

ENVIRONMENTAL IMPACT ASSESSMENT- STUDY REPORT

**FOR THE PROPOSED USED OIL RECYCLING
FACILITY ON PLOT L.R. NO.
KWALE/SAMBURU/SOUTH SAMBURU-GORA
IN SAMBURU, KWALE COUNTY.**

Coordinates (-3.7936; 39.12988)

NSM ENTERPRISE LIMITED

P.O BOX 83559-80100

KWALE COUNTY

ENVIRONMENTAL CONSULTANTS

**Katrina Management
Consultants Limited**

Reg No. 1695

**2026 NEMA License No.
NEMA/ENVIS/ELI/F0083**

JULY,2026

CERTIFICATION

The report has been done with reasonable skills, care and diligence in accordance with the Environmental management and Co-ordination Act, 1999 (amended 2015) and the Environmental (Impact Assessment and Audit) Regulations, 2003.

We certify that the particulars given in this report are correct to the best of our knowledge.

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ACRONYMS

AOI	Area of Influence
CSR	Corporate Social Responsibility
DOSHS	Directorate of Occupational Safety & Health Services
EHS	Environmental, Health & Safety
EMCA	Environmental Management and Coordination Act
EPRA	Energy and Petroleum Regulatory Authority
EPR	Extended Producer Responsibility
ESA	Environmentally Sensitive Area
ESG	Environmental, Social and Governance
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
GBV	Gender-Based Violence
GPS	Global Positioning System
GRM	Grievance Redress Mechanism
HAZOP	Hazard and Operability Study
HFO	Heavy Fuel Oil
KEBS	Kenya Bureau of Standards
KWAWASCO	Kwale Water and Sewerage Company Limited
LDAR	Leak Detection and Repair
MSDSs	Material Safety Data Sheets
OSHA	Occupational Safety and Health Act
OWS	Oil-Water Separator
PAPs	Project Affected Persons

PPE	Personal Protective Equipment
PRO	Producer Responsibility Organization
QRA	Qualitative Risk Assessment
SH	Sexual Harassment
SOPs	Standard Operating Procedures
TOR	Terms of Refence
TPH	Total Petroleum Hydrocarbons
VOCs	Volatile Organic Compounds
WRA	Water Resources Authority

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NON-TECHNICAL SUMMARY

Background

Used oil is oil that has completed its intended service life in an engine, transmission, or hydraulic system which poses severe environmental risks if disposed of improperly, as it contains toxic heavy metals and pollutants. In Kenya, used oil is broadly classified into used motor/lubricating oil and used cooking oil. Both require strict, authorized disposal methods to prevent severe environmental contamination and health hazard.

Currently, there are illicit and unscrupulous markets where some dealers "clean" and repackage used engine oil, selling it back to unsuspecting customers as new oil, a situation that can cause damage to engines and worsen environmental pollution. It is therefore advised that the consumer should always purchase lubricants from reputable, authorized fuel stations. Other alternative uses of used oil include incineration in high-temperature boilers, some individuals reuse it informally for treating fencing posts and wood, or for repelling insects and reptiles.

It is in this space that the company intends to venture into used oil recycling by converting used motor oil into Heavy Fuel Oil (HFO) and industrial lubricants. Used oil recycling (re-refining) restores dirty motor oil into reusable base oil. The standard process involves pre-treating the oil to remove water and light hydrocarbons, followed by vacuum distillation to separate the heavy base oil, and a final polishing step (like hydrotreating or clay adsorption) to eliminate impurities. This circular economy effort will help curb environmental pollution and support industrial development. To support this venture, National Environment Management Authority (NEMA) has issued technical guidelines in an effort to making professional recycling a strict environmental requirement with emphasis on proper handling, storing, transportation and recycling processes.

Environmental and Social Impact Assessment (ESIA) is a tool for environmental conservation and has been identified as a key component in new project implementation. Early identification and mitigation of possible development impacts to the environment should be considered to enhance responsible investment and promote sustainability.

The ESIA planning tool will further instill the ESG as an investment principle that prioritizes environmental issues, social concerns and corporate Governance.

According to the legal notice 31 of 30th April 2019, amendment of the second schedule of EMCA no. 8 of 1999, the projects are categorized as low risk, medium risk and high risk according to their potential impacts to the environment. Screening of the proposed project was done and according to the classification described in the above-mentioned legislation, the project is categorized as a high-risk and therefore subjected to an ESIA Study Report.

Project Location

The proposed project site is located on Plot L.R. No. KWALE/SAMBURU/SOUTH SAMBURU-GORA, along the Nairobi-Mombasa Highway in Samburu, Kwale County and on Global Positioning System (GPS) Coordinates; longitude - 3.7936 and latitude 39.2988. The proposed project site is a parcel of land measuring approximately 2 acres or thereabout in size. The area is served with good road network since it's adjacent to the Nairobi-Mombasa Highway which allows for easy access. The land ownership document is attached to this report as ***annex 1***.

Land use character

The proposed project site is located in an area whose land use character is generally agricultural with upcoming industrial establishments dotting the landscape. It is adjacent to Masani Eco Green waste Tyre Pyrolysis plant, Metraf Mineral Resources Limited and approximately 500 meters from Devki Steel Mill. The drier areas of the Nyika plateau in Kinango, Kasemeni, Samburu and some parts of Lunga Lunga divisions are held under group ranches.

Project Description, Components and Cost

The proposed project will involve the construction and subsequent operation of a used oil recycling facility. The facility will comprise a total of a ten (10) no. (approximately 400,000 litres) storage tanks; 659.68 square metres plant shed, 8 to 10 feet high Boundary wall & a main gate, an office block, quality assurance department, restrooms,

truck parking area, loading and offloading bay, cooling tower, air compressor, filter press, recycling plant machineries, and washrooms among others.

The design capacity of the plant is approximately 20,000 Litres per every batch while the daily processing schedule of the plant will be determined by the demand of the products in the market.

The proposed project shall comprise of the following components:

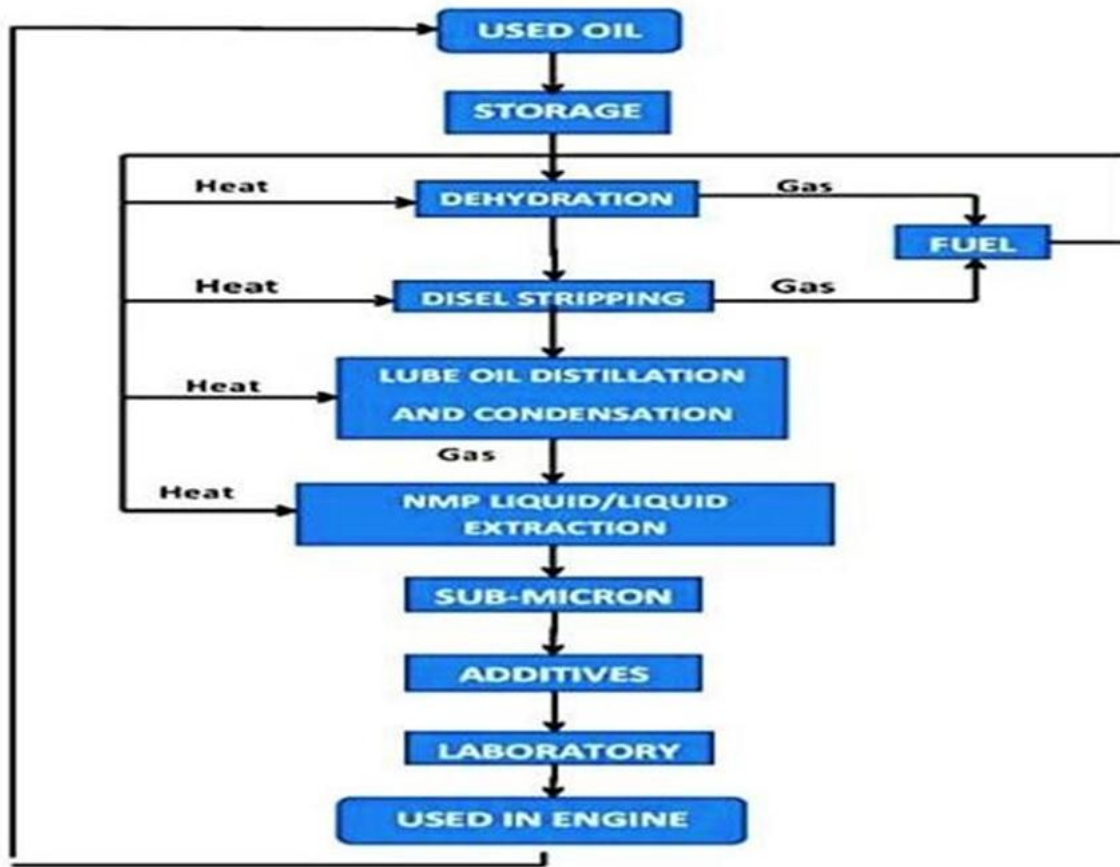
- Main gate, 8 to 10 feet high Boundary wall, offices, Quality Assurance department, restrooms, Plant shed, truck parking area, loading and offloading bay, cooling tower, air compressor, filter press, ten (10) no. (approximately 400,000 litres) used oil storage tanks, recycling plant machineries, and washrooms.
- Other installations at the plant include: Electricity and electrical appliances, Water supply systems including water storage tanks. The architectural designs are attached to this report as ***annex 2***.

The total project cost is Kshs. twenty-four million, twelve thousand, two hundred eighty-one shillings and forty-two cents. The certified Bills of Quantities (BQs) and valid quantity surveyor's practicing license are attached to this report as ***annex 3a and 3b respectively***.

The used oil refining process

Used oil recycling, commonly known referred to as re-refining, is the process of restoring contaminated or spent lubricating oil into reusable petroleum products through the removal of impurities, contaminants, and degraded additives. The standard process involves pre-treating the oil to remove water and light hydrocarbons, followed by vacuum distillation to separate the heavy base oil, and a final polishing step (like hydrotreating or clay adsorption) to eliminate impurities.

SCHEMATIC OF RE-REFINING PROCESS



i. Collection and Pre-Treatment

- **Collection:** The facility will process a wide range of used oil streams, including automotive crankcase and lubricating oils; industrial lubricating oils such as metalworking, marine, railway, and turbine oils; industrial non-lubricating oils including hydraulic, transmission, quenching, and non-PCB transformer oils (containing less than 50 ppm PCBs); oil recovered from tank cleaning and de-ballasting operations; as well as oil recovered from accidental spills or discharges onto land or water.

The proposed facility will receive used oils from approved collection centers or transfer stations and transported to the facility in appropriate dully licensed vehicles.

- **Filtration:** The raw used oil undergoes physical filtration and centrifuging to remove solid particulate matter, metal shavings, and large sludge.
- ii. **Dehydration**
- **Evaporation:** The filtered oil is heated to drive off entrained water and light hydrocarbons (such as fuel and naphtha).
 - **Preparation:** Removing these lighter compounds prevents foaming and interference during subsequent, high-temperature distillation steps.
- iii. **Vacuum Distillation**
- **Fractionation:** The dehydrated oil is passed through a vacuum distillation column (often utilizing thin-film evaporation). The vacuum lowers the boiling point of the oil, preventing thermal degradation.
 - **Separation:** The oil is separated into different fractions based on molecular weight and viscosity, isolating high-value base oils from heavier asphaltic residues.
- iv. **Polishing and Finishing**
- **Hydrotreating / Chemical Treatment:** To remove lingering impurities, sulfur, and odor, the base oil undergoes hydro-treating (a process using hydrogen and a catalyst) or regenerative media polishing.
 - **Final Product:** The resulting base oil is virtually indistinguishable from virgin crude oil with enhanced properties like increase in viscosity, specific gravity etc. and is packed in jars of 1L, 2L, 5L, 20L, and 200L barrels. The lubricating oil produced at this stage is similar to that of Group1 and group 2 class base lubricating oil.

Scope of the Assessment

The scope of the assessment covers the project life cycle of the used oil recycling facility from the planning, construction, installation/setting up, operation to decommissioning.

The output of this assessment is an ESIA Study Report for submission to NEMA to inform licensing of the project.

Terms of reference (TOR)

The consultant on behalf of the proponent conducted the assessment by incorporating but not limited to the following terms of reference:

- A description on the location of the proposed project and its associated amenities.
- A concise description of the National and County environmental legislative and regulatory framework.
- Description of the baseline information, and any other relevant information related to the project.
- The objectives of the proposed project.
- The technology, materials, procedures and processes to be used in the construction and implementation of the project.
- The products, by-products and waste to be generated by the project.
- A description of the potentially affected environment.
- The environmental impacts of the project including the socio-cultural and the direct, indirect, cumulative, irreversible, short-term and long-term impacts.
- Analysis of alternatives including project site, design, materials and technologies.
- Climate Change vulnerability and risk assessment of the proposed project
- An environmental and social management plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment, including the cost, monitorable indicators, timeframe and responsibility to implement the measures.
- Propose measures to prevent health hazards and to ensure security in the working environment for the employees, residents and for the management in case of emergencies.
- An identification of gaps in knowledge and uncertainties, which were encountered in compiling the information.
- Such other matters as the Authority may require.

Methodology Outline

The general steps followed during the assessment were as follows:

- Environmental screening in which the project was identified as among those requiring Environmental and Social Impact Assessment under schedule 2 of EMCA, Cap. 387.
- Environmental scoping that provided the key environmental and social issues.
- Development of Terms of References (TORs): The Proponent through licensed experts developed and submitted the TORs for undertaking an ESIA study for the proposed project to the Authority for processing. Upon review, the Authority approved the ToRs and issued approval NEMA/ENVIS/EIA/TOR/Approval_0255. Copy of TORs approval is attached to this report as ***annex 4***.
- Desk-top studies and reviews.
- Physical inspection of the site and surrounding areas.
- Baseline studies and analysis of applicable parameters for example; land use character and development trends, solid waste management, wastewater management, water demand and supply, ambient air quality, soil Total Petroleum Hydrocarbons (TPH), Noise and excessive vibrations and traffic impacts.
- Public participation and stakeholders' engagements: To ensure adequate and meaningful public participation, formal meeting invitation notices were issued to the PAPs and other stakeholders within a 500 meters radius in the project Area of Influence (AOI) at least one week prior to the scheduled meetings. The invitations clearly indicated the meeting date, time and venue. Subsequently, the consultants in collaboration with representatives of the National Government Administration Officers (NGAO), conducted two public participation meetings with the PAPs. During these engagements, structured questionnaires were administered to further collect stakeholders' views, concerns, and recommendations regarding the proposed project.
- Baseline soil quality investigations were undertaken prior to establishment of the facility to serve as a standard or reference line to monitor and measure future

environmental changes (with regards to heavy metals and TPH) and to safeguard public health.

- Quantitative Risk Assessment (QRA) mapping the risk contours, evaluate the off-site impacts and recommend mitigation measures.
- Reporting.

The Outcome of Public participation

The purpose for carrying out public participation was to receive feedback from various stakeholders and project affected persons (PAPs). This process also provided an opportunity to identify potential environmental and social issues, which may bring conflicts and delays in the project implementation.

As part of the stakeholder engagement process, the consultants conducted two public participation meetings in collaboration with representatives of the National Government Administration Officers (NGAO). The first meeting was held on 27th May, 2026 and was attended by twenty-five (25) participants, comprising fourteen (14) male and eleven (11) female respondents. The second meeting was held on 3rd June, 2026 and recorded an attendance of fifty-three (53) participants, comprising twenty-eight (28) male and twenty-five (25) female respondents. In addition, structured questionnaires were administered during the public meetings to further capture stakeholders' views, concerns, and recommendations regarding the proposed project.

The proposed development was positively received by the Project Affected Persons (PAPs) and other stakeholders during the public participation exercise. Participants expressed their support for the project, noting that the proposed recycling of used oil is a commendable circular economy initiative that will promote the environmentally sound management of used oil, reduce environmental pollution, enhance resource recovery, and support industrial development. However, stakeholders emphasized the need for the proponent to implement meaningful Corporate Social Responsibility (CSR) initiatives that benefit the local community, including the provision of educational bursaries for deserving students and support for community development programmes. They further requested the proponent to ensure that the facility is operated in an environmentally responsible manner by

implementing effective pollution prevention and control measures to safeguard public health and the surrounding environment. The PAPs independently gave their views, opinions and suggestions. The formal meeting notices, meeting attendance register, minutes as well as public participation questionnaires are annexed to this report as ***annex 5a, 5b, 5c and 5d respectively.***

Relevant policy, legal and institutional frameworks

This section highlights the relevant international environmental law principles, applicable national legislation and the relevant government agencies mandated to oversee developments in the manufacturing sector. This is detailed in section 4 of this report.

Anticipated Environmental and Social Impacts

As with any other physical development, both positive and negative impacts are anticipated to arise from the proposed project, during the construction phase, operational phase as well as the during the decommissioning stage. In general, the following positive and negative impacts are expected to be associated with the proposed project.

Positive Impacts

- Creation of employment opportunities
- Improved growth of the economy
- Promotion of the circular economy through resource recovery
- Reduction in environmental pollution associated with the improper disposal of used oil.
- Conservation of natural resources through the recovery and reuse of used oil.
- Enhanced hazardous waste management and compliance with environmental regulations.
- Stimulation of industrial growth and investment within the petroleum recycling sector.
- Business opportunities for licensed used oil collectors, transporters, suppliers, and other service providers.

- Generation of revenue to the National and County Governments through taxes, permits, and statutory levies.
- Contribution to Kenya's green growth, cleaner production, and sustainable industrial development objectives.

Negative Impacts

IMPACTS DURING THE CONSTRUCTION PHASE	
Possible Impacts	Mitigations to be enhanced
Natural resource depletion	• Implement a robust landscaping and tree planting scheme as an offset to the tree cover uprooted or removed during excavation works. • Source materials from suppliers that use environmentally friendly processes in their operation. • Ensure that damage or loss of material at the site is kept minimal through proper storage. • The tender documents should specify required standards and certification for procurement of all materials and appliances. • Implement water conservation measures such as controlled water use for curing and dust suppression. • Reuse excavated soil and construction debris where feasible.
Loss of tree cover and ground exposure	• Specify location for trucks and equipment, and areas of the site which should be kept free from traffic, equipment and storage. • Designate access route within the site. • Design and implement an appropriate landscaping and tree planting program to help in re-vegetation of part of the project site after construction that focuses on increasing the green area. • Protecting the existing vegetation as much as possible.
Noise and excessive vibrations	The proponent shall: • Ensure compliance with Environmental Management and Coordination (Noise and Excessive Vibrations Pollution) (Control) Regulations, 2009 during construction phase. • Sensitize vehicle drivers and machinery operators to switch off vehicles or machinery not being used.

	• Ensure that all heavy-duty equipment is insulated or placed in enclosures to minimize noise levels. • Ensure regular maintenance and servicing of the trucks and construction machinery. • Install temporary noise barriers where necessary. • Consider substituting existing equipment with quieter compliant equipment; retro-fitting existing equipment with damping materials, mufflers, or enclosures. • Ensure strict use of ear protection devices like earplugs and earmuffs in areas of high noise levels. • Ensure the trucks and machinery are not left on idling mode when not in operation. • Conduct periodic noise surveys to ensure that noise levels do not exceed 75dB (A). • Appropriate authorization will be required before any blasting or excessive vibration operation. • Ensure periodic monitoring of noise and vibration levels within and without the site to ensure compliance.
Water consumption	• The proponent will consider the installation of water-conserving automatic taps or push type taps. Moreover, any water leaks resulting from damaged pipes and/or faulty taps will be promptly fixed by qualified staff. • Prompt reuse and recycling of water as much as possible where necessary. • Install a water meter at water inlet point to monitor and determine total water usage. • Sensitize construction workers on the importance of proper water management. • Establish on-site storage tanks to supplement supply and manage water during peak construction and installation activities.

Pressure on existing utilities	The proponent shall: • Seek necessary approvals from the Kwale Water and Sewerage Company (KWAWASCO) for connection of their water supply to the development. • Sensitize the workers on efficient water utilization. • Acquire necessary authorization from KPLC prior to connection of electricity supply to the site. • Assign traffic marshals to direct traffic as may be required. • Consider the need for backup measures such as solar heating system and standby genset to supplement electricity supply. • The proponent shall install a setback gate to prevent traffic snarl up along the adjoining road traffic and therefore enhance convenience.
Air pollution (Gaseous emissions, dust, fumes)	The proponent shall ensure: • Stock piles of construction materials are covered to reduce dust emissions especially during windy conditions. • Gaseous emissions are controlled by ensuring that all fuel powered construction equipment is serviced and maintained on a regular basis. • Provision of adequate and appropriate Personnel Protective Equipment (PPE) to the workforce. • Construction activities are mainly undertaken during the day. • Monitor stack and ambient air quality regularly and ensure emissions are within permissible limits in line with EMC (Air Quality) Regulations, 2024. • Appropriate pollution control systems are employed to ensure compliance with the emissions standards. • The proponent is further advised to design the stack of the in line with part XIV of the 5th schedule of EMC (Air quality) Regulations of 2024 with emphasis on insulation, height and periodic maintenance. • Obtain emissions license for the facility. • All vehicles and machinery not being utilized will be switched off to reduce emissions of fumes and dust. • Sprinkle water on the access roads to suppress dust. • Ensure maintenance of the trucks and construction machinery. • Installation of double-netted dust screens at the construction site.

Solid waste generation (Debris and other wastes generated from the construction site)	• Through accurate estimation of quantities of materials required, order materials in the sizes and quantities they will be needed, rather than cutting them to size, or having large quantities of residual materials. • Opt for machinery and materials with minimal packaging materials and request suppliers to use recyclable packaging whenever possible. • Provide facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements. • Dispose waste more responsibly by engaging a NEMA licensed waste handler for the collection, transportation and disposal. • Maintain proper waste tracking documents. • The handling, storage, transportation and treatment of hazardous wastes shall be undertaken in line with regulation 16 -23 of the waste management regulation of 2024. • The proponent shall ensure that all excavated material, debris and general construction waste are collected, reused, recycled, reprocessed and disposed of as appropriate. • The general solid wastes generated shall be segregated in line with the Sustainable Waste Management Act, 2022 and the National Color-Coding System as indicated in the table below; <table><tr><th>NO.</th><th>COLOR</th><th>TYPE OF WASTE</th></tr><tr><td>1.</td><td>Green</td><td>Organic Waste</td></tr><tr><td>2.</td><td>Blue</td><td>Recyclable Waste</td></tr><tr><td>3.</td><td>Black</td><td>General Waste</td></tr><tr><td>4.</td><td>Red</td><td>E-Wastes</td></tr></table>	NO.	COLOR	TYPE OF WASTE	1.	Green	Organic Waste	2.	Blue	Recyclable Waste	3.	Black	General Waste	4.	Red	E-Wastes
NO.	COLOR	TYPE OF WASTE														
1.	Green	Organic Waste														
2.	Blue	Recyclable Waste														
3.	Black	General Waste														
4.	Red	E-Wastes														

Vector breeding grounds	• The proponent will put in place efficient storm water and waste management systems that will prevent the accumulation of rain water and uncontrolled waste, as well as an efficient collection system and off-site disposal. • If necessary, fumigation of the open drains shall be undertaken by licensed firms to control pest.
Temporary scenic/ Visual Blight	• Ensure minimal footprint of construction activities. • Project workers and activities restricted to site. • Designate specific areas for material storage and ensure that stockpiles are neatly arranged, covered where necessary, and kept at minimal heights. • Progressively restore disturbed areas as construction progresses, including landscaping and re-vegetation where applicable. • Erect appropriate perimeter hoarding, fencing, or scaffold around the site to screen unsightly activities and materials from public view. • Ensure exposed surfaces are stabilized immediately after construction.
Traffic disruptions within the driveways and adjoining roads	• Construction activities that might substantially disrupt traffic e.g. delivery of materials should not be performed during peak travel periods to the maximum extent practicable. • The proponent shall ensure that the project does not encroach on any way-leave and road reserves. • Warning signs should be used as appropriate to provide notice of road hazards and other pertinent information to motorists and the general public. • Signage and barricades should be used as part of the typical construction traffic controls. • Traffic marshals will direct traffic as may be required. • Adherence to County Government Traffic by laws and Kenya traffic laws.

Sanitary wastewater	The Proponent shall: • Provide construction workers with an adequate number of portable toilets lined with impermeable materials to prevent wastewater from leaching into the ground, thereby protecting soil and groundwater resources and minimizing potential public health risks. • Ensure portable toilets are maintained in a clean and hygienic condition. • Put arrangements in place with NEMA licensed waste service provider for regular exhaustion. • Prevent discharge of untreated wastewater into stormwater drains or neighbouring properties. • Decommission temporary sanitation facilities immediately after completion of construction.
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Management of construction workers	• Keep a site worker register with names, ID numbers, job roles, next of kin, and medical details. • Set clear expectations including work quality, timelines, code of conduct and site safety protocols with emphasis on compliance with laws and regulations, professionalism, ethical conduct, appropriate conduct on the job site and ensuring environmental and social responsibility. • Eating facilities for the construction workers shall be provided at the construction site to mitigate on the proliferation of informal and illegal kiosks within the area and along the road reserve. • Conduct regular stakeholder consultations with neighboring residents, local businesses, and community leaders to address any emerging concerns related to the facility operations. • Promote local employment opportunities, giving priority to qualified individuals from the surrounding community. • Implement and enforce codes of conduct for employees to minimize social disturbances such as noise, disorderly behavior, or littering. • Train construction workers on safety procedures. • Regularly update workers on project progress, changes and any potential issues. • Assign tasks based on individual skills and expertise. • Streamline workplace communication channels. • Establish a Grievance Redress Mechanism (GRM) to receive, record, and address any complaints from neighbouring facilities promptly. • Support community initiatives (e.g., environmental clean-ups, tree planting, or cultural events) as part of Corporate Social Responsibility (CSR). • Ensure gender equality and inclusivity in workforce recruitment and other facility operations. • All employees are required to attend an induction-training prior to commencing work on site to ensure they are familiar with the No Gender Based Violence (GBV) and No Sexual Harassment (SH)policies and Code of Conduct. • Gangways to be clearly marked for pedestrian and vehicle traffic on site.
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Climate Change, vulnerability and risk assessment of the project	• Climate change Mitigation and adaptation-a number of measures will be incorporated to cope and adapt to climate change risks. For example, i. Creation of landscaped area and tree planting to reduce urban heat island phenomenon. ii. Design of Climate smart infrastructure to be installed and avoidance of climate sensitive infrastructure. iii. Installation of renewable energy sources such as solar Photovoltaic (PV) systems. iv. Employ other institutional, behavioral and nature-based adaptation actions. • Climate Resilience- The design of the proposed facility shall incorporate green building technologies whereby it shall be well ventilated, adequately lit from natural sunlight and therefore resource efficient and environmentally responsible. In addition, administrative strategies such as awareness among the management and construction workers will be undertaken and sustained within the facility. • The Proponent shall adhere to the national climate obligations to combat climate change, protect the environment, enhance climate resilience, and minimize its carbon footprint.
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Occupational and safety hazards	The Proponent shall: • Register the workplace with DOSHS and other relevant authorities. • Design and put in place a project signboard as per the Ministry of Public Work Standards, indicating the EIA license and other information. • Ensure that appropriate buffers (hoarding and dust screens) are installed to protect members of the public from flying objects. • Provide adequate sanitary facilities for the construction workforce and ensure proper decommissioning of the facilities once construction is complete. • It is recommended the sanitary conveniences at the facility conform to the provisions of the Occupational Safety and Health Act as read together with LD 280 on sanitary convenience standards. The standards give an indication on the minimum number of toilets depending on the number of people at work; 1 for up to 5; 2 toilets for up to 25; and 3 toilets for up to 50. • The proponent shall ensure the sanitary facilities are properly maintained to guarantee cleanliness, accessibility and adequacy with separation for both male and female with appropriate signages. • Provide adequate supply of both quantity and quality of wholesome drinking water. • Ensure maintenance of suitable washing facilities and changing rooms. • Ensure provision of well-equipped First Aid kits. • Ensure provision of appropriate PPEs to the construction workforce as well as undertaking adequate training. • Emergency response procedure including the contacts of emergency responders such the Red Cross, St Johns and nearby hospitals are displayed. • Ensure provision of suitable protective clothing and appliances including where necessary, suitable gloves, footwear, goggles and head covering, and maintained for the use of workers in any process involving exposure to wet or to any injurious or offensive substances/conditions. • The workers, immediate neighbours and other stakeholders are sensitized on the dangers and risk associated with the construction works for enhanced self- responsibility on personal safety.
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	• Enforce adherence to safety procedures and preparing contingency plan for accident response. In addition, safety education and training shall be emphasized. • Scaffolds and work platforms are installed in the prescribed standards throughout construction phase • Install guardrails, toe boards, and handrails on platforms, scaffolds and walkways. • Canopies to be constructed for work at height to reduce impact of workers falling off and to intercept objects falling from higher grounds. • Regular training of the construction workforce on occupational safety issues. • Training of first aiders and provision of well-equipped first aid facilities. • Ensure strict adherence to the provisions of the Occupational Safety and Health Act, 2007 as well as the Building Operations and Works of Engineering Construction Regulations.
Social and human rights concerns (Gender inequality, PWDs accessibility among others)	• The Proponent shall put in place a Grievance Redress Mechanism (GRM) accessible to all Project Affected Persons to address emerging issues, complaints and conflicts to enhance harmonious co-existence. • Equal employment opportunities will be provided for both men and women. • There will be enhanced gender sensitivity to reduce gender discrimination during the construction activities. • The sanitary facilities and changing rooms should be clean, accessible, adequate and convenient with separation for both female and male gender. • Universal Accessibility: Provide wheelchair ramps and accessible washrooms within the development; and ensure parking spaces include designated slots for persons with disabilities. • There shall be zero tolerance to child labour.

Security concerns	• The proposed project site shall be surrounded by an 8 to 10 feet boundary wall and a lockable entrance gate which will be manned 24 hours. • Implement access control systems by managing entry using ID badges, key cards or biometric systems. • Conduct a comprehensive risk assessment of the construction site. • The facility shall contract the services of a registered security firm. • Ensure proper visitor management by implementing the visitor policy that prescribe the need for registration, badges and designated waiting areas. • Ensure designated entrances and parking lots for employees potentially with separate access points. • There will be installation of a functional security lighting system and a CCTV coverage & surveillance. • Install alarm systems and integrate them with surveillance and access control systems.
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IMPACTS DURING THE OPERATIONAL PHASE	
Possible Impacts	Mitigations to be enhanced
Unsustainable environmental and procurement practices	• Adopt green procurement by procurement goods and services with minimal adverse environmental impacts considering their life cycle in order to reduce their ecological footprints, promote circular economy and support sustainability. • Source materials from supplies that use environmentally friendly processes in their operation. • Ensure that damage or loss of material at the site is kept minimal through proper storage. • The tender documents should specify required standards and certification for procurement of all materials and appliances.
Management of air pollution (Stack emissions, fugitive emissions, odors, VOCs, vapors, fumes from	• Initial baseline ambient air quality was undertaken prior to establishment of the facility to serve as a standard or reference line to monitor and measure future environmental changes and to safeguard public health. • From the obtained results, the ambient air quality assessment indicated that the average concentrations of

machinery or processing activities)	particulate matter (PM_{2.5} and PM₁₀) and the monitored gaseous pollutants, including Carbon Dioxide (CO₂), Volatile Organic Compounds (VOCs), Sulphur Dioxide (SO₂), and Nitrogen Dioxide (NO₂), at all monitoring locations were within the permissible limits stipulated under the EMCA Air Quality Regulations, 2024. The ambient air quality assessment report is attached to this report as <i>annex 6</i>. • The Proponent shall install suitable complete air pollution systems for the used oil recycling facility such as: i. Implement dust/particulate control mechanisms and strict oil/water separators to prevent the evaporation of volatile hydrocarbons into the ambient air. ii. Design the exhaust stacks in line with part XIV of the 5th schedule of EMC (Air quality) Regulations of 2024 with emphasis on insulation, height and periodic maintenance. iii. Fumes from the process shall be channeled through an exhaust system equipped with a scrubbing equipment. iv. Vapor Recovery Units (VRUs): These systems capture hydrocarbon vapors from the headspace of storage tanks during loading and unloading. Instead of venting them, the VRUs compress and liquefy the vapors so they can be routed back into the production line or used as fuel. v. Closed-Vent Systems: All processing equipment, dehydration units, and distillation columns shall be sealed and piped directly into a centralized collection manifold, ensuring no gases vent directly to the air. vi. Regenerative Media Polishing: The base oils shall be channeled through automatic media-based polishing systems (like clay, silica gel, or zeolites) to adsorb volatile compounds and eliminate remaining foul odors • It is recommended that NSM Enterprise Limited be carrying out bi-annual monitoring of the ambient air quality, stack emissions and fugitive emissions and
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	compare with the baseline data to note any variations and corrective actions to be undertaken as required in the EMC (Air Quality) Regulations, 2024. • The operator shall apply for and obtain an annual emissions License as required. • Use covered containers for handling and transporting used oil.
Management of spills, leaks and non-refinable used oil	• Baseline soil quality investigations were undertaken prior to establishment of the facility to serve as a standard or reference line to monitor and measure future environmental changes and to safeguard public health. • From the obtained results, all the analyzed heavy metals, namely arsenic, cadmium, chromium, molybdenum, nickel and lead; and soil nutrients including phosphorus, calcium, magnesium, iron, boron, copper and zinc were all below the applicable laboratory guideline values, indicating no evidence of contamination. In addition, Total Petroleum Hydrocarbons (TPH) were not detected, confirming the absence of petroleum contamination at the site. The baseline soil quality analysis report is annexed to this report as <i>annex 7</i>. • The proponent shall: i. Pave the loading and offloading area with an impervious material to prevent any spills from contaminating ground water and soil. ii. Design all storage tanks, loading and offloading area within impermeable secondary containment (bund walls) capable of containing at least 110% of the largest tank volume to prevent accidental oil leaks and spills from flowing to other areas. iii. Provide automatic overfill protection, level gauges and high-level alarms for storage tanks. iv. Provide strategically located spill kits containing absorbent pads, booms, sand, sawdust and recovery equipment. v. Incorporate an Oil–Water Separator (OWS) system to manage oily wastewater generated from plant operations, equipment washing, spill wash-downs,

	and surface runoff from oil-handling and storage areas. vi. Regularly empty sludge tanks and maintain the oil interceptor in good working condition. vii. Conduct regular tests on the used oil tanks to curb possible tank failure. viii. Undertake a Hazard and Operability (HAZOP) Study to inform the formulation of a Spill Prevention and an Emergency Response plan with a demonstrated capacity to control the worst-case disaster scenario to safeguard the recipient properties and communities. ix. Maintain and keep records of incoming used oil by date, volume and source. x. Non-recyclable used oil shall be managed in strict accordance with the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2024. xi. Such oils will be treated as hazardous waste and shall be disposed of through licensed high temperature incineration facilities approved by NEMA. xii. Use covered containers for handling and transporting used oil. xiii. Recover oil from separators and return it to the refining process where technically feasible. xiv. Maintain good housekeeping practices to minimize spills and leaks. xv. Leak Detection and Repair (LDAR): A significant portion of VOCs escape through tiny leaks in valves, pumps, flanges, and compressors. The facility shall run strict LDAR programs using toxic gas analyzers to routinely scan thousands of connection points. xvi. Ensure compliance with the Technical Guidelines on the Management of Used Oil and oil Sludge in Kenya, 2016 during facility operations with emphasis on the handling, collection, transportation, tracking, storage, site requirements, standard infrastructure, complaint management system and record keeping.
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Noise and excessive vibrations	The proponent shall: • Ensure that the equipment used are well maintained in accordance with the EMC (Noise and Excessive Vibration Pollution Control) Regulations, 2009. • Install acoustic enclosures or silencers to control noise from the machinery and equipment. • Schedule equipment maintenance to avoid worn-out and noisy components. • Endeavor to conduct operations with minimal noise as practicable. • Provide staff and workers with ear protection in areas with high noise levels. • Establish rules, regulations and management policies for all the workers. • Sensitize the staff and workers on the rules, regulations and management policy for compliance and to avoid noise-related activities. • Conduct periodic noise surveys and assessments.
Energy Consumption	• Adopt cleaner production approaches such as: i. Upgrade to energy-efficient motors, LED lighting and variable frequency drives (VFDs). ii. Explore energy efficient production technologies to reduce the facility's carbon footprint. iii. Monitor energy use during operations and keep records. iv. Procurement of energy saving appliances that have a low energy rating. • The proponent is advised to consider exploring the use of renewable energy sources such as installation of solar Photovoltaic (PV) systems to complement energy supply from the national grid. • Sensitize the staff and workers on the importance of proper energy use, management and conservation. • There is need to undertake energy audits by accredited energy auditors to inform on appropriate energy conservation measures and a record of such audits kept available for inspection.

Wastewater management (sanitary, process and equipment cleaning)	• The project area has no sewerage service provider hence the common methods for disposal of sanitary wastes is through pit latrines, septic tank systems. • The sanitary wastewater shall be channeled to a septic tank system and with arrangements in place for regular exhaustion by a NEMA Licensed transporter (exhauster) for disposal at the designated sewer service provider manholes. • A polymer additive should be added to the wastewater settling tank to increase the density of sludge produced in order to decrease the solid content of the effluent. • Spill Containment: All storage tanks and truck loading and offloading zones shall feature impervious concrete floors with bund walls to prevent contaminated runoff from reaching the environment. • Process wastewater generated from equipment cleaning, oil-water separation, storage tank cleaning, floor washing, condensate and other refining operations shall be directed through a closed drainage system to an oil-water separator for the removal of free oil and grease. • The recovered oil shall be returned to the production process where practicable, while the separated sludge shall be handled as hazardous waste and disposed of through NEMA-licensed hazardous waste handlers.
Management of Solid Wastes (office, spent filter media, packaging waste)	• Periodic collection will be undertaken by a NEMA Licensed waste transporter. • Opt for packaging materials that are recyclable and the same should be undertaken through licensed recycling facilities. • The handling, storage, transportation, and treatment of hazardous waste shall be undertaken in line with regulation 16-23 of the waste management regulations of 2024 with emphasis on implementation of a waste segregation program to ensure hazardous wastes are handled appropriately, reducing contamination of non-hazardous waste streams. • The proponent has been advised to ensure waste segregation is done in line with the Sustainable Waste

	Management Act, 2022 and the National Color-Coding System as indicated in the table below; <table><tr><th>NO.</th><th>COLOR</th><th>TYPE OF WASTE</th></tr><tr><td>1.</td><td>Green</td><td>Organic Waste</td></tr><tr><td>2.</td><td>Blue</td><td>Recyclable Waste</td></tr><tr><td>3.</td><td>Black</td><td>General Waste</td></tr><tr><td>4.</td><td>Red</td><td>E-Wastes</td></tr></table>	NO.	COLOR	TYPE OF WASTE	1.	Green	Organic Waste	2.	Blue	Recyclable Waste	3.	Black	General Waste	4.	Red	E-Wastes
NO.	COLOR	TYPE OF WASTE														
1.	Green	Organic Waste														
2.	Blue	Recyclable Waste														
3.	Black	General Waste														
4.	Red	E-Wastes														
Pressure on existing utilities	• The proponent shall seek necessary approvals from the Kwale Water and Sewerage Company Limited (KWA WAWASCO)for connection of their water supply to the facility. • The proponent will acquire necessary authorization from KPLC prior to connection of electricity supply to the site. • The proponent shall incorporate the deceleration and acceleration lanes at the entry and exit points of the facility. • The proponent shall install a setback gate to prevent traffic snarl up along the adjoining road traffic and therefore enhance convenience. • Sensitize the workers on efficient water utilization. • The proponent will consider the need for backup measures such as solar heating system and standby gen set to supplement the required utilities.															
Climate Change, vulnerability and risk assessment of the project	• Climate change Mitigation and adaptation-a number of measures will be incorporated to cope and adapt to climate change risks. For example; • Enhancement of the landscaped areas, greenery/green spaces within the facility to reduce urban heat island phenomenon. • Design of Climate smart infrastructure to be installed and avoidance of climate sensitive infrastructure. • Installation of renewable energy sources such as solar Photovoltaic (PV) systems. • Employ other institutional, behavioral and nature-based adaption actions.															

	• Climate Resilience-The design of the units shall incorporate green building technologies in which it shall be well ventilated, adequately lit from natural sunlight therefore resource efficient and environmentally responsible. In addition, administrative strategies such as awareness among the management, workers, tenants and occupants will be undertaken and sustained within the facility. • The Proponent shall adhere to the national climate obligations to combat climate change, protect the environment, enhance climate resilience, and minimize its carbon footprint.
Convenience and access to Sanitary facilities	• It is recommended the sanitary conveniences at the facility conform to the provisions of the Occupational Safety and Health Act as read together with LD 280 on sanitary convenience standards. The standards give an indication on the minimum number of toilets depending on the number of people at work; 1 for up to 5; 2 toilets for up to 25; and 3 toilets for up to 50. • The proponent shall ensure the sanitary facilities are properly maintained to guarantee cleanliness, accessibility and adequacy with separation for both male and female with appropriate signages. • The proponent shall sustain provision of reliable, clean, adequate and safe water at sanitary facilities for handwashing.
Impacts on traffic and site accessibility	• The trucks carrying used oil will be advised to access the site at intervals to reduce traffic congestion along the access road and the adjacent Mombasa-Nairobi Highway. • Design a dedicated deceleration lane for vehicles entering the facility and an acceleration lane where required by the road authority. • Provide separate entry and exit gates to reduce conflicts between inbound and outbound traffic. • Ensure all tankers comply with EPRA and traffic safety requirements. • Provide adequate truck holding and parking areas within the site so vehicles do not queue on the highway.

	• Ensure entrance gates are set back sufficiently from the highway to accommodate waiting trucks. • Install road markings and reflective signage in accordance with highway standards. • The transporter shall have in place an Emergency Response Plan (Spill contingency plan, spill control equipment, a fire control plan and evacuation plan) in case of truck rollover incidents, spillages, fires and explosions. • Ensure compliance with the Technical Guidelines on the Management of Used Oil and oil Sludge in Kenya, 2016 during used oil transportation with emphasis on license acquisition, vehicle labelling, flush points testing before delivery, tracking, complaint management system and record keeping.
Extended Producer Responsibility (EPR)	• The proponent shall ensure registration as a producer (recycler), obtain EPR Certificate of registration and annual license to operate an EPR scheme, thus guarantee Extended Producer obligations. • To lessen the administrative and financial burden of operating an individual EPR scheme, the proponent will transfer the entire EPR obligation to a Producer Responsibility Organization (PRO) as a collective EPR compliance scheme. • The proposed used oil recycling facility shall implement an EPR take-back mechanism to facilitate the environmentally sound collection, transportation, recycling, and disposal of used lubricating oils and used oil containers generated by consumers, commercial enterprises, industries, and institutions. • Used oil generators shall be encouraged to return used oil to designated collection centers or arrange for collection by licensed transporters for delivery to the recycling facility.
Increased surface/stormwater generation	• Harvest rainwater from the roof for non-portable uses e.g. landscaping and cleaning. • Ensure observance of the open spaces and greenery requirements to enhance rainwater infiltration.

	• The facility should have standard drainage systems for the stormwater and ensure a complete separation from the process wastewater. • Implementation of climate change adaptation and mitigation strategies.
Cleaner production approaches	Source & Process Optimization • Segregation at Source: Proactively separate used oil from other hazardous fluids (like solvents, glycols, or brake fluids) during collection. Unmixed oil requires less energy and fewer chemicals to re-refine. • Modern Dehydration & Distillation: Replace polluting acid-clay treatments with advanced, closed-loop re-refining technologies. Techniques such as thin-film evaporation and vacuum distillation remove water and lighter contaminants without generating hazardous acid sludge. • Adoption of modern technologies such as automation, robotics, and remote monitoring to reduce the risk of human error and improve safety. • Centrifuges and Fine Filtration: Utilize high-speed centrifuges and microfiltration to remove mechanical contaminants (metal fragments, dust, and sludge) mechanically, drastically reducing the need for chemical additives. Resource & Energy Efficiency • Closed-Loop Heat Integration: Implement heat exchangers in the distillation process to capture and reuse thermal energy, significantly lowering the plant's overall fuel and electricity consumption. • Solvent Recycling: For facilities utilizing solvent extraction to de-asphalt the oil, install internal solvent recovery systems to minimize solvent loss and prevent toxic airborne emissions. Waste Minimization & Byproduct Recovery • Catalyst & Clay Optimization: Use highly selective, long-lasting catalysts or doped materials (e.g., spent catalysts

	and modified clays) to crack and treat the oil, minimizing the volume of spent solid waste produced. • Bottom Sludge Management: Oil sludge (non-flowing mixtures of solids and liquids) poses the highest environmental threat. Implement co-processing, such as routing heavy bottom residues into cement manufacturing kilns, instead of sending them to landfills. • Leak Detection and Repair (LDAR): A significant portion of VOCs escape through tiny leaks in valves, pumps, flanges, and compressors. The facility shall run strict LDAR programs using toxic gas analyzers to routinely scan thousands of connection points. Good Housekeeping • Strict Leak Detection: Routinely monitor pumps, valves, and pipelines to prevent fugitive emissions and spills. Install impermeable flooring and secondary containment around storage tanks. • Comprehensive Tracking: Maintain accurate inventories to track oil inputs, outputs, and waste generation rates.
Workplace safety and health risks	The proponent will: • Ensure that the completed buildings/yards/premises are fitted with safety facilities including fire detectors, firefighting equipment, unobstructed fire exits, adequate access and buffers. • All employees shall be provided with the appropriate Personal Protective Equipment, enforce their use. • Warning & Safety signage to be displayed at strategic areas within the facility. • Develop and implement a safety and health policy, emergency response plan and Standard Operating Procedures (SOPs) for critical site activities within the facility. • Sensitize employees to adhere to standard work procedures to minimize accidents. • Conduct first aid training among the workers and provide well-stocked first aid kits.

	• Provide and keep an accident/incident register occurring on the facility including near misses and actions taken to prevent future occurrences. • Workers handling waste oils must undergo mandatory medical examination and surveillance for chemical exposure. • Conduct annual occupational safety and health audits, fire safety audits and risk assessments and other statutory safety audits. • A safety and health policy will be formulated. • Firefighting equipment are strategically placed to ensure easy access within the facility along with periodic servicing of the same. • There shall be designated fire assembly points and Emergency evacuation plans including fire/emergency exits. • Provide adequate and appropriate personal protective equipment (PPE) for the workers and conduct training on proper use. • Ensure adequate supply of both quantity and quality of wholesome drinking water for the estate workers. • Provisions will be made for workers' changing rooms. • Frequent cleaning and maintenance will be undertaken to ensure hygienic environment. • Shared sanitary facilities and changing rooms are clean, accessible, adequate and convenient with separation for both female and male gender. • Undertake periodic inspection of the plant and equipment/machinery by DOSHS approved persons in prescribed periods of time. • Undertake indoor occupational noise measurements and surveys at the facility on annual basis. • Display the Material Safety Data Sheets (MSDSs) for the chemicals used in the facility in prominent places to allow for easy access by the employees. • Carry out annual occupational hygiene measurements and surveys to inform the process of implementing the recommended measures.
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Fire risks	The proponent shall: • Undertake a Hazard and Operability (HAZOP) Study to inform the formulation of a spill prevention and an Emergency Response plan with a demonstrated capacity to control the worst-case disaster scenario to safeguard the recipient properties and communities and/or undertake a fire risk assessment to determine the emergencies that may arise and therefore inform on the formulation of an Emergency Response Plan (ERP). • Install fire extinguishers, fire hose reels and sand buckets at strategic locations around the plant and train employees on the use of the same. • Ensure the firefighting equipment are serviced regularly by the contracted fire service providers. • Train all workers on fire safety, use of extinguishers, and evacuation procedures. • Conduct regular fire drills, fire safety audits and emergency preparedness exercises and implement fire emergency response plan and evacuation procedures. • Install smoke detectors and heat sensors in critical areas. • Prohibit open flames and smoking (with "No Smoking" and "Flammable Materials" signage) displayed within the site.) • Clearly label flammable materials. • Designate and clearly mark a fire assembling point at a safe place within the site. • Provide informative fire safety and warning signage within the facility. • Maintain adequate separation distances between tanks, processing equipment and buildings in accordance with KEBS, EPRA and OSHA requirements.
Occupational risks related to mechanical failures	• Develop and implement a preventive maintenance programme for all plant and machinery, including pumps, boilers, reactors, distillation units, compressors, conveyors, storage tanks, pipelines, valves, and generators.

	• Conduct routine inspection, servicing, calibration, and testing of equipment in accordance with the manufacturers' recommendations. • Install automated monitoring and control systems to continuously monitor critical operating parameters such as pressure, temperature, flow rates, liquid levels, and vacuum conditions, with alarms and automatic shutdown mechanisms in the event of abnormal operating conditions. • Ensure that all rotating equipment is properly lubricated, aligned, and balanced to minimize wear, vibration, and unexpected breakdowns. • Regularly inspect pipelines, hoses, flanges, valves, and storage tanks for signs of corrosion, leakage, fatigue, or mechanical damage, and undertake prompt repairs or replacements. • Install pressure relief valves, emergency shut-off valves, and burst protection devices on pressurized systems to prevent equipment failure due to overpressure. • Maintain an adequate inventory of critical spare parts to facilitate timely replacement of worn or damaged components and minimize production downtime. • Train operators and maintenance personnel on proper equipment operation, routine inspection procedures, fault identification, and emergency shutdown protocols. • Establish and implement Standard Operating Procedures (SOPs) for equipment operation, maintenance, startup, shutdown, and emergency response. • Maintain comprehensive maintenance records and periodically review equipment performance to identify recurring faults and opportunities for improvement. • Conduct periodic non-destructive testing (NDT) of critical equipment such as pressure vessels, boilers, storage tanks, and pipelines to detect hidden defects before failure occurs. • Install spill containment systems, including bund walls, drip trays, and secondary containment, around oil handling and processing equipment to contain leaks resulting from mechanical failures.
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	• Develop and implement an Emergency Response Plan (ERP) outlining procedures for responding to equipment failures, oil spills, fires, explosions, and other process-related emergencies. • Ensure that emergency response equipment, including spill kits, absorbent materials, firefighting equipment, and first aid facilities, is readily available and regularly inspected. • Carry out periodic risk assessments and equipment integrity audits to identify potential failure modes and implement corrective actions before failures occur. • Ensure all pressure vessels, boilers, lifting equipment, and other statutory plant are inspected and certified by authorized inspectors in accordance with the Occupational Safety and Health Act (OSHA), 2007 and applicable regulations. • Ensure adequate housekeeping around machinery to prevent the accumulation of oil residues, debris, and combustible materials that may contribute to equipment malfunction or fire.
Emergency preparedness	• The facility shall undertake a risk assessment to determine the emergencies that may arise and therefore inform on the formulation of an Emergency Response Plan (ERP). • The ERP shall provide procedures for likely emergencies including poisonous gas leaks, fire, equipment malfunction/fall etc. and determine the appropriate prevention, mitigation, preparedness, response and recovery procedures. • Performance of regular fire drills, safety inspections and monitoring shall be undertaken by the facility and a record made available for inspection. Exits and Exit Routes • Keep safeguards designed to protect workers during an emergency (e.g., sprinkler systems, alarm systems, fire doors, exit lighting) in proper working order. • Ensure exit signs are illuminated and clearly visible at all times.

	• Keep exit routes and exits free and unobstructed; ensure that exit doors are not locked or blocked. • Ensure exit routes are adequately lit. • Exit routes must not go through a room that can be locked, e.g., a bathroom, nor may it lead into a dead-end corridor. • Mark doorways or passages along an exit route that could be mistaken for an exit with "Not an Exit" or "Fire Exit" language identifying their actual use, e.g., "closet." • If the direction of travel to the nearest exit is not immediately apparent, post signs along the exit access indicating the direction of travel to the nearest exit.
Social risks	• There shall be strict enforcement of the facility rules and regulations by the management. • New employees are encouraged to subscribe the management rules and regulations. • All workers are required to report any disciplinary or conduct-related issues to the management for appropriate action. • Establish a Grievance Redress Mechanism (GRM) accessible to receive, record, and promptly address any complaints, emerging issues or conflicts, therefore enhance harmonious co-existence with the local community. • Support community initiatives (e.g., scholarships, environmental clean-ups, tree planting, or cultural events) as part of Corporate Social Responsibility (CSR). • The proponent shall develop a deliberate local content policy on the use of local human resources, materials, goods and services. • All employees are required to attend an induction-training prior to commencing of work at the factory to ensure they are familiar with the No Gender Based Violence (GBV) and No Sexual Harassment (SH) policies and Code of Conduct.
Security Concerns	• The access gate shall be manned by a 24hours security personnel.

	• The facility shall be surrounded by an 8 to 10 feet high boundary wall, a lockable main entrance gate and a multi-zone electric fencing. • The facility will feature an installed functional security lighting system and CCTV coverage & surveillance. • All vehicles and visitors moving in and out of the facility shall be subjected to inspection by the security guards. • There shall be proper visitor management protocol that includes visitor registration, issuance of badges and designated waiting areas. • The workers shall continuously be sensitized on safety requirements including being aware of their surrounding and report any unusual or suspicious activity/behaviour. • Install alarm systems and integrate them with surveillance and access control systems. • The facility shall practice the <i>Nyumba Kumi</i> security co-management model.
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Quantitative Risk Assessment (QRA)

The QRA was undertaken to evaluate the probability and magnitude of potential hazards, specific risk scenarios and to guide on mitigation measures. The QRA report is attached to this report as *annex 8*.

Analysis of Alternatives

Evaluation of alternatives has been discussed in this study report as an essential part of the assessment and decision making. The site, technology, design, material use and no-project alternatives have been analyzed in the report to identify and select alternatives that offer the greatest overall benefits and avoid undesirable impacts.

The project site was found to be suitable as it conforms to the existing land use and zoning specifications; the combined water supply is selected to provide uninterrupted water supply to the facility; and a selection of materials and technologies will be based on the quality standards, cost effectiveness and their environmental credentials. For example:

a) Alternative Technologies

There exists a number of used oil recycling technologies such as vacuum distillation, thin-film evaporation, solvent extraction, pyrolysis, membrane filtration and acid/clay treatment. Among the technologies above, vacuum distillation and clay treatment is the most preferred technology because it;

- i. Effective in the removal of impurities, water, and degradation products from used oil.
- ii. Recovers high-quality base oil fractions for reuse.
- iii. Provides enhanced environmental protection by preventing soil and water contamination.
- iv. Enables waste oils recycling and energy recovery, adding value beyond storage.
- v. Ensures compliance with international best practices and environmental regulations

An identification of gaps in knowledge and uncertainties

During the assessment and report preparation phases, no specific gaps in knowledge or uncertainties were identified.

Environmental and Social Management Plan

The ESMP is an important tool for ensuring project sustainability, environmental conservation and social protection during the project phases (planning, construction, operation and decommissioning). It is therefore important to integrate in the ESIA process, a monitoring and management plan that includes the monitoring of the progress of mitigation measures being implemented. Furthermore, emerging environmental issues which were not earlier considered or anticipated and may pose adverse impacts are also monitored. The proponent shall also ensure that the contractor understands and implements all specified mitigation measures especially during the construction and operational phases.

Section 9 of this report gives details of the ESMP with prescription on the recommendations for corrective measures/activities, their costs, responsibility, timeframe, monitorable indicators and mechanism for implementation which will assist in mitigating and managing the adverse impacts while optimizing the positive impacts associated with the project.

Conclusion and Recommendations

The proposed used oil recycling facility will contribute to significant positive impacts in the area during its construction and operational phases. The positive impacts include: Creation of employment opportunities, improved growth of the economy, promotion of the circular economy through resource recovery, reduction in environmental pollution associated with the improper disposal of used oil, conservation of natural resources through the recovery and reuse of waste oil, enhanced hazardous waste management and compliance with environmental regulations, stimulation of industrial growth and investment within the petroleum recycling sector, business opportunities for licensed used oil collectors, transporters, suppliers, and other service providers, generation of revenue to the National and County Governments through taxes, permits & statutory levies and contribution to Kenya's green growth, cleaner production, and sustainable industrial development objectives.

It is equally evident that, although the project will contribute to various positive impacts, some negative impacts are inevitable and the purpose of conducting this assessment is to outline measures to mitigate them or where possible eradicate them completely. The negative impacts of this project include; pressure on existing infrastructure, occupational safety and health concerns; management of solid waste, sanitary waste and associated social risks.

It is our informed recommendation that the proponent be allowed to proceed with the implementation of the proposed project provided that the outlined mitigation measures in this report are adhered to and the Environmental and Social Management Plan (ESMP) is implemented effectively. An initial environmental audit will also be carried out within a period of 12 months after operation to check compliance of the project to the ESMP, set policies, standards and laws. The proponent is advised to contract licensed experts to undertake the Environmental, Health and Safety Monitoring during the construction phase of the project to enhance harmony among the workers, neighbors and regulatory authorities.

1. INTRODUCTION

1.1 Background

Used oil is oil that has completed its intended service life in an engine, transmission, or hydraulic system which poses severe environmental risks if disposed of improperly, as it contains toxic heavy metals and pollutants. In Kenya, used oil is broadly classified into used motor/lubricating oil and used cooking oil. Both require strict, authorized disposal methods to prevent severe environmental contamination and health hazard.

Currently, there are illicit and unscrupulous markets where some dealers "clean" and repackage used engine oil, selling it back to unsuspecting customers as new oil, a situation that can cause damage to engines and worsen environmental pollution. It is therefore advised that the consumer should always purchase lubricants from reputable, authorized fuel stations. Other alternative uses of used oil include incineration in high-temperature boilers, some individuals reuse it informally for treating fencing posts and wood, or for repelling insects and reptiles.

It is in this space that the company intends to venture into used oil recycling by converting used motor oil into Heavy Fuel Oil (HFO) and industrial lubricants. Used oil recycling (re-refining) restores dirty motor oil into reusable base oil. The standard process involves pre-treating the oil to remove water and light hydrocarbons, followed by vacuum distillation to separate the heavy base oil, and a final polishing step (like hydrotreating or clay adsorption) to eliminate impurities. This circular economy effort will help curb environmental pollution and support industrial development. To support this venture, National Environment Management Authority (NEMA) has issued technical guidelines in an effort to making professional recycling a strict environmental requirement with emphasis on proper handling, storing, transportation and recycling processes.

Environmental and Social Impact Assessment (ESIA) is a tool for environmental conservation and has been identified as a key component in new project implementation. Early identification and mitigation of possible development impacts to the environment should be considered to enhance responsible investment and promote sustainability. The

ESIA planning tool will further instill the ESG as an investment principle that prioritizes environmental issues, social concerns and corporate Governance.

According to the legal notice 31 of 30th April 2019, amendment of the second schedule of EMCA no. 8 of 1999, the projects are categorized as low risk, medium risk and high risk according to their potential impacts to the environment. Screening of the proposed project was done and according to the classification described in the above-mentioned legislation, the project is categorized as a high-risk and therefore subjected to an ESIA Study Report.

1.2 Scope of the assessment

The scope of the assessment covers the project life cycle of the used oil recycling facility from the planning, construction, installation/setting up, operation to decommissioning. The output of this assessment is an ESIA Study Report for submission to NEMA to inform licensing of the project.

1.3 Objectives

The overall objective of the study report is to ensure that all the environmental and social concerns are considered and integrated into the lifecycle activities of the proposed used oil recycling facility.

Specifically, the objectives are:

- To identify potential environmental, social, occupational safety and health impacts, both direct and indirect;
- To assess the significance of the impacts;
- To propose preventive mitigation and compensative measures for the significant adverse impacts of the project on the environment;
- To generate baseline data for monitoring and evaluation of how well the mitigating measures are being implemented during the project cycle;
- To identify and analyze the available alternatives of the proposed project
- To present the results of the EIA that can guide informed decision making; and
- To develop an ESMP for the proposed project with mechanisms for monitoring and evaluating the environmental compliance and the decommissioning plan.

1.4 Terms of Reference (s)

The consultant on behalf of the proponent conducted the assessment by incorporating but not limited to the following terms of reference:

- A description on the location of the proposed project and its associated amenities.
- A concise description of the National and County environmental legislative and regulatory framework.
- Description of the baseline information, and any other relevant information related to the project.
- The objectives of the proposed project.
- The technology, materials, procedures and processes to be used in the construction and implementation of the project.
- The products, by-products and waste to be generated by the project.
- A description of the potentially affected environment.
- The environmental impacts of the project including the socio-cultural and the direct, indirect, cumulative, irreversible, short-term and long-term impacts.
- Analysis of alternatives including project site, design, materials and technologies.
- Climate Change vulnerability and risk assessment of the proposed project
- An environmental and social management plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment, including the cost, monitorable indicators, timeframe and responsibility to implement the measures.
- Propose measures to prevent health hazards and to ensure security in the working environment for the employees, residents and for the management in case of emergencies.
- An identification of gaps in knowledge and uncertainties, which were encountered in compiling the information.
- Such other matters as the Authority may require.

1.5 Methodology outline

The general steps followed during the assessment were as follows: Environment screening; Environmental scoping that provided the key environmental issues; Desktop studies and

interviews; Physical inspection of the site and surrounding areas; public participation and stakeholders' engagements; Reporting and documentation.

1.5.1 Environmental screening

According to the legal notice 31 of 30th April 2019, amendment of the second schedule of EMCA no. 8 of 1999, projects are categorized as low risk, medium risk and high risk according to their potential impacts to the environment. Screening of the proposed project was done and according to the classification described in the above-mentioned legislation, the project is categorized as a high-risk project.

1.5.2 Environmental scoping

The scoping process narrowed down the project report to the most critical issues requiring attention during the assessment. Environmental issues were categorized into physical, social and economic aspects.

1.5.3 Desktop study

The project report preparation included documentary review on the nature of the proposed activities, project documents, designs, relevant policy and legislative framework as well as the environmental setting of the project site area among others.

1.5.4 Site assessment

A rapid site suitability assessment was undertaken to evaluate and assess the suitability of the site for the proposed used oil recycling facility. The site assessment involved an analysis of various factors and criteria to determine if the site meets the requirements and constraints of the intended use. It provided an early review to further clarify the feasibility of the project with regards to conformity and practicality of fitting the project into the existing development plan. The following parameters were considered during the assessment;

- Conformity to existing spatial/Land use planning policies & regulations
- Proximity to utilities and supporting infrastructure
- Ecological Sensitive Areas
- Proximity to Sensitive Security Installations

- Potential for future expansion and growth
- Views of the local communities and other stakeholders including government departments

1.5.5 Environmental baseline studies

Baseline soil quality investigations were undertaken prior to establishment of the facility to serve as a standard or reference line to monitor and measure future environmental changes and to safeguard public health. In addition, initial baseline ambient air quality was undertaken prior to establishment of the facility to serve as a standard or reference line to monitor and measure future environmental changes and to safeguard public health. Furthermore, a Quantitative Risk Assessment (QRA) mapping the risk contours, evaluate the off-site impacts and recommend mitigation measures.

1.5.6 Public participation

Public participation and stakeholders' engagements: To ensure adequate and meaningful public participation, formal meeting invitation notices were issued to the PAPs and other stakeholders within a 500 meters radius in the project Area of Influence (AOI) at least one week prior to the scheduled meetings. The invitations clearly indicated the meeting date, time and venue. Subsequently, the consultants in collaboration with representatives of the National Government Administration Officers (NGAO), conducted two public participation meetings with the PAPs. During these engagements, structured questionnaires were administered to further collect stakeholders' views, concerns, and recommendations regarding the proposed project.

1.5.7 Quantitative Risk Assessment (QRA)

The Quantitative Risk Assessment (QRA) was undertaken to identify and evaluate the potential hazards and risks associated with the proposed used oil recycling facility during its construction, operation and emergency conditions. The assessment specifically considers potential risks arising from process failures, including Loss of Containment (LOC), fires, explosions and other credible accident scenarios that could affect workers, contractors, visitors, neighbouring communities, property and the surrounding environment.

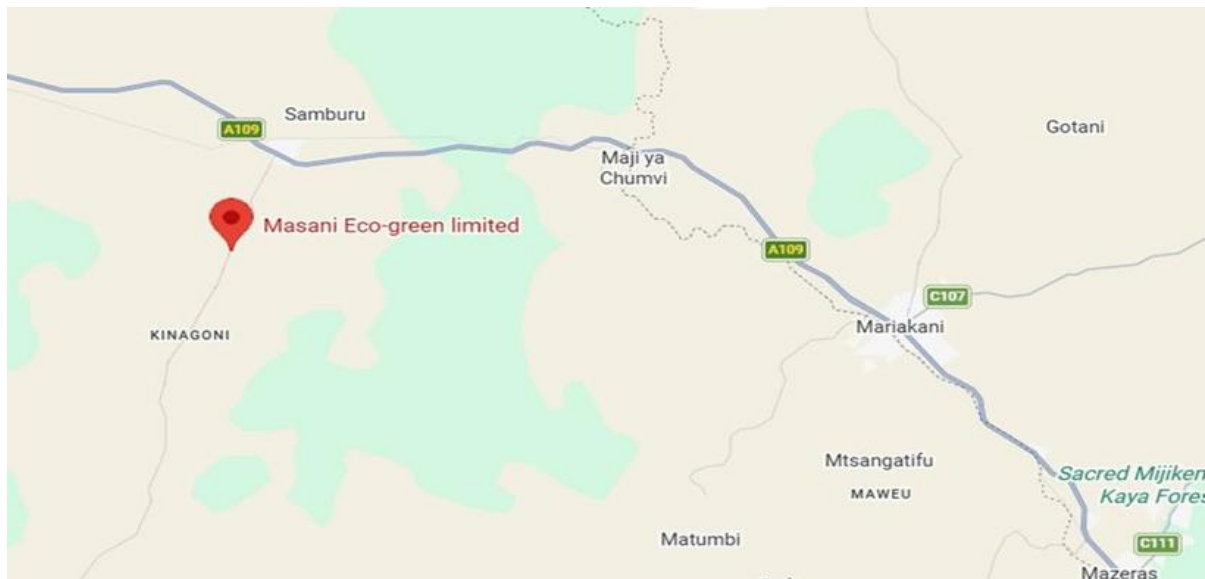
1.5.8 Reporting and Documentation

This study report has been compiled in accordance with the regulations and guidelines issued by NEMA. The report has been prepared on behalf of NSM Enterprise Limited by Katrina Management Consultants Limited for submission to NEMA. The Consultants ensured constant briefing with the client during the entire exercise. The study report has been signed by both the Proponent and Firm of Experts as a proof of authentication and ownership.

2. PROJECT DESCRIPTION

2.1 Project location

The proposed project site is located on Plot L.R. No. KWALE/SAMBURU/SOUTH SAMBURU-GORA, along the Nairobi-Mombasa Highway in Samburu, Kwale County and on Global Positioning System (GPS) Coordinates; longitude - 3.7936 and latitude 39.2988. The proposed project site is a parcel of land measuring approximately 2 acres or thereabout in size. The area is served with good road network since it's adjacent to the Nairobi-Mombasa Highway which allows for easy access. The land ownership document is attached to this report as *annex 1*.



Geographical location of the proposed project



Physical location of the proposed project

2.2 Project's surrounding

The proposed project site is located in an area whose land use character is generally agricultural with upcoming industrial establishments dotting the landscape. It is adjacent to Masani Eco Green waste Tyre Pyrolysis plant, Metraf Mineral Resources Limited and approximately 500 meters from Devki Steel Mill. The drier areas of the Nyika plateau in Kinango, Kasemeni, Samburu and some parts of Lunga Lunga divisions are held under group ranches.



Project surrounding

2.3 Project description

The proposed project will involve the construction and subsequent operation of a used oil recycling facility. The facility will comprise a total of a ten (10) no. (approximately 400,000 litres) storage tanks; 659.68 square metres plant shed, 8 to 10 feet high Boundary wall & a main gate, an office block, quality assurance department, restrooms, truck parking area, loading and offloading bay, cooling tower, air compressor, filter press, recycling plant machineries, and washrooms among others.

The design capacity of the plant is approximately 20,000 Litres per every batch while the daily processing schedule of the plant will be determined by the demand of the products in the market.

2.4 Project components

The facility will accommodate the following basic components;

2.4.1 Office Block

The project proponent proposes to put up office block that will provide working space for the workforce during operation phase of the project.

2.4.2 Washrooms

The proponent intends to construct adequate toilet and washing facilities for use by the workforce during operation phase of the proposed project.

2.4.3 Storage Tanks

The facility will comprise a total of a ten (10) no. (approximately 400,000 litres) storage tanks each incorporating concrete bund walls to serve as secondary containment for spillage.

2.4.4 Site Store

The proponent will include a store room to provide a designated space for the safe and organized storage of various equipment, tools, and supplies that are essential for the operation and maintenance of the facility.

2.4.5 Parking Space

The open space within the yard/facility will be used as a parking area for the trucks that will be delivering used oil to the site or collecting processed/refined oil from the site. The proposed project site will be expanded to provide adequate parking space for trucks.

2.4.6 Oil/Water interceptor

The design of the facility will incorporate concrete drainage channel complete with oil/water interceptor. At the interceptor, oil will be separated from water.

2.4.7 Perimeter Fence

The proposed project site has existing boundary wall with one gate entrance. The construction of the boundary wall is still ongoing onsite.

2.4.8 Site accessibility/Security

The proponent will provide a security area/room to serve as a centralized location for monitoring and controlling access to the facility. It will also serve as a hub for storing

important documents, records, and communication equipment related to the facility's security protocols.

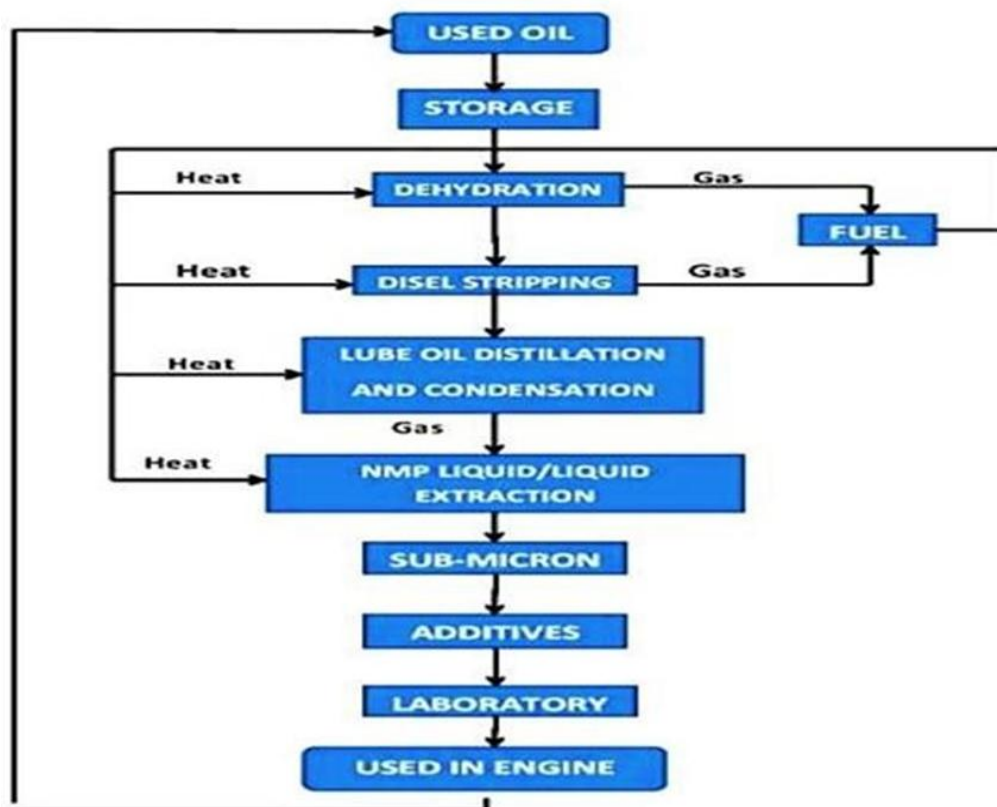
2.4.9 Other installations

Other installations at the facility include: Electricity and electrical appliances, Water supply systems including water storage tanks. *(The architectural designs are attached to this report as annex 2)*

2.5 The used oil refining process

Used oil recycling, commonly known referred to as re-refining, is the process of restoring contaminated or spent lubricating oil into reusable petroleum products through the removal of impurities, contaminants, and degraded additives. The standard process involves pre-treating the oil to remove water and light hydrocarbons, followed by vacuum distillation to separate the heavy base oil, and a final polishing step (like hydrotreating or clay adsorption) to eliminate impurities.

SCHEMATIC OF RE-REFINING PROCESS



2.5.1 Collection and Pre-Treatment

- a) Collection:** The facility will process a wide range of used oil streams, including automotive crankcase and lubricating oils; industrial lubricating oils such as metalworking, marine, railway, and turbine oils; industrial non-lubricating oils including hydraulic, transmission, quenching, and non-PCB transformer oils (containing less than 50 ppm PCBs); oil recovered from tank cleaning and de-ballasting operations; as well as oil recovered from accidental spills or discharges onto land or water.

The proposed facility will receive used oils from approved collection centers or transfer stations and transported to the facility in appropriate dully licensