and Audit) Regulations 2003 and Legal notice 31 & 32 of 2019, your terms of reference for the Environmental Impact Assessment (EIA) for the **PROPOSED EXTENSION OF BUTALI SUGAR MILLS ON PLOTS L.R. NO. N/KABRAS/MALAVA/3134 AND NORTH KABRAS/MALAVA/4204 IN MANYONJE AREA, KAKAMEGA COUNTY** has been approved.

You shall submit ten (10) copies, a soft copy summarised version of the ESMP in WORD form and one electronic copy of your report prepared by a registered expert to the Authority.

MARRIAN KIOKO
HEAD OF EIA SECTION

Our Environment, Our Life, Our Responsibility

ISO 9001:2015 Certified

12. Copies of the baseline monitoring reports for ambient air, water quality and soil tests

Polucon
At your service

BUTALI SUGAR MILLS LIMITED
P.O BOX 1400-50205
WEBUYE, KENYA

TEST REPORT NO: 202216010531	
SAMPLE	**WATER**
DATE & PLACE SUBMITTED	**03rd August 2022 at Polucon Laboratory, Mombasa.**
DATE ANALYSIS STARTED	**04th August 2022**
SAMPLING METHOD	**N/A**
MARKINGS	**--**

TESTS	TEST METHOD	RESULTS	UNITS	KS EAS 12: 2018: NATURAL POTABLE WATER SPECIFICATION
PHYSICAL-CHEMICAL TESTS				
*Appearance	APHA 2110	**Turbid**	--	Unobjectionable
*Odour	APHA 2150 B	Unobjectionable	--	Unobjectionable
Suspended Matter	APHA 2540D	**Detectable**	--	Not Detectable
*Colour hazen units	APHA 2120B	37	TCU	50 Max
pH value	APHA 4500-H^+	7.81	@ 25.0°C	5.5 Min – 9.5 Max
Conductivity,	APHA 2510 B	789.2	µS/cm	2000 Max
*Total dissolved solids	APHA 2540 C	436.8	mg/L	1500 Max
Total hardness as $CaCO_3$	KS05-459-2	112	mg/L	600 Max
Chlorides as Cl^-	KS 05-459-5	72.9	mg/L	250 Max
*Aluminium as Al	APHA 3111D	<0.02	mg/L	0.2 Max
Manganese as Mn	APHA 3111B	<0.01	mg/L	0.1 Max
Iron as Fe	APHA 3111B	0.02	mg/L	0.3 Max
Sodium as Na	APHA 3111B	82.26	mg/L	200 Max
Magnesium as Mg	APHA 3111 B	13.66	mg/L	100 Max
Calcium as Ca	APHA 3111B	41.33	mg/L	150 Max
Lead as Pb	APHA 3111B	<0.01	mg/L	0.01 Max
Copper as Cu	APHA 3111B	0.01	mg/L	1.0 Max
*Fluoride as F^-	PQA/LIM/061	0.2	mg/L	1.5 Max
Potassium as K	APHA 3111B	7.94	mg/L	50 Max
*Sulphates as SO_4	APHA 4500-SO_4 B	27.42	mg/L	400 Max
*Residual Chlorine as Cl_2	ISO 7393-2	<0.1	mg/L	Absent
MICROBIOLOGICAL TESTS				
Total plate count @ 37°C	ISO 6222	**170**	cfu/ml	50 Max
Total plate count @ 22°C	ISO 6222	**190**	cfu/ml	100 Max
Total coliform count	ISO 9308-1	**13**	cfu/100ml	Absent
Escherichia coli	ISO 9308-1	Not detected	cfu/100ml	Absent
Pseudomonas aeruginosa	ISO 16266	Absent	per 100ml	Absent

**********End of test results**********

Comment: Based on the above tests only, the water does not conform to the referenced specification for natural potable water due to high total coliform, total plate count, presence of suspended matter and its turbid appearance.

Mombasa Lab
10th August 2022

Analyst
S. Mugi – *Chemist*

Technical signatory
J. Onsinyo – *Lab manager*

POLUCON SERVICES (K) LTD KENYA
P.O. BOX 99344 - 80107, MOMBASA

*"Indicates test(s) not covered under the KENAS accreditation schedule.
Where a statement of conformity is made, the following decision rules are applied not considering uncertainties: 'conform/comply' – Results are within limits while 'does not conform/comply' – Results exceed limits
This test report and/or certificate is issued subject to Polucon Services (K) Limited Standard Terms and Conditions, a copy of which is available on request, and, cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful, and offenders may be prosecuted to the fullest extent of the law.
"Unless otherwise stated the results shown in this test report refer only to sample(s) tested and such sample(s) are retained for 90 days only if non-perishable)."

Page 1 of 1

Polucon
At your service

BUTALI SUGAR MILLS LIMITED
P.O BOX 1400-50205
WEBUYE, KENYA

TEST REPORT NO: 202216010530	
SAMPLE	**SOIL**
DATE & PLACE SUBMITTED	**03rd August 2022 at Polucon Laboratory, Mombasa**
DATE ANALYSIS STARTED	**04th August 2022**
SAMPLING METHOD	**N/A**
MARKINGS	**--**

TEST	METHOD	RESULTS	UNITS	REQUIRED SPECIFICATIONS
METALS				
Moisture Content	EPA 1316	18.62	%m/m	--
Organic Matter	PQA/LIM/104	0.57	mg/kg	--
pH Value	EPA 9045D	7.36	@25°C	--
Nitrogen	EPA 350.1	0.04	mg/kg	--
Chromium as Cr	EPA 3050 B	1.58	mg/kg	--
Arsenic as As	EPA 3050 B	<0.01	mg/kg	--
Posphorous as P	PQA/LIM/020	7.06	mg/kg	--
Cadmium as Cd	EPA 3050 B	<0.01	mg/kg	--
Potassium as K	EPA 3050 B	10.97	mg/kg	--
Calcium as Ca	EPA 3050 B	40.22	mg/kg	--
Magnesium as Mg	EPA 3050 B	12.87	mg/kg	--
Sulphur as S	EPA 3050 B	<0.01	mg/kg	--
Sodium as Na	EPA 3050 B	95.06	mg/kg	--
Chloride as Cl^-	PQA/LIM/081	4.27	mg/kg	--
Copper as Cu	EPA 3050 B	3.33	mg/kg	--
Manganese as Mn	EPA 3050 B	1.17	mg/kg	--
Iron as Fe	EPA 3050 B	7.09	mg/kg	--
Zinc as Zn	EPA 3050 B	3.28	mg/kg	--
Boron as B	EPA 3050 B	0.02	mg/kg	--
Arsenic as As	EPA 3050 B	<0.01	mg/kg	--
Nickel as Ni	EPA 3050 B	<0.01	mg/kg	--
Aluminium as Al	EPA 3050 B	2.12	mg/kg	--
Molybdenum as Mo	EPA 3050 B	<0.01	mg/kg	--

**********End of test results**********

Limit of Quantification (LOQ) = 0.01 mg/kg

Mombasa Lab
10th August 2022

Analyst
S. Mugi – *Chemist*

Technical signatory
J. Onsinyo – *Lab manager*

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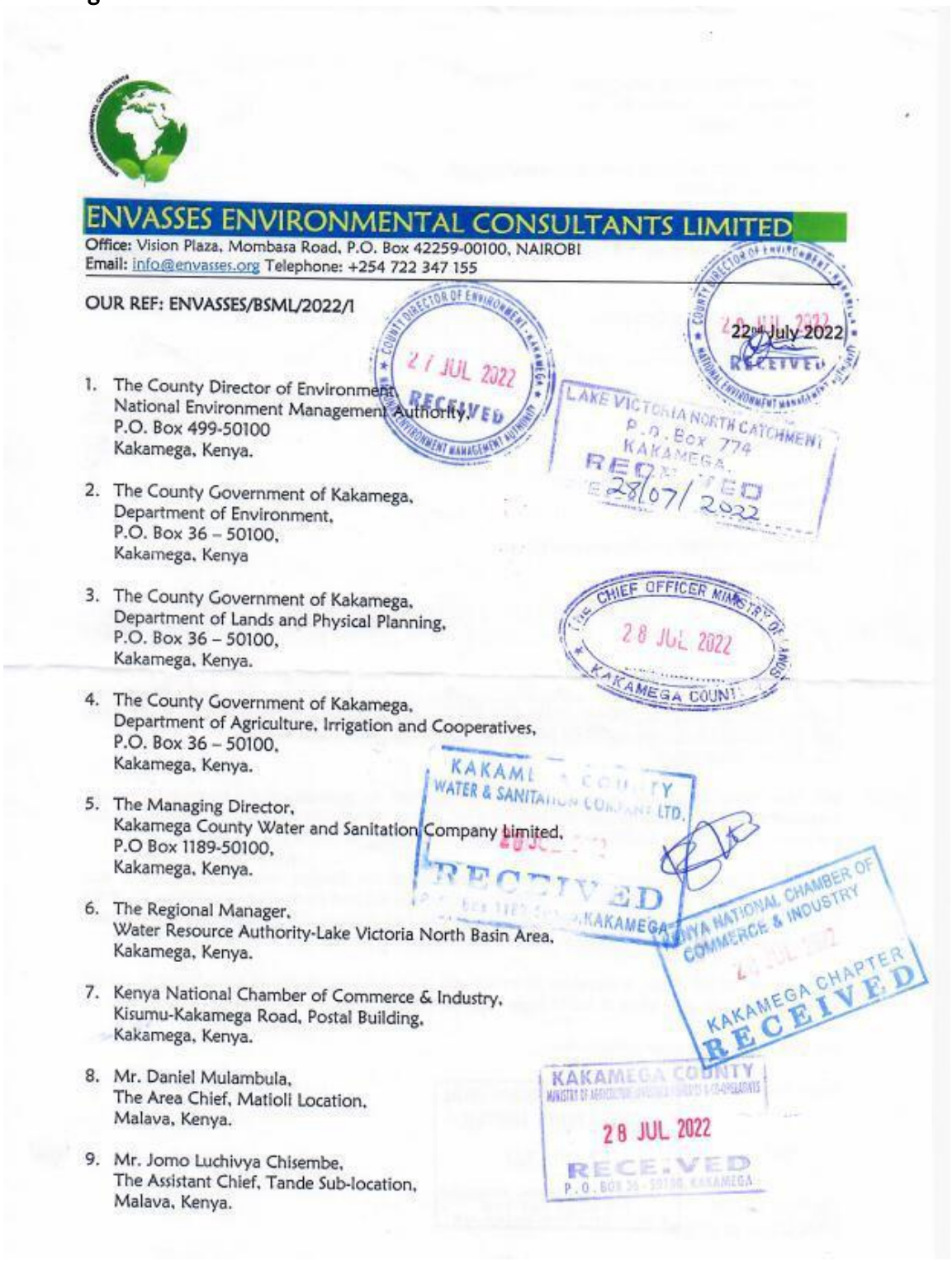
NB: This report relates to submitted sample(s) only. The source and/or markings are as provided by the customer.

P.O. BOX 99344 - 80107, MOMBASA

1 of 1

13. Letters of Invitation and Evidence of Receipt by the stakeholders for the public consultative meeting



ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED

Office: Vision Plaza, Mombasa Road, P.O. Box 42259-00100, NAIROBI
Email: info@envasses.org Telephone: +254 722 347 155

OUR REF: ENVASSES/BSML/2022/1

22nd July 2022

1. The County Director of Environment,
   National Environment Management Authority,
   P.O. Box 499-50100
   Kakamega, Kenya.
2. The County Government of Kakamega,
   Department of Environment,
   P.O. Box 36 – 50100,
   Kakamega, Kenya
3. The County Government of Kakamega,
   Department of Lands and Physical Planning,
   P.O. Box 36 – 50100,
   Kakamega, Kenya.
4. The County Government of Kakamega,
   Department of Agriculture, Irrigation and Cooperatives,
   P.O. Box 36 – 50100,
   Kakamega, Kenya.
5. The Managing Director,
   Kakamega County Water and Sanitation Company Limited,
   P.O Box 1189-50100,
   Kakamega, Kenya.
6. The Regional Manager,
   Water Resource Authority-Lake Victoria North Basin Area,
   Kakamega, Kenya.
7. Kenya National Chamber of Commerce & Industry,
   Kisumu-Kakamega Road, Postal Building,
   Kakamega, Kenya.
8. Mr. Daniel Mulambula,
   The Area Chief, Matioli Location,
   Malava, Kenya.
9. Mr. Jomo Luchivya Chisembe,
   The Assistant Chief, Tande Sub-location,
   Malava, Kenya.

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   Kisumu-Kakamega Road, Postal Building,
   Kakamega, Kenya.

8. Mr. Daniel Mulambula,
   The Area Chief, Matioli Location,
   Malava, Kenya.

   Received on 27/7/22
   Area Chief.

9. Mr. Jomo Luchivya Chisembe,
   The Assistant Chief, Tande Sub-Location,
   Malava, Kenya. Received

10. Mr. Geoffrey Lucheli Washisino,
    Nyumba Kumi- Manyonje area

Tel: 07 21341983

11. Butali Sugarcane Out-growers Company Limited,
P.O. Box 29-50103,
Malava, Kenya.

12. Butali Sugarcane Farmers Association,
Malava, Kenya.

13. Chebwai Adventist Complex,
P.O. Box 51-50205,
Webuye, Kenya.

DEPUTY PRINCIPAL
CHEBWAI SDA SECONDARY SCHOOL
* 27 JUL 2022 *
P.O. BOX 51-50205, WEBUYE

14. Manyonje Primary School,
P.O. Box 229-50103,
Malava, Kenya.

15. Manyonje Friends Quakers Church,
Malava, Kenya.

16. Chebwai Holiness and Repentance Church,
Malava, Kenya.

Dear Sir/Madam,

RE: INVITATION TO A STAKEHOLDER CONSULTATIVE MEETING ON THE PROPOSED EXTENSION OF BUTALI SUGAR MILLS ON PLOTS L.R. NOS. N/KABRAS/MALAVA/3134 AND NORTH KABRAS/MALAVA/4204 IN MANYONJE AREA, KAKAMEGA COUNTY.

The above subject refers.

We have been contracted by Butali Sugar Mills Limited to prepare an Environmental Impact Assessment (ESIA) Study Report for the proposed extensions of their plant. The extensions will double the plant capacity from 2,500 Tonnes of Canes per Day (TCD) to 5,000 TCD.

The ESIA study is prepared pursuant to Section 58 of the Environmental Management and Coordination Act Cap 387 of the Laws of Kenya. Under the Act and particularly Regulation 17 of the Environmental Impact Assessment and Audit (EIA/EA) Regulations, 2003, the potentially project affected persons are required to participate in the EIA process.

The purpose of this letter is therefore to invite you to a stakeholder consultative meeting on 2nd August 2022 starting at 10am at Butali Sugar Mills Limited premises.

We look forward to your participation.

Yours sincerely,

Mr. Simon Nzuki
Chief Executive Officer

14. Copy of the public consultative meeting programme

Environmental and Social Impact Assessment Study for the Proposed extension of Butali Sugar Mills in Manyonje area, Kakamega County.

Community Consultative Meeting to be held at Butali Sugar Mills in Tande Sub-location on 2nd August 2022.

Programme

Time	Agenda Item	Presenter/responsibility
09:30 am	Arrival and registration	Envasses Environmental Consultants Limited
10:00 am	Prayer and introductions	Area Chief - Matioli Location
10:10 am	Overview of the proposed project	Envasses Environmental Consultants Limited/Proponent
11:00 am	Questions, comments and reactions on presentation	Plenary
11:45 am	Way forward	Envasses Environmental Consultants Limited
12:00 noon	AOB	Envasses Environmental Consultants Limited
12:05 pm	Prayer/Closure of meeting	Envasses Environmental Consultants Limited
12:05 pm	**Departure**	

15. Proceedings of the public consultative meeting held at the project site on 2nd August 2022

Environmental and Social Impact Assessment Study Report for the Proposed Extension of Butali Sugar Mills on Plots L.R. Nos. N/Kabras/Malava/3134 and North Kabras/Malava/4204 in Manyonje area, Kakamega County.

Task: Proceedings of the public consultative meeting held on 2nd August 2022 at Butali Sugar Mills Limited.

Prepared by:

Envasses Environmental Consultants Limited,
P.O. Box 42259-00100,
Nairobi, Kenya.
Tel: +254 722 347 155
Email: info@envasses.org

Proponent

Butali Sugar Mills Limited,
P.O. Box 1400-50205,
Webuye, Kenya.

1. Introduction

The proponent, Butali Sugar Mills Limited, is proposing to expand the existing sugar mills plant which have a capacity to crush of capacity 2,500 to 5,000 Tonnes of Sugarcane per Day (TCD). Pursuant to Section 58 of the Environmental Management and Coordination Act Cap 387 of the Laws of Kenya, the company has contracted Envasses Environmental Consultants Limited to prepare an Environmental and Social Impact Assessment (ESIA) Study Report. Accordingly, the contractor in collaboration with Butali Sugar Mills Limited and the local administration organized a stakeholder engagement meeting at the project site to sensitize them on the proposed project and seek their comments on the proposal consistent with EMCA requirements (Figure 1).

The meeting was called to order by Mr. Daniel Chimuche, the area chief-Matioli Location at 11.00 am and opened with a word of prayer by Mr. Emmanuel Luku from Muvundi village. After the prayers, the area Chief welcomed the stakeholders and proceeded to introductions.

Figure 1: A section of the participants who attended the stakeholder engagement meeting at Butali Sugar Mills Premises (Source: Public consultative meeting, August 2022).

2. Overview of the proposed project

Ms. Martha Muhonia from Butali Sugar Mills Limited thanked the stakeholders for attending the meeting and proceeded to give an overview of the proposed project. Ms. Muhonia informed the meeting that Butali Sugar Mills Limited proposes to expand the existing sugar mills plant of capacity 2,500 to 5,000 Tonnes of Sugarcane per Day. She added that the proposed project will include a modernized state of art Effluent Treatment Plant (ETP) of capacity 1,260m³/day to ensure efficient management of effluent from the plant. Further, Ms. Muhonia highlighted that a power turbine and steam boiler of capacity 12MW and 70TPH respectively will be installed to meet the increased energy demand for sugar production. She then invited Ms. Rhoda Mutua from Envasses to address the meeting.

Ms. Mutua cited the legal basis of the meeting as per Section 58 of the Environmental Management and Coordination Act Cap. 387 of the Laws of Kenya and the Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003 where public participation in the ESIA process is a mandatory requirement. She highlighted the key steps of the ESIA process including

gathering the views and concerns of the stakeholders about the proposed project and assessing the social and environmental impacts of the project. She then invited the participants to give their views, concerns and comments regarding the proposed project.

3. Plenary session

Mr. Patrick Butalanyi from Chebwai area, had no objection to the proposed project and mentioned that the expanded capacity may lead to water quality degradation at River Chevaywa. Mr Butalanyi wanted to know if there are measures put in place to curb the potential pollution. In response, Ms. Muhonja stated that the effluent treatment plant to be put in place will be of a high capacity and modern technology for efficient treatment. She further mentioned that the company collaborates with the Water Resource Authority to carry out water quality sampling and analysis every quarter for the existing sugar mills and will continue to do for the proposed extension.

Mr. Emmanuel Simiyu and Brown Wanami from Muyundi and Tande areas respectively were concerned whether there will be reduced manpower. Ms. Muhonja responded and informed the participants that the technology to be used will not substitute manpower with robots instead the expansion of the sugar mills will require more manpower.

Ms. Lilian Lumbasi from Chebwai area mentioned that the expansion of the sugar mills will create job opportunities for youth and women and most farmers will be able to sell the sugarcane and get income to pay school fees.

Mr. Mulupi Wanakacha resident of Butali, had no objection to the proposed extension and thanked the proponent for taking into consideration the modern art of technology for Effluent Treatment Plant (ETP). Mr. Wanakacha added that the proposed project will create employment opportunities thus leading to reduced illegal activities among the youths.

Mr. Meshack M. Karani resident of Chebwai was keen to know whether there will be environmental issues related with the wastewater treatment technology. In response, Ms. Muhonja stated that the technology incorporated in the design plans will effectively manage the effluent.

Mr. Benea Chikati from Chebaywa area noted that the production operations release ash that if not addressed sticks on cloths, roof and vegetables. Ms. Muhonja responded and stated that Butali Sugar Mills Limited will use electrostatic precipitators in place of the current mechanical dust collectors to efficiently control the emissions. Ms. Mutua further added that the proponent will carry out air/stack emissions monitoring as a way to effectively manage the emissions levels and ensuring compliance with the Environmental Management (Air Quality) Regulations, 2014.

Mr. Chikati wanted to know the progress of the electrical transmission agreement between the proponent and the community. Ms. Muhonja responded and informed the participants that Butali Sugar Mills Limited is not authorized to supply and transmit electricity. She added that unresolved issues exist between the proponent and the Kenya Power Lighting Company Limited (that has been given the mandate and power for electrical transmission in the Country).

Mr Muterwa Shirachira was keen to know whether manure provided by the proponent have any impacts. In response, Ms. Muhonja stated that the filter mud is always tested after every 2hours to confirm the quality before it's sold to farmers.

Mr. Fred Nyongesa from Butali area noted that during drought season there's increased dust emissions along the access road and requested the proponent to implement measures to address it. In response, Ms. Muhonja stated that the company will enhance the use of molasses to manage the dust. She further mentioned that Butali Sugar Mills will display speed limit signage along the road and sensitize drivers on speed limits.

Ms. Maureen Masinde from Tande area wanted to know whether the proponent will need to acquire land from the community in-case of future expansion of the sugar mills. Ms. Muhonja stated that the existing expansion is projected for the next 10 years and land acquisition decisions will be made by the company management. She added that if need will arise for land acquisition, there will be an agreement between the proponent and the community.

Mr. John Chisembe from Tande area mentioned that Butali Sugar Mills Limited has done a lot in terms of Community Social Responsibility (CSR) that includes the provision of sanitary towels to schools, provisions of desks to schools and construction of wards at Chebwai Dispensary amongst others. He further requested Butali Sugar Mills Limited to support education of children from poor background within the area as part of their CSR.

Mr. John Lucheli, the Director of farmers from Butali/Chegulo ward thanked the proponent for choosing to carry-out the extension in their area. Mr. Lucheli suggested if possible for the proponent can expand the crashing capacity of the plant to 10,000TCD. He further mentioned that the expansion of the sugar mills will provide market for the overgrown sugarcane, create employment opportunities for the youth and women, increase rental income and permits will be acquired easily.

Mr. William Lipo, the Chairman, Butali Farmers stated that the farmers fully support the expansion of the sugar mills. Mr. Lipo further mentioned that with the expansion of the plant capacity, the farmers will be able to acquire the permits without delays.

Mr John L Chisembe, the office of Assistant Chief-Tande Sub-location, had no objection to the proposed extension and he requested the proponent to enhance and implement measures that ensures River Chevaywa is not polluted.

Mr. Caleb Makunda, the office of the Assistant Chief- Shipala Sub-location, had no objection to the proposed project and he urged the community members to provide support to any development within the area. He further stated that the proponent should enhance the CSR and ensure the local community benefit.

Ms. Roselida Ogutu, the Sub-County Agricultural Officer, thanked the proponent for the proposed extension. Ms. Ogutu stated that the agricultural office serves the interest of farmers and as the proposed expansion will increase the income of farmers, provide market for local goods and services, she urged the proponent to ensure that the project does not affect the existing crops, air and water quality.

4. Way forward

Ms. Mutua noted that the views and issues raised by the community will be incorporated in the ESIA Study Report and submitted together with the final report to National Environment Management Authority (NEMA) for decision making. Additionally, she mentioned that the proposed project will be advertised for a period of thirty (30) days in a newspaper with nationwide circulation, the Kenya Gazette and local radio station inviting the public to submit oral and written comments on the proposed project to NEMA.

5. Closure of the meeting

There being no other business, the meeting ended at 12.05pm with a word of prayer from Mr. Jafred Mola Ndalusia.

ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
03 AUG 2022
P.O. Box 2013-80100, MOMBASA
Tel: 0723 347 155
Email: info@envasses.org

Signed: _____ Date: 03 AUG 2022

Ms. Fridah Khamalisha,
Envasses Environmental Consultants Limited
Meeting Secretary

DANIEL CHIMUCHE CHIEF DATE..... SIGN..... MATIOLI LOCATION

Signed: _____ Date: 03-08-2022

Mr. Daniel Chimuche
Area Chief –Matioli Location

16. Copy of the public consultation attendance list

ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
Office: Vision Plaza, Mombasa Road, P.O. Box 42259-00100, NAIROBI
Email: info@envasses.org Telephone: +254 722 347 155

Environmental and Social Impact Assessment Study Report for the Proposed Extension of Butali Sugar Mills on Plots L.R. Nos. N/KABRAS/MALAVA/3134 and NORTH KABRAS/MALAVA/4204 in Manyonje area, Kakamega County.

Public Consultative Meeting held at Butali Sugar Mills Limited Premises on 2nd August 2022.

Attendance list

NO.	NAME	AFFILLIATION	TELEPHONE NO/EMAIL	SIGN
1.	CHIEF DANIEL CHIMUGHE	SNR. CHIEF-MATIOLI	0725863755	
2.	WILLIAM KOPI	CHAIRMAN BUTALI FARMERS	0)2227545	
3.	REUBEN S. KWALANDA	ASSISTANT CHIEF-MUKHUAKALIA	0725838932	
4.	JOHN L. CHISEMBE	ASSISTANT CHIEF-TANDIE	0713513259	
5.	CHEBUSIT KONYONI	ASS. CHIEF BUTALI	0723462135	

NAME	AFFLIATION	TEL. NO	SIGN
FCPA Wycliffe Khisiu	KNCCI-Kakamega Chairman	0722362190	
Nickel Tari	CEO KNCCI Kakamega	0796735557	
	BUTAL	0727641705	
MELAB CHITAI			
EDITH Mulati	CHEBWAI	0715174931	
CATHERINE N. SAMITA	TANDE	0720129276	
ENOS AVUBE ONYANGO	MANYONJETRIENDS(TANDE)	0722942488	
Alfred Musina	manyonje/Tande	0729667579	
Yohana Mulindi	CHEWBWAI	0707250453	
RABECCA MUWPI	BUTAL	0720386169	
JEDIDA ADEMO	BUTALI	0724495107	
REUBEN MAKUNDA	SHIPALA	0728582244	
Kennedy Wambwaya	Chebwai	0727136262	
Nyongesa Wambunya	Shipala	0726241260	
Richard Kotuka	Shipala	0724691442	
Noel Mayenze	Butali	0723404721	
Loice BROWN	manyonje	0790020599	
Beronira Majimbo	manyonje	0719751340	
Martha D. Muhonja	HSE-Butali		
Fridah K. Khamalishi	Envasses Environmental	0704063064	
Rhodah Mutua	Consultant Limited	0726721393	

NO.	NAME	AFFILLIATION	TELEPHONE NO/EMAIL	SIGN
6.	CALEB MAKUNDA	ASSISTANT CHIEF, SHIPALA	Calebmakunda@gmail.com 0727683063	
7.	ROSELIDA OGUTU	SCAO – MALAVA	0718723669	
8.	LINET OYANGI	TANDE	0713840988	
9.	EUNICE K. ONAMU	TANDE	0714885013	
10.	SAUPA TABAYO NAWIRE	BUTALI	0712793919	
11.	ANDREA MURUVA	CHEPTULI	0742093531	
12.	ROBERT MUNGAFU	TANDE	0722325218	
13.	CHARLES MULOLWE	BUTALI	0708015366	
14.	JUMA MWINAMO	TANDE	0723435871	
15.	JOSPHAT TUSA	TANDE	0712983714	
16.	STEPHE SINDIKHA	CHEPTULI	0706328265	
17.	CHARLES OMOR	TANDE	0702475309 0702475309	
18.	HARBAI SHIVINA	TANDE	0725399384	

NO.	NAME	AFFILLIATION	TELEPHONE NO/EMAIL	SIGN
	LOICE MAMBILI	~~0791034467~~ CHEBWAI	0791034467	[signature]
19.	DINAH A. MICHELI	TANDE	0725899215	[signature]
20.	LILIAN I. MUKAISI	BUTALI	0718072560	Mukaisi
21.	EBBY M. ISAAC	CHEBWAI	0799069674	[signature]
22.	BROWN WAMAMI	TANDE	0712774706	[signature]
23.	MESHACK M KARANI	CHEBWAI	0701812277	[signature]
24.	ALFRED WAFULA	BUTALI	0720575937	[signature]
25.	ESTHER ENOCK	TAHIBE	0742726984	[signature]
26.	FRANCIS INDM AWILI	TANDE	0729433590	[signature]
27.	SIKALIA MBAKAYA	Chepyli	0704842497	[signature]
28.	WORI OKENGE	MUKAVAKAVA	0717164528	[signature]
29.	RUBIA MASINDE	TANDE	0748164293	[signature]
30.	CHARLES S. Kibanyi	TANDE	0704644060	[signature]
31.	LILAH LUMBASI	CHEBWAI	0713026258	[signature]

ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
Office: Vision Plaza, Mombasa Road, P.O. Box 42259-00100, NAIROBI
Email: info@envasses.org Telephone: +254 722 347 155

Environmental and Social Impact Assessment Study Report for the Proposed Extension of Butali Sugar Mills on Plots L.R. Nos. N/KABRAS/MALAVA/3134 and NORTH KABRAS/MALAVA/4204 in Manyonje area, Kakamega County.

Public Consultative Meeting held at Butali Sugar Mills Limited Premises on 2nd August 2022.

Attendance list

NO.	NAME	AFFILLIATION	TELEPHONE NO/EMAIL	SIGN
1.	HEZRON MUKANGAI SHITANDA	MATIOLI	07225 79824	
2.	JOHN MULUPI LUCHELI	FUKOYE	0700741138	
3.	NATHAN INZAI	MUYUNDI	0706078666	
4.	ALFONZI MUTELWA	FUKOYE	0720801940	
5.	BENEA CHIKATI	CHEBAIWA	0720262995	

NO.	NAME	AFFILIATION	TELEPHONE NO/EMAIL	SIGN
6.	MULUPI .W. WANAKACHA	BUTALI	0721998792	
7.	SOLOMON LIJODI	BUTALI	0714132184	
8.	JOSEPH MURUNGA	MUYUNDI	0728 05 0787	
9.	TITO MURUNGA	BUTALI	0719314199	
10.	BROWN LUCHINYA	MANYONIE	0717144065	
11.	PETER WETATIA	"	0729250422	PETED
12.	JAFRED MOLA NDALUSIA	MATOLA	0715006577	
13.	BOAZ WANAMI.	TANDE	0701839426	
14.	PETER MUSOTSI	BUTALI	0707364178	
15.	RICHARD CHIBUYI	MATIDI-I	0713580879	
16.	FANUEL ANYELA	TANDE B	0704065603	
17.	RODRIC SHITANDA.	BUTALI	0708162735	
18.	PATRICK WANAKACHA	NAMANIA	0719231639	Patrick

NO.	NAME	AFFILIATION	TELEPHONE NO/EMAIL	SIGN
19.	Florence Lubaba	Tande B	0718138012	[signature]
20.	Emmanuel Luka	Muyundi	0724282068	[signature]
21.	Jaspa M. Mulupi Inzai	Muyundi	0727063486	[signature]
22.	Brian Mulanda	Manyonje	0769191878	[signature]
23.	HENRY SHITANDA	LUNYILONI	0795457593	[signature]
24.	Solomon Kokota	CHEPTULI	0711742873	[signature]
25.	JOTHAM SITOKO	TANDE	0715377064	[signature]
26.	FRED NYONGESA	BUTALI	0740522217	[signature]
27.	Peter Liambira Sikolia	Cheptuli	0792623110	[signature]
28.	PATRICK BUTALANYI	CHEBWAI	0724234064	[signature]
29.	Alex Lwausi	Tande	0757180905	[signature]
30.	Zebedayo Wanami	Tande	07222335[illegible]	[signature]
31.	Tabitha N. Nyongesa	Cheptuli	07111994[illegible]	[signature]

17. Copy of public Participation Questionnaires

ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
Vision Plaza, Mombasa Road
P.O. Box 42259-00100, NAIROBI
Email: info@envasses.org; Telephone: +254 722 347 155

18th July, 2022

Our Ref: ESIA/BUTALI SUGAR MILLS/2022

PUBLIC CONSULTATIONS QUESTIONNAIRE

Dear Neighbor to Butali Sugar Mills Limited,

ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED EXTENSION OF BUTALI SUGAR MILLS, KAKAMEGA COUNTY.

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The ESIA study is carried out pursuant to Section 58 of the Environmental Management and Coordination Act Cap 387 of the Laws of Kenya and Environmental Management and Co-ordination (Impact Assessment and Audit) Regulations, 2003. The results of the ESIA will be used for the management of the proposed extension to reduce potential environmental, safety and health risks to the general public.

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ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
18 JUL 2022
P.O. Box 2013 - 80100, MOMBASA
Tel: 0722 347 155
Email: info@envasses.org

Yours sincerely,

Mr. Simon Nzuki
Chief Executive Officer and Lead Consultant

This letter is to be acknowledged to confirm that the neighbor has received it and the questionnaire

About the questionnaire

This questionnaire has four parts. Part I and II provide details of the interviewer and the respondent's profile. Part III seeks baseline information from the stakeholders who are likely to be affected by the proposed project. Kindly fill part II-IV and seek clarifications where necessary from the interviewer or from the lead consultant on 0722 347 155 or email: info@envasses.org.

Part 1: Interviewer Profile	
Name of interviewer	Omar Said
Position/Title	Environmental Assistant
Date	18/07/2022
Signature	

Part II: Respondent's Profile	
Names	Josephine Mulesda
Plot Number	—
Gender (Male, Female, N/A for companies)	Female
Position of respondent (For companies)	—
Occupation/type of business	
Approximate distance from site	<50m
Period of residency in the area (<5, >5years)	6 Years
Telephone contact	07—
ID No. or Registration No. for businesses	—
Signature	

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them) Increased cases of respiratory diseases to children esp. during drought season as windy season
Part IV: Objections and impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☑ No ☐ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project?	Yes ☐ No ☑ If yes, list them

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes ☑ No ☐ If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social Impacts of the proposed project	**Proposed mitigation measures**
Dust emission from baggasses esp. during drought season Increases cases of respiratory diseases esp. from baggasses	

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18th July, 2022

Our Ref: ESIA/BUTALI SUGAR MILLS/2022

PUBLIC CONSULTATIONS QUESTIONNAIRE

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ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
18 JUL 2022
P.O. Box 2013 - 80100, MOMBASA
Tel: 0722 347 155
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Yours sincerely,

Mr. Simon Nzuki
Chief Executive Officer and Lead Consultant

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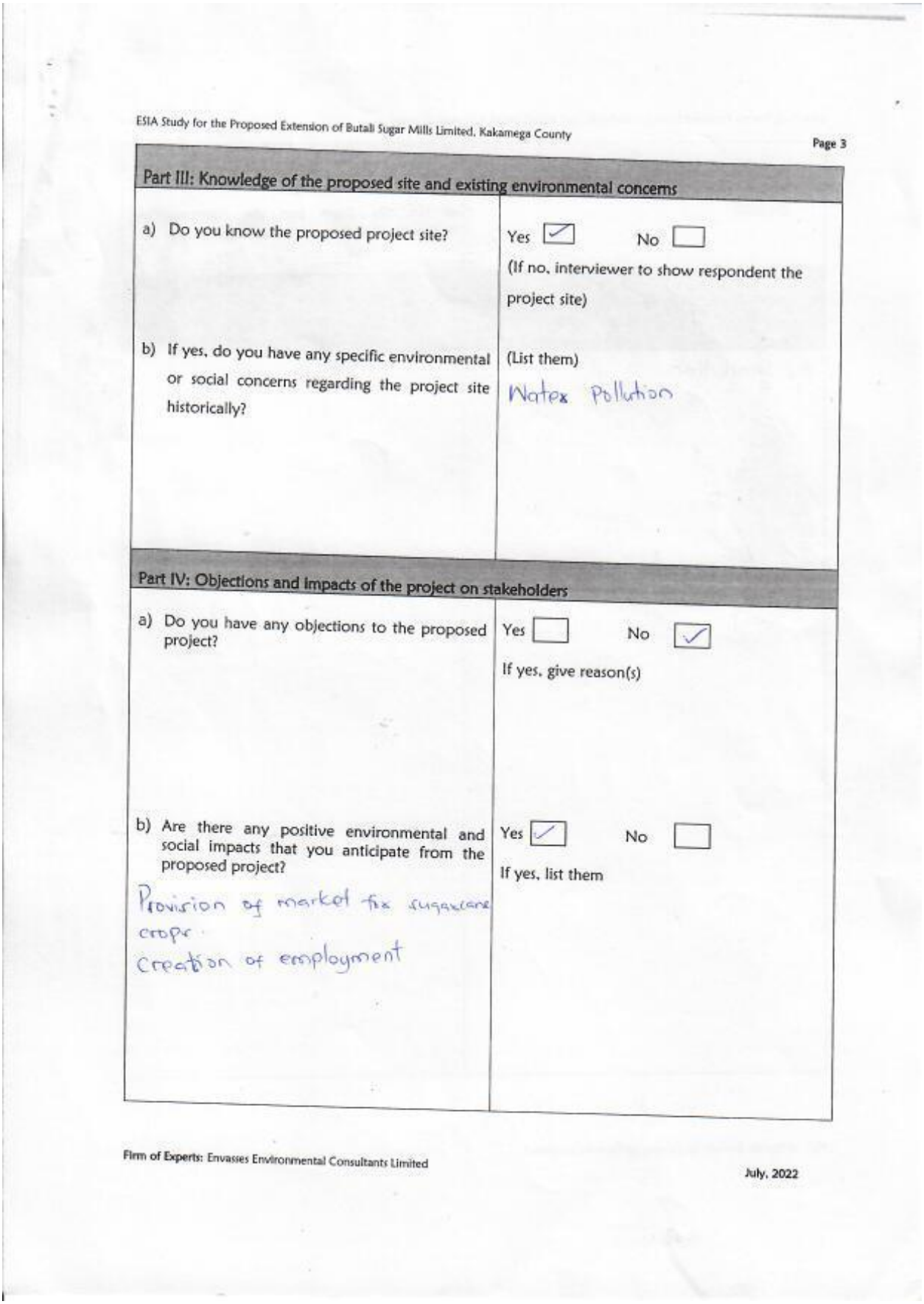
Part 1: Interviewer Profile	
Name of interviewer	Omar Said
Position/Title	Environmental Assistant
Date	18/07/2022
Signature	

Part II: Respondent's Profile	
Names	Elphas Ongaya
Plot Number	
Gender (Male, Female, N/A for companies)	Male
Position of respondent (For companies)	
Occupation/type of business	Farmer (small scale)
Approximate distance from site	< 5km
Period of residency in the area (<5, >5years)	>20years
Telephone contact	0712890743
ID No. or ~~Registration No. for businesses~~	8585881
Signature ~~Elphas~~	Elphas



ESIA Study for the Proposed Extension of Butali Sugar Mills Limited, Kakamega County

Page 3

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them) Water Pollution
Part IV: Objections and impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☐ No ☑ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project? Provision of market for sugarcane crops Creation of employment	Yes ☑ No ☐ If yes, list them

Firm of Experts: Envasses Environmental Consultants Limited

July, 2022

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes ☑ No ☐ If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social impacts of the proposed project	**Proposed mitigation measures**
Air pollution	

ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
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18th July, 2022

Our Ref: ESIA/BUTALI SUGAR MILLS/2022

PUBLIC CONSULTATIONS QUESTIONNAIRE

Dear Neighbor to Butali Sugar Mills Limited,

ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED EXTENSION OF BUTALI SUGAR MILLS, KAKAMEGA COUNTY.

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18 JUL 2022
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Part 1: Interviewer Profile	
Name of interviewer	Omar Said
Position/Title	Environmental Assistant
Date	18/07/2022
Signature	

Part II: Respondent's Profile	
Names	Rose Likhodio
Plot Number	—
Gender (Male, Female, N/A for companies)	Female
Position of respondent (For companies)	—
Occupation/type of business	Farmer
Approximate distance from site	100 m
Period of residency in the area (<5, >5years)	7 years
Telephone contact	0723306073
ID No. or Registration No. for businesses	11739069.
Signature	

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them) Water from baggase Pollutes water in the river Cnearby

Part IV: Objections and Impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☐ No ☑ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project?	Yes ☐ No ☑ If yes, list them

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes ☑ No ☐ If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social impacts of the proposed project	**Proposed mitigation measures**
Bagasse dust emission	

ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
Vision Plaza, Mombasa Road
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Email: info@envasses.org; Telephone: +254 722 347 155

18th July, 2022

Our Ref: ESIA/BUTALI SUGAR MILLS/2022

PUBLIC CONSULTATIONS QUESTIONNAIRE

Dear Neighbor to Butali Sugar Mills Limited,

ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED EXTENSION OF BUTALI SUGAR MILLS, KAKAMEGA COUNTY.

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18 JUL 2022
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Part 1: Interviewer Profile	
Name of interviewer	Omar Said
Position/Title	Environmental Assistant
Date	18/07/2022
Signature	

Part II: Respondent's Profile	
Names	Jeremiah Gideon
Plot Number	
Gender (Male, Female, N/A for companies)	Male.
Position of respondent (For companies)	
Occupation/type of business	Farmer
Approximate distance from site	< 50m
Period of residency in the area (<5, >5years)	> 30 years
Telephone contact	07—
ID No. or Registration No. for businesses	7903948
Signature	

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them) Baggasse dust emission
Part IV: Objections and impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☐ No ☑ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project?	Yes ☐ No ☑ If yes, list them

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes ☑ No ☐ If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social impacts of the proposed project	**Proposed mitigation measures**
Increased baggasse dust emissions	

ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
Vision Plaza, Mombasa Road
P.O. Box 42259-00100, NAIROBI
Email: info@envasses.org; Telephone: +254 722 347 155

18th July, 2022

Our Ref: ESIA/BUTALI SUGAR MILLS/2022

PUBLIC CONSULTATIONS QUESTIONNAIRE

Dear Neighbor to Butali Sugar Mills Limited,

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18 JUL 2022
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Yours sincerely,

Mr. Simon Nzuki
Chief Executive Officer and Lead Consultant

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Part 1: Interviewer Profile	
Name of interviewer	Omar Said
Position/Title	Environmental Assistant
Date	18/07/2022
Signature	

Part II: Respondent's Profile	
Names	Gladys Mukhwana
Plot Number	—
Gender (Male, Female, N/A for companies)	Female.
Position of respondent (For companies)	—
Occupation/type of business	
Approximate distance from site	<50m
Period of residency in the area (<5, >5years)	>30 years
Telephone contact	0790316882.
ID No. or Registration No. for businesses	
Signature	GM

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them)

Part IV: Objections and impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☐ No ☑ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project? Provision of employment opportunities.	Yes ☑ No ☐ If yes, list them

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes ☑ No ☐ If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social impacts of the proposed project	**Proposed mitigation measures**
Bagasse dust emission Noise Pollution	

ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
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18th July, 2022

Our Ref: ESIA/BUTALI SUGAR MILLS/2022

PUBLIC CONSULTATIONS QUESTIONNAIRE

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Part 1: Interviewer Profile	
Name of interviewer	Omar Said
Position/Title	Environmental Assistant
Date	18/07/2022
Signature	

Part II: Respondent's Profile	
Names	Stephen Kwalanda
Plot Number	—
Gender (Male, Female, N/A for companies)	Male.
Position of respondent (For companies)	—
Occupation/type of business	Farmer/Trail Transporter.
Approximate distance from site	100m
Period of residency in the area (<5, >5years)	18 years
Telephone contact	0799406783
ID No. or Registration No. for businesses	24645630
Signature	

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them) Wastewater run-off from bagasse has resulted to poor water quality and soil.

Part IV: Objections and Impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☐ No ☑ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project?	Yes ☐ No ☑ If yes, list them

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes ☑ No ☐ If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social Impacts of the proposed project	**Proposed mitigation measures**
Increared volume of bagasse Dust emissions	• Provide a suitable site for disposal cause the existing is full.

ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
Vision Plaza, Mombasa Road
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18th July, 2022

Our Ref: ESIA/BUTALI SUGAR MILLS/2022

PUBLIC CONSULTATIONS QUESTIONNAIRE

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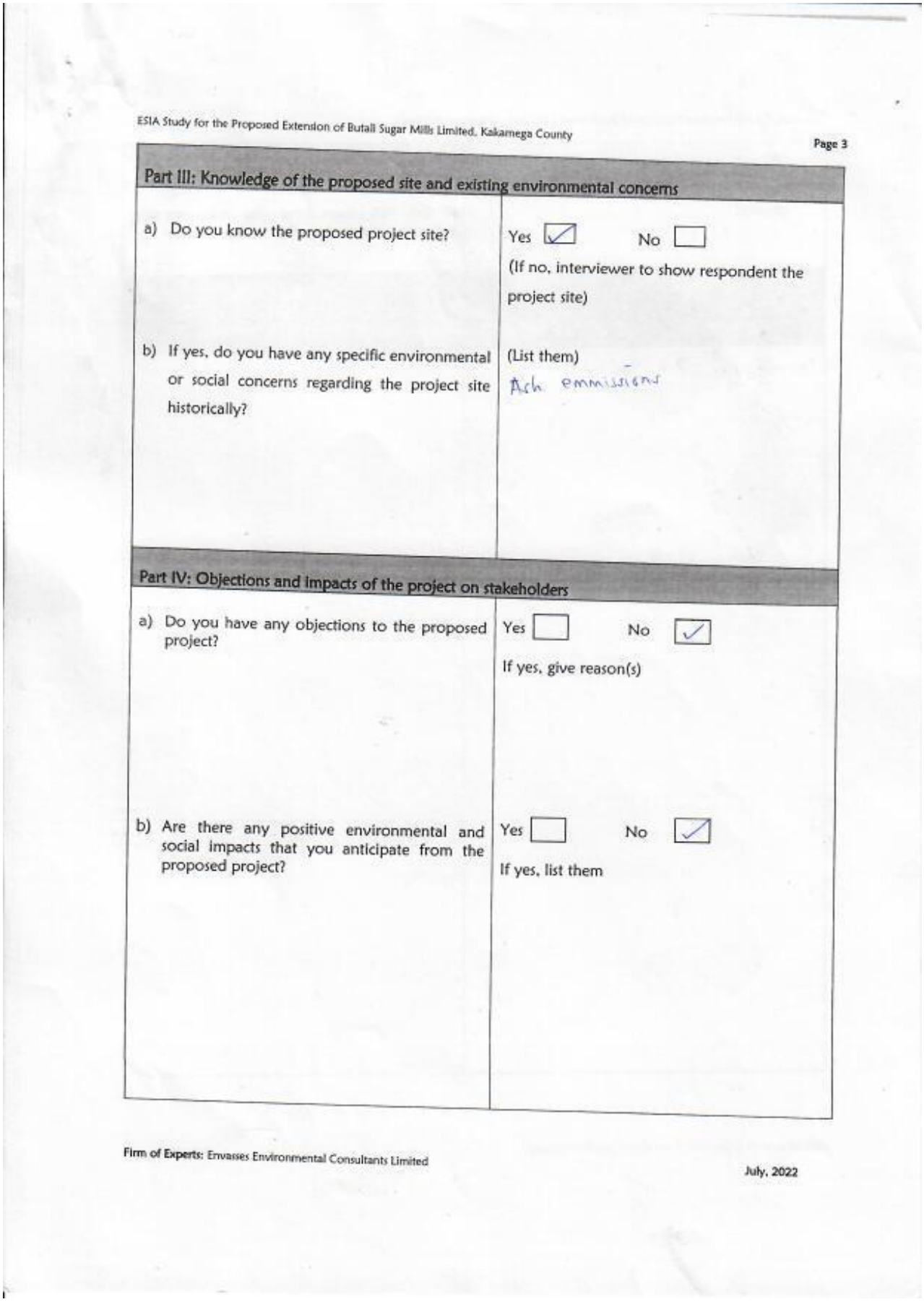
Part 1: Interviewer Profile	
Name of interviewer	Omar Said
Position/Title	Environmental Assistant
Date	19/07/2022
Signature	

Part II: Respondent's Profile	
Names	Celestine Mwenje
Plot Number	—
Gender (Male, Female, N/A for companies)	Female
Position of respondent (For companies)	
Occupation/type of business	Tailor
Approximate distance from site	150m
Period of residency in the area (<5, >5years)	6 years
Telephone contact	0727410771
ID No. or Registration No. for businesses	31528682
Signature	



ESIA Study for the Proposed Extension of Butali Sugar Mills Limited, Kakamega County

Page 3

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them) Ash emissions
Part IV: Objections and impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☐ No ☑ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project?	Yes ☐ No ☑ If yes, list them

Firm of Experts: Envasses Environmental Consultants Limited

July, 2022

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes ☐ No ☑ If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social impacts of the proposed project	**Proposed mitigation measures**

ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
Vision Plaza, Mombasa Road
P.O. Box 42259-00100, NAIROBI
Email: info@envasses.org; Telephone: +254 722 347 155

18th July, 2022

Our Ref: ESIA/BUTALI SUGAR MILLS/2022

PUBLIC CONSULTATIONS QUESTIONNAIRE

Dear Neighbor to Butali Sugar Mills Limited,

ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED EXTENSION OF BUTALI SUGAR MILLS, KAKAMEGA COUNTY.

We have been contracted by Butali Sugar Mills Limited to prepare an Environmental Impact Assessment Study Report (ESIA) for the proposed extension of the Butali Sugar Mills at Manyonje area, Kakamega County. The existing Sugar Mills have a capacity to crush and process 2,500 Tonnes of Sugarcane per Day (TCD) which will be doubled to 5,000 TCD with the proposed expansion. The proposed expansion seeks to increase the size and scope of the cane yard, pre-mill and milling lines to be able to meet the new TCD. In addition, the Proponent will expand the existing effluent treatment facilities to manage the increased production of waste water flows.

The ESIA study is carried out pursuant to Section 58 of the Environmental Management and Coordination Act Cap 387 of the Laws of Kenya and Environmental Management and Co-ordination (Impact Assessment and Audit) Regulations, 2003. The results of the ESIA will be used for the management of the proposed extension to reduce potential environmental, safety and health risks to the general public.

As part of data and information collection during the ESIA process, we have prepared a questionnaire targeting the neighbors to the proposed project site. The purpose of this letter is therefore to request for your participation in the ESIA process by responding to the attached questionnaire. Please note that your response to the questionnaire is expected within 7 days after receipt.

ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
18 JUL 2022
P.O. Box 2013 - 80100, MOMBASA
Tel: 0722 347 155
Email: info@envasses.org

Yours sincerely,

Mr. Simon Nzuki
Chief Executive Officer and Lead Consultant

This letter is to be acknowledged to confirm that the neighbor has received it and the questionnaire

About the questionnaire

This questionnaire has four parts. Part I and II provide details of the interviewer and the respondent's profile. Part III seeks baseline information from the stakeholders who are likely to be affected by the proposed project. Kindly fill part II-IV and seek clarifications where necessary from the interviewer or from the lead consultant on 0722 347 155 or email: info@envasses.org.

Part 1: Interviewer Profile	
Name of Interviewer	Omar Said
Position/Title	Environmental Assistant
Date	18/07/2022
Signature	

Part II: Respondent's Profile	
Names	Pius Mutalakhani
Plot Number	
Gender (Male, Female, N/A for companies)	Male.
Position of respondent (For companies)	Student
Occupation/type of business	
Approximate distance from site	>100m
Period of residency in the area (<5, >5years)	22years
Telephone contact	0795416571
ID No. or Registration No. for businesses	37958343
Signature	

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them)

Part IV: Objections and impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☐ No ☑ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project?	Yes ☐ No ☑ If yes, list them

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes ☑ No ☐ If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social Impacts of the proposed project	**Proposed mitigation measures**
Increased dust pollution	

ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
Vision Plaza, Mombasa Road
P.O. Box 42259-00100, NAIROBI
Email: info@envasses.org; Telephone: +254 722 347 155

18th July, 2022

Our Ref: ESIA/BUTALI SUGAR MILLS/2022

PUBLIC CONSULTATIONS QUESTIONNAIRE

Dear Neighbor to Butali Sugar Mills Limited,

ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED EXTENSION OF BUTALI SUGAR MILLS, KAKAMEGA COUNTY.

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18 JUL 2022
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Email: info@envasses.org

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Mr. Simon Nzuki
Chief Executive Officer and Lead Consultant

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Part 1: Interviewer Profile	
Name of interviewer	Omar Said
Position/Title	Environmental Assistant
Date	18/07/2022
Signature	

Part II: Respondent's Profile	
Names	Leonida Lilian
Plot Number	
Gender (Male, Female, N/A for companies)	
Position of respondent (For companies)	
Occupation/type of business	Business – Food stuffs
Approximate distance from site	
Period of residency in the area (<5, >5years)	3 yrs
Telephone contact	0799156397
ID No. or Registration No. for businesses	32330799
Signature	

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them)
Part IV: Objections and Impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☐ No ☑ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project?	Yes ☑ No ☐ If yes, list them Atleast it will provide job opportunities to the pple of the area. It will minimise illegal actions among the youth ie theft since they will have employment to provide for their needs

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes ☐ No ☑ If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social impacts of the proposed project	**Proposed mitigation measures**

ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
Vision Plaza, Mombasa Road
P.O. Box 42259-00100, NAIROBI
Email: info@envasses.org; Telephone: +254 722 347 155

18th July, 2022

Our Ref: ESIA/BUTALI SUGAR MILLS/2022

PUBLIC CONSULTATIONS QUESTIONNAIRE

Dear Neighbor to Butali Sugar Mills Limited,

ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED EXTENSION OF BUTALI SUGAR MILLS, KAKAMEGA COUNTY.

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ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
18 JUL 2022
P.O. Box 2013 - 80100, MOMBASA
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Yours sincerely,

Mr. Simon Nzuki
Chief Executive Officer and Lead Consultant

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Part 1: Interviewer Profile	
Name of interviewer	Omar Said
Position/Title	Environmental Assistant
Date	18/07/2022
Signature	

Part II: Respondent's Profile	
Names	Rebecca Omusula
Plot Number	
Gender (Male, Female, N/A for companies)	Female
Position of respondent (For companies)	
Occupation/type of business	Businesswoman
Approximate distance from site	>100m
Period of residency in the area (<5, >5years)	6years
Telephone contact	0704347840
ID No. or Registration No. for businesses	34622813
Signature	

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them)
Part IV: Objections and Impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☐ No ☑ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project? → Creation of employment. → Subsidy on farm inputs → Improved road access.	Yes ☑ No ☐ If yes, list them

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes ☑ No ☐ If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social Impacts of the proposed project	**Proposed mitigation measures**
Air pollution from the ashes Corrosion of iron sheets. Security issues.	Setting up of Police post nearby.

ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
Vision Plaza, Mombasa Road
P.O. Box 42259-00100, NAIROBI
Email: info@envasses.org; Telephone: +254 722 347 155

18th July, 2022

Our Ref: ESIA/BUTALI SUGAR MILLS/2022

PUBLIC CONSULTATIONS QUESTIONNAIRE

Dear Neighbor to Butali Sugar Mills Limited,

ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED EXTENSION OF BUTALI SUGAR MILLS, KAKAMEGA COUNTY.

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18 JUL 2022
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Yours sincerely,

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Chief Executive Officer and Lead Consultant

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Part 1: Interviewer Profile	
Name of interviewer	Faidah Khamalishi
Position/Title	Environmental Assistant
Date	18/07/2022
Signature	

Part II: Respondent's Profile	
Names	Samson Kisiang'ani Jami
Plot Number	
Gender (Male, Female, N/A for companies)	Male
Position of respondent (For companies)	CIPRAND AGENCY
Occupation/type of business	
Approximate distance from site	250m
Period of residency in the area (<5, >5years)	75 Oyears
Telephone contact	0742320416
ID No. or Registration No. for businesses	7885840
Signature	

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them) Ash emissions from the boiler

Part IV: Objections and impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☐ No ☑ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project? Creation of employment	Yes ☑ No ☐ If yes, list them

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes ☑ No ☐ If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social Impacts of the proposed project	**Proposed mitigation measures**
Water Pollution Increased water-borne diseases Ash emission that contains chemicals that causes diseases ~~on plants~~ Corrosion of iron sheets.	

ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
Vision Plaza, Mombasa Road
P.O. Box 42259-00100, NAIROBI
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18th July, 2022

Our Ref: ESIA/BUTALI SUGAR MILLS/2022

PUBLIC CONSULTATIONS QUESTIONNAIRE

Dear Neighbor to Butali Sugar Mills Limited,

ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED EXTENSION OF BUTALI SUGAR MILLS, KAKAMEGA COUNTY.

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ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
18 JUL 2022
P.O. Box 2013 - 80100, MOMBASA
Tel: 0722 347 155
Email: info@envasses.org

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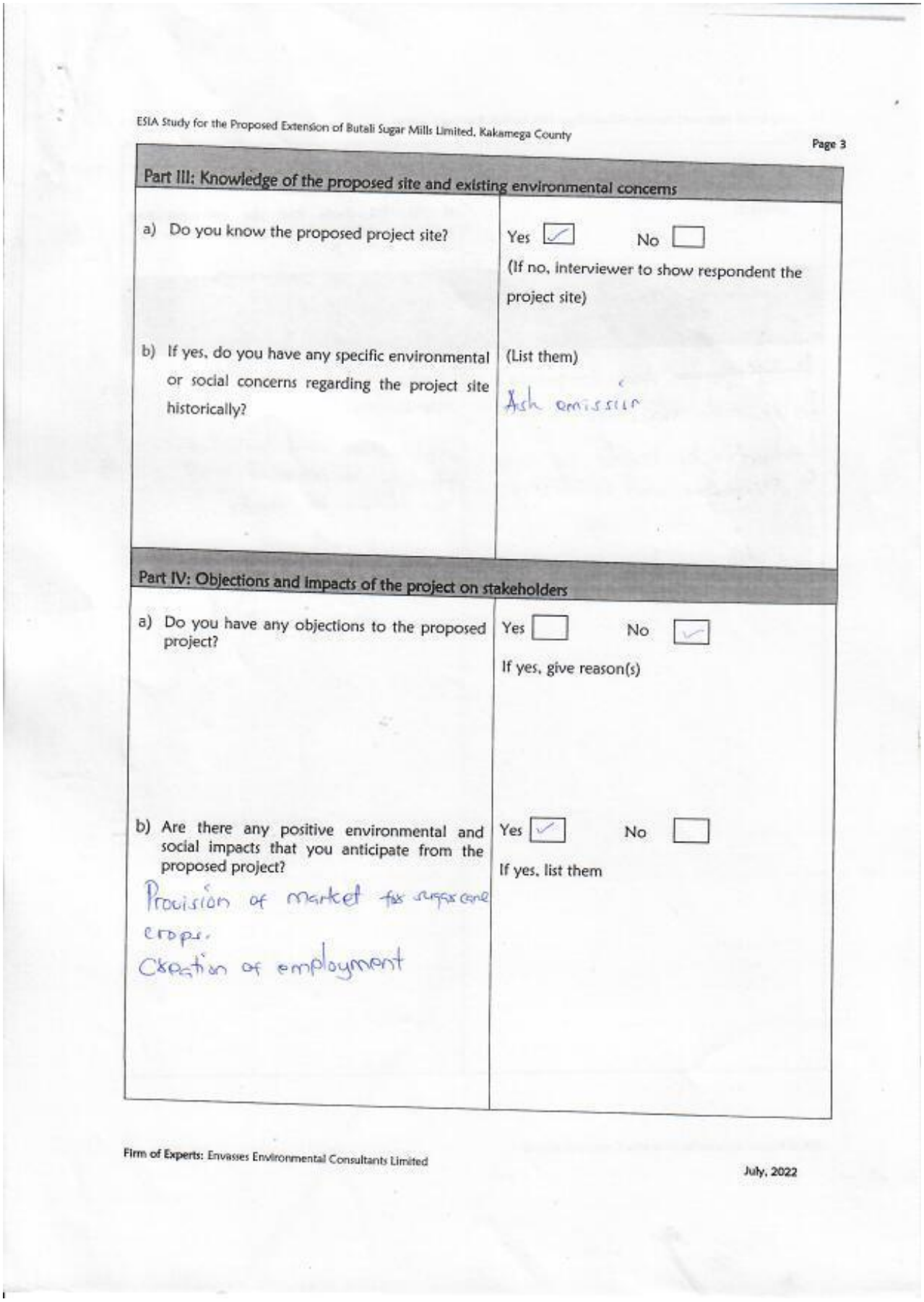
Part 1: Interviewer Profile	
Name of interviewer	Fridah Khamalichi
Position/Title	Environmental Assistant
Date	18/07/2022
Signature	

Part II: Respondent's Profile	
Names	Boniface Muxuli
Plot Number	
Gender (Male, Female, N/A for companies)	Male
Position of respondent (For companies)	
Occupation/type of business	Self-employed.
Approximate distance from site	>100m
Period of residency in the area (<5, >5years)	>5years
Telephone contact	0710786633
ID No. or Registration No. for businesses	25787128
Signature	



ESIA Study for the Proposed Extension of Butali Sugar Mills Limited, Kakamega County

Page 3

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them) Ash emission
Part IV: Objections and impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☐ No ☑ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project? Provision of market for sugarcane crops. Creation of employment	Yes ☑ No ☐ If yes, list them

Firm of Experts: Envasses Environmental Consultants Limited

July, 2022

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes ☑ No ☐ If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social impacts of the proposed project	**Proposed mitigation measures**
~~Dust emission from~~ bagasses Boiler ash emission. Destruction of roads by use of excavators and bulldozers	• Consider dust collection at the boilex • Excavators and bulldozers need to be fenced and not driven on roads.

ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
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18th July, 2022

Our Ref: ESIA/BUTALI SUGAR MILLS/2022

PUBLIC CONSULTATIONS QUESTIONNAIRE

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ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED EXTENSION OF BUTALI SUGAR MILLS, KAKAMEGA COUNTY.

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18 JUL 2022
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Part 1: Interviewer Profile	
Name of interviewer	Fxidah Khamalishi
Position/Title	Environmental Assistant
Date	18/07/2022
Signature	

Part II: Respondent's Profile	
Names	Thomas Wadiya
Plot Number	
Gender (Male, Female, N/A for companies)	Male
Position of respondent (For companies)	
Occupation/type of business	Masonry
Approximate distance from site	< 50m
Period of residency in the area (<5, >5years)	>20 years
Telephone contact	0724888496
ID No. or Registration No. for businesses	11738365
Signature	T. Wadiya

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them) During drought season, burning emission ~~are~~ is rampant.

Part IV: Objections and Impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☐ No ☑ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project? * Reduced cases of sugarcane theft. Creation of employment	Yes ☑ No ☐ If yes, list them

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes ☑ No ☐ If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social Impacts of the proposed project	**Proposed mitigation measures**
Excessive Vibrations Dust emission	- Minimize level of noise working activities. - Install barriers at the baggasse storage to suppress emission.

ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
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Email: info@envasses.org; Telephone: +254 722 347 155

18th July, 2022

Our Ref: ESIA/BUTALI SUGAR MILLS/2022

PUBLIC CONSULTATIONS QUESTIONNAIRE

Dear Neighbor to Butali Sugar Mills Limited,

ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED EXTENSION OF BUTALI SUGAR MILLS, KAKAMEGA COUNTY.

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18 JUL 2022
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Part 1: Interviewer Profile	
Name of interviewer	Faidah Khamalichi
Position/Title	Environmental Assistant
Date	18/07/2022
Signature	

Part II: Respondent's Profile	
Names	Loise Musa Nashisino
Plot Number	
Gender (Male, Female, N/A for companies)	Female
Position of respondent (For companies)	
Occupation/type of business	
Approximate distance from site	< 100m
Period of residency in the area (<5, >5years)	>20years
Telephone contact	07
ID No. or Registration No. for businesses	6303314
Signature	

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them)
Part IV: Objections and impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☐ No ☑ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project?	Yes ☐ No ☑ If yes, list them

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes ✓ No ☐ If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social Impacts of the proposed project	**Proposed mitigation measures**
Noise Pollution	

ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
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PUBLIC CONSULTATIONS QUESTIONNAIRE

Dear Neighbor to Butali Sugar Mills Limited,

ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED EXTENSION OF BUTALI SUGAR MILLS, KAKAMEGA COUNTY.

We have been contracted by Butali Sugar Mills Limited to prepare an Environmental Impact Assessment Study Report (ESIA) for the proposed extension of the Butali Sugar Mills at Manyonje area, Kakamega County. The existing Sugar Mills have a capacity to crush and process 2,500 Tonnes of Sugarcane per Day (TCD) which will be doubled to 5,000 TCD with the proposed expansion. The proposed expansion seeks to increase the size and scope of the cane yard, pre-mill and milling lines to be able to meet the new TCD. In addition, the Proponent will expand the existing effluent treatment facilities to manage the increased production of waste water flows.

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ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
18 JUL 2022
P.O. Box 2013 - 80100, MOMBASA
Tel: 0722 347 155
Email: info@envasses.org

Yours sincerely,

Mr. Simon Nzuki
Chief Executive Officer and Lead Consultant

This letter is to be acknowledged to confirm that the neighbor has received it and the questionnaire

About the questionnaire

This questionnaire has four parts. Part I and II provide details of the interviewer and the respondent's profile. Part III seeks baseline information from the stakeholders who are likely to be affected by the proposed project. Kindly fill part II-IV and seek clarifications where necessary from the interviewer or from the lead consultant on 0722 347 155 or email: info@envasses.org.

Part 1: Interviewer Profile	
Name of interviewer	Faidah Khamalishi
Position/Title	Environmental Assistant
Date	18/07/2022
Signature	

Part II: Respondent's Profile	
Names	Scovia Nangila
Plot Number	
Gender (Male, Female, N/A for companies)	Female
Position of respondent (For companies)	
Occupation/type of business	
Approximate distance from site	<100m
Period of residency in the area (<5, >5years)	1 Year
Telephone contact	0797160203
ID No. or Registration No. for businesses	37506769
Signature	

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them) Dust emission during drought season
Part IV: Objections and impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☐ No ☑ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project?	Yes ☐ No ☑ If yes, list them

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes ☑ No ☐ If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social Impacts of the proposed project	**Proposed mitigation measures**
Bad odour from sugarcane waste Air Pollution esp Particulate matter. Changes in soil composition and fertility.	Suppress the burnt emissions • stop use of chemicals that change soil composition.

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Vision Plaza, Mombasa Road
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18th July, 2022

Our Ref: ESIA/BUTALI SUGAR MILLS/2022

PUBLIC CONSULTATIONS QUESTIONNAIRE

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Part 1: Interviewer Profile	
Name of interviewer	Faidah Khamalwa.
Position/Title	Environmental Assistant
Date	18/07/2022.
Signature	

Part II: Respondent's Profile	
Names	Catherine Mulongo
Plot Number	—
Gender (Male, Female, N/A for companies)	Female
Position of respondent (For companies)	—
Occupation/type of business	Jua kali Business
Approximate distance from site	< 50m
Period of residency in the area (<5, >5years)	21 years
Telephone contact	0717936270
ID No. or Registration No. for businesses	21605944
Signature	

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them) Noise Pollution

Part IV: Objections and impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☐ No ☑ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project? Provision of market for goods and services such as vegetables	Yes ☑ No ☐ If yes, list them

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes ☑ No ☐ If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social impacts of the proposed project	**Proposed mitigation measures**
Excessive noise and vibrations Dust emissions esp. during drought season Contamination of water	• Install noise baxxiexs Inform the community what type of chemical is used near the spring water source.

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18th July, 2022

Our Ref: ESIA/BUTALI SUGAR MILLS/2022

PUBLIC CONSULTATIONS QUESTIONNAIRE

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Part 1: Interviewer Profile	
Name of interviewer	Fridah Khamalishi
Position/Title	Environmental Assistant
Date	18/07/2022
Signature	

Part II: Respondent's Profile	
Names	Geoffrey Luchel Wachiano
Plot Number	
Gender (Male, Female, N/A for companies)	Male.
Position of respondent (For companies)	
Occupation/type of business	Farmer
Approximate distance from site	>100m
Period of residency in the area (<5, >5years)	>30 years
Telephone contact	0721341983
ID No. or Registration No. for businesses	24252780
Signature	

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them)

Part IV: Objections and impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☐ No ☑ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project? Creation of employment	Yes ☑ No ☐ If yes, list them

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes ☑ No ☐ If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social Impacts of the proposed project	**Proposed mitigation measures**
Increased bagasse Ash (Black) emissions.	

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18th July, 2022

Our Ref: ESIA/BUTALI SUGAR MILLS/2022

PUBLIC CONSULTATIONS QUESTIONNAIRE

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Part 1: Interviewer Profile	
Name of interviewer	Fridah Khamalishi
Position/Title	Environmental Assistant
Date	18/07/2022
Signature	

Part II: Respondent's Profile	
Names	Catherine chivini
Plot Number	–
Gender (Male, Female, N/A for companies)	Female
Position of respondent (For companies)	–
Occupation/type of business	Nurse - Pharmacy
Approximate distance from site	>100m
Period of residency in the area (<5, >5years)	>5years
Telephone contact	0706170440
ID No. or Registration No. for businesses	21604488
Signature	

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them)

Part IV: Objections and Impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☑ No ☐ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project? Creation of employment to the youth	Yes ☑ No ☐ If yes, list them

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes [✓] No [ ] If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social Impacts of the proposed project	**Proposed mitigation measures**
Cause of insecurity. Water pollution at R. Chebayusi Destruction of roads due to excess passage of trucks.	→ Provide lighting (enough) along the ~~road~~ roads. → Construct proper drainage and improve roads facility

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18th July, 2022

Our Ref: ESIA/BUTALI SUGAR MILLS/2022

PUBLIC CONSULTATIONS QUESTIONNAIRE

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Part 1: Interviewer Profile	
Name of interviewer	Faidah Khamalishi
Position/Title	Environmental Assistant
Date	18/07/2022
Signature	

Part II: Respondent's Profile	
Names	Pauline Kona
Plot Number	
Gender (Male, Female, N/A for companies)	Female
Position of respondent (For companies)	
Occupation/type of business	Businesswoman
Approximate distance from site	>100m
Period of residency in the area (<5, >5years)	19 years
Telephone contact	0706249674
ID No. or Registration No. for businesses	
Signature	

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them) Ash emissions from bagasse
Part IV: Objections and impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☐ No ☑ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project? Provision of employment opportunities Provide market for goods and services	Yes ☑ No ☐ If yes, list them

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes ☑ No ☐ If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social Impacts of the proposed project	**Proposed mitigation measures**
Water pollution Dust from baggasse that stick to vegetables esp during drought season	

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Our Ref: ESIA/BUTALI SUGAR MILLS/2022

PUBLIC CONSULTATIONS QUESTIONNAIRE

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Name of interviewer	Fridah Khamalishi
Position/Title	Environmental Assistant
Date	18/07/2022
Signature	

Part II: Respondent's Profile	
Names	Evaline Khanyongi Meru
Plot Number	—
Gender (Male, Female, N/A for companies)	Female
Position of respondent (For companies)	—
Occupation/type of business	
Approximate distance from site	>100m
Period of residency in the area (<5, >5years)	>10 years
Telephone contact	0715417797
ID No. or Registration No. for businesses	—
Signature	

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them)

Part IV: Objections and Impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☐ No ☑ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project? Creation of employment. Reduced insecurity	Yes ☑ No ☐ If yes, list them

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes ☑ No ☐ If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social impacts of the proposed project	**Proposed mitigation measures**
Pollution of River Chebaywa Increased cases of waterborne diseases.	-Ensure proper treatment of wastewater. -Maintain good sanitation and hygiene.

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Part 1: Interviewer Profile	
Name of interviewer	Fadhl Khamalish
Position/Title	Environmental Assistant
Date	18/07/2022
Signature	

Part II: Respondent's Profile	
Names	Racheal Mota Amakobe
Plot Number	—
Gender (Male, Female, N/A for companies)	Female
Position of respondent (For companies)	—
Occupation/type of business	Elder
Approximate distance from site	>100m
Period of residency in the area (<5, >5years)	14 years
Telephone contact	0713871204
ID No. or Registration No. for businesses	1360693
Signature	Racheal Mota Amakobe

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them)
Part IV: Objections and impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☐ No ☑ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project? Creation of employment to the youth.	Yes ☑ No ☐ If yes, list them

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes [✓] No [ ] If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social Impacts of the proposed project	**Proposed mitigation measures**
Water Pollation ~~Legals~~ Continued delay in sugarcane Permits.	• Provide alternative source of water. • Involvement in CSR. eg development of schools, hospitals. • Formation of SACCO for the nearby farmers.

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Part 1: Interviewer Profile	
Name of interviewer	Faidah Khamalishi
Position/Title	Environmental Assistant
Date	18/07/2022
Signature	

Part II: Respondent's Profile	
Names	Ethna Shinyenyi
Plot Number	—
Gender (Male, Female, N/A for companies)	Female
Position of respondent (For companies)	—
Occupation/type of business	Farmer
Approximate distance from site	>100m
Period of residency in the area (<5, >5years)	40yrs
Telephone contact	07—
ID No. or Registration No. for businesses	—
Signature	

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them)

Part IV: Objections and impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☐ No ☑ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project? Provide market for businesses	Yes ☑ No ☐ If yes, list them

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes ☑ No ☐ If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social impacts of the proposed project	**Proposed mitigation measures**
Release of untreated wastewater into river might lead to death of animals	→ Ensure wastewater is effectively treated before release into the river

ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
Vision Plaza, Mombasa Road
P.O. Box 42259-00100, NAIROBI
Email: info@envasses.org; Telephone: +254 722 347 155

18th July, 2022

Our Ref: ESIA/BUTALI SUGAR MILLS/2022

PUBLIC CONSULTATIONS QUESTIONNAIRE

Dear Neighbor to Butali Sugar Mills Limited,

ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED EXTENSION OF BUTALI SUGAR MILLS, KAKAMEGA COUNTY.

We have been contracted by Butali Sugar Mills Limited to prepare an Environmental Impact Assessment Study Report (ESIA) for the proposed extension of the Butali Sugar Mills at Manyonje area, Kakamega County. The existing Sugar Mills have a capacity to crush and process 2,500 Tonnes of Sugarcane per Day (TCD) which will be doubled to 5,000 TCD with the proposed expansion. The proposed expansion seeks to increase the size and scope of the cane yard, pre-mill and milling lines to be able to meet the new TCD. In addition, the Proponent will expand the existing effluent treatment facilities to manage the increased production of waste water flows.

The ESIA study is carried out pursuant to Section 58 of the Environmental Management and Coordination Act Cap 387 of the Laws of Kenya and Environmental Management and Co-ordination (Impact Assessment and Audit) Regulations, 2003. The results of the ESIA will be used for the management of the proposed extension to reduce potential environmental, safety and health risks to the general public.

As part of data and information collection during the ESIA process, we have prepared a questionnaire targeting the neighbors to the proposed project site. The purpose of this letter is therefore to request for your participation in the ESIA process by responding to the attached questionnaire. Please note that your response to the questionnaire is expected within 7 days after receipt.

ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
18 JUL 2022
P.O. Box 2013 - 80100, MOMBASA
Tel: 0722 347 155
Email: info@envasses.org

Yours sincerely,

Mr. Simon Nzuki
Chief Executive Officer and Lead Consultant

This letter is to be acknowledged to confirm that the neighbor has received it and the questionnaire

About the questionnaire

This questionnaire has four parts. Part I and II provide details of the interviewer and the respondent's profile. Part III seeks baseline information from the stakeholders who are likely to be affected by the proposed project. Kindly fill part II-IV and seek clarifications where necessary from the interviewer or from the lead consultant on 0722 347 155 or email: info@envasses.org.

Part 1: Interviewer Profile	
Name of interviewer	Faidah Khamalishi
Position/Title	Environmental Assistant
Date	18/07/2022
Signature	

Part II: Respondent's Profile	
Names	Solomon Kakanya Munialo
Plot Number	1565
Gender (Male, Female, N/A for companies)	Male
Position of respondent (For companies)	—
Occupation/type of business	Self employed
Approximate distance from site	>50m
Period of residency in the area (<5, >5years)	15 years
Telephone contact	0711742873
ID No. or Registration No. for businesses	10164746
Signature	

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them) Ash emission
Part IV: Objections and impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☐ No ☑ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project? Provision of market for sugarcane Creation of employment to youth	Yes ☑ No ☐ If yes, list them

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes ✓ No ☐ If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social impacts of the proposed project	**Proposed mitigation measures**
Release of wastewater to the nearby River. Noise pollution Ash dust emission	

ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
Vision Plaza, Mombasa Road
P.O. Box 42259-00100, NAIROBI
Email: info@envasses.org; Telephone: +254 722 347 155

18th July, 2022

Our Ref: ESIA/BUTALI SUGAR MILLS/2022

PUBLIC CONSULTATIONS QUESTIONNAIRE

Dear Neighbor to Butali Sugar Mills Limited,

ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED EXTENSION OF BUTALI SUGAR MILLS, KAKAMEGA COUNTY.

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The ESIA study is carried out pursuant to Section 58 of the Environmental Management and Coordination Act Cap 387 of the Laws of Kenya and Environmental Management and Co-ordination (Impact Assessment and Audit) Regulations, 2003. The results of the ESIA will be used for the management of the proposed extension to reduce potential environmental, safety and health risks to the general public.

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ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
18 JUL 2022
P.O. Box 2013 - 80100, MOMBASA
Tel: 0722 347 155
Email: info@envasses.org

Yours sincerely,

Mr. Simon Nzuki
Chief Executive Officer and Lead Consultant

This letter is to be acknowledged to confirm that the neighbor has received it and the questionnaire

About the questionnaire

This questionnaire has four parts. Part I and II provide details of the interviewer and the respondent's profile. Part III seeks baseline information from the stakeholders who are likely to be affected by the proposed project. Kindly fill part II-IV and seek clarifications where necessary from the interviewer or from the lead consultant on 0722 347 155 or email: info@envasses.org.

Part 1: Interviewer Profile	
Name of interviewer	Faidah Khamalidi
Position/Title	Environmental Assistant
Date	18/07/2022
Signature	

Part II: Respondent's Profile	
Names	Phanice Aloni
Plot Number	
Gender (Male, Female, N/A for companies)	Female.
Position of respondent (For companies)	
Occupation/type of business	Nurse Practitioner
Approximate distance from site	<50m
Period of residency in the area (<5, >5years)	18years
Telephone contact	0724805316
ID No. or Registration No. for businesses	13581731
Signature	

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them)

Part IV: Objections and impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☐ No ☑ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project? *Increased market for sugarcane crops *Creation of employment	Yes ☑ No ☐ If yes, list them

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes ☑ No ☐ If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social Impacts of the proposed project	**Proposed mitigation measures**
Odour from wastewater treatment plant. Pollution of groundwater	

ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
Vision Plaza, Mombasa Road
P.O. Box 42259-00100, NAIROBI
Email: info@envasses.org; Telephone: +254 722 347 155

18th July, 2022

Our Ref: ESIA/BUTALI SUGAR MILLS/2022

PUBLIC CONSULTATIONS QUESTIONNAIRE

Dear Neighbor to Butali Sugar Mills Limited,

ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED EXTENSION OF BUTALI SUGAR MILLS, KAKAMEGA COUNTY.

We have been contracted by Butali Sugar Mills Limited to prepare an Environmental Impact Assessment Study Report (ESIA) for the proposed extension of the Butali Sugar Mills at Manyonje area, Kakamega County. The existing Sugar Mills have a capacity to crush and process 2,500 Tonnes of Sugarcane per Day (TCD) which will be doubled to 5,000 TCD with the proposed expansion. The proposed expansion seeks to increase the size and scope of the cane yard, pre-mill and milling lines to be able to meet the new TCD. In addition, the Proponent will expand the existing effluent treatment facilities to manage the increased production of waste water flows.

The ESIA study is carried out pursuant to Section 58 of the Environmental Management and Coordination Act Cap 387 of the Laws of Kenya and Environmental Management and Co-ordination (Impact Assessment and Audit) Regulations, 2003. The results of the ESIA will be used for the management of the proposed extension to reduce potential environmental, safety and health risks to the general public.

As part of data and information collection during the ESIA process, we have prepared a questionnaire targeting the neighbors to the proposed project site. The purpose of this letter is therefore to request for your participation in the ESIA process by responding to the attached questionnaire. Please note that your response to the questionnaire is expected within 7 days after receipt.

ENVASSES ENVIRONMENTAL CONSULTANTS LIMITED
18 JUL 2022
P.O. Box 2013 - 80100, MOMBASA
Tel: 0722 347 155
Email: info@envasses.org

Yours sincerely,

Mr. Simon Nzuki
Chief Executive Officer and Lead Consultant

This letter is to be acknowledged to confirm that the neighbor has received it and the questionnaire

About the questionnaire

This questionnaire has four parts. Part I and II provide details of the interviewer and the respondent's profile. Part III seeks baseline information from the stakeholders who are likely to be affected by the proposed project. Kindly fill part II-IV and seek clarifications where necessary from the interviewer or from the lead consultant on 0722 347 155 or email: info@envasses.org.

Part 1: Interviewer Profile	
Name of interviewer	Fridah Khamalisha
Position/Title	Environmental Assistant
Date	18/07/2022
Signature	

Part II: Respondent's Profile	
Names	Trizah Sikolia
Plot Number	
Gender (Male, Female, N/A for companies)	Female.
Position of respondent (For companies)	
Occupation/type of business	Shop.
Approximate distance from site	>100m
Period of residency in the area (<5, >5years)	>20years.
Telephone contact	0701089657
ID No. or Registration No. for businesses	21259537
Signature	

Part III: Knowledge of the proposed site and existing environmental concerns	
a) Do you know the proposed project site?	Yes ☑ No ☐ (If no, interviewer to show respondent the project site)
b) If yes, do you have any specific environmental or social concerns regarding the project site historically?	(List them)

Part IV: Objections and impacts of the project on stakeholders	
a) Do you have any objections to the proposed project?	Yes ☐ No ☑ If yes, give reason(s)
b) Are there any positive environmental and social impacts that you anticipate from the proposed project? Increased customer flow Provision of employment.	Yes ☐ No ☑ If yes, list them

c) Are there negative environmental and social impacts that you anticipate from the proposed project?	Yes ☐ No ☑ If yes, list them and the corresponding mitigation measures in the columns below
List of negative Environmental and Social impacts of the proposed project	**Proposed mitigation measures**

18. Copy of Bill of Quantities

BUTALI SUGAR MILLS LTD.

Head Office - Factory
Butali Village
Off Kakamega-Webuye Highway
P.O. Box 1400 - 50205, Webuye, Kenya
Phone +254-771-767676 / 7
Fax +254-20-2631169
Email info@butalisugar.co.ke
BSMI

To Whom it may Concern 19/08/2022

Dear Sir/Madam

We wish to let you know that the current estimated cost of our expansion shall be as mentioned below section wise.

	Section	Kshs
1	New Milling Tendam	235,000,000
2	New Boiler	215,000,000
3	New Turbine	140,000,000
4	Process house expansion	230,000,000
5	New ETP	40,000,000
6	Civil Works & Infrastructure	275,000,000
7	Steel Structure Buildings	125,000,000
8	Upgrade to ESP for old Boilers	45,000,000
	Total Cost Kshs	**1,305,000,000**

Thanking you
Sincerely

Sanjay Patel
For Butali Sugar Mills Ltd

19. Copy of NEMA practicing license for the firm, Envasses Environmental Consultants Limited

FORM 7 (r.15(2))

nema

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)
THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING LICENSE

License No : NEMA/EIA/ERPL/16253
Application Reference No: NEMA/EIA/EL/21204

M/S **Envasses Environmental Consultants Ltd**
(individual or firm) of address

P.O. Box 2013 - 80100, Mombasa

is licensed to practice in the

capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Firm of Experts**
registration number **6175**

in accordance with the provision of the Environmental Management and Coordination Act Cap 387.

Issued Date: **1/10/2022** Expiry Date: **12/31/2022**

Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001:2015 Certified

Conditions For Licensing

1. This license expires on 31st December of the year it is issued.
2. The expert shall comply with code of practice and Professional Ethics for EIA/EA experts.
3. The expert shall comply with the attached conditions.

General Conditions

1. All Environment Experts certified and registered in the accordance with the provision of relevant Regulations, may establish professional associations to complement and implement the objectives of the Code of Practice.
2. An Expert shall act professionally, accurately, fairly and in an unbiased manner in undertaking his work.
3. The Director General, in consultation with relevant stakeholders, may from time to time issue guidelines for the proper conduct of registered Environmental Impact and Audit Experts.
4. Every Environmental Expert shall each year attend at least two relevant seminars organized by the authority for the purposes of improving the professional expertise of its members.
5. No Expert shall exploit the inexperience, lack of understanding, illiteracy or other lack of technical knowledge in environmental matters of a project proponent, owner or the public, for his personal gain.

Receiving Instructions

1. No Environmental Expert shall act for any project proponent unless he has received written instructions form such project proponent or his authorized agent.
2. An Environmental Expert shall not unreasonably delay the carrying out of instructions received from the project proponent of his authorized agent.
3. An Environmental Expert shall discharge his responsibilities to the project proponent with due diligence and integrity.
4. An Environment Expert may terminate a contract on carrying out an environmental impact assessment or audit as stipulated in section 8 of the Code of Practice and Professional Ethics of EIA/EA Experts.

Carrying out an EIA/EA

1. An Environmental Expert shall follow relevant regulations or guidelines and directives issued by the Authority.
2. An Environmental Expert shall take due care and diligence to collect the relevant data to address the significant environmental issues in the various stages of the assessment or audit process and fully acknowledge the source of any data that is not the result of his findings.
3. Environmental Expert shall consult widely with all the relevant agencies, stakeholders, interested parties and the general public on all the matters that likely to affect them.
4. An Environmental Impact Assessment or Audit Report shall be based on the Terms of Reference of the Assignment and shall include all the matters relevant to the findings of the study, all the relevant matters are required by statutory provisions, and must be guided by professional standards and judgments.

Responsibility of Lead Environmental Experts

1. (1) An Environmental Lead Expert shall be responsible for the documents prepared by him/her on behalf of the project proponent.
   (2) An Environmental Expert shall guide the proponent throughout the preparation of the environmental impact assessment and/or environmental audit, and/or during implementation of the Environmental Management Plan.
   (3) An Environmental Expert shall disclose to a client or employer any relationships of conflicting or competing interests that may influence his judgment prior to the carrying out of work.

Misconduct of Environmental Experts

1. An Environmental Expert who contravenes a provision of Code of Practice and Professional Ethics shall be deemed to have committed professional misconduct and shall be subject to disciplinary action by the Authority as appropriate and as stipulated in the Code of Practice and Professional Ethics of Environmental Experts.

Disciplinary Action

1. Where an Environmental Expert is found to have committed professional misconduct by the Environmental Experts' Advisory Committee/Authority shall be punished as stated under section 19 of the code of Practice and Professional Ethics.

Appeals

1. (1) An Expert aggrieved by the decision of the Authority may apply for the review of such decision in the High Court.
   (2) If an application for judicial review shall not have been filed at the expiry of 30 days from the date of the decision of the Authority, the director General may publicize the disciplinary action takes against the Expert.

20. Copy of NEMA practicing license for Lead Expert, Mr. Simon Nzuki

FORM 7 (r.15(2))

nema

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING LICENSE

License No : NEMA/EIA/ERPL/16254

Application Reference No: NEMA/EIA/EL/21205

M/S **Simon Kioko Nzuki**
(individual or firm) of address

P.O. Box 2013 - 80100, Mombasa

is licensed to practice in the

capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Lead Expert**
registration number **1350**

in accordance with the provision of the Environmental Management and Coordination Act Cap 387.

Issued Date: **1/10/2022** Expiry Date: **12/31/2022**

Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

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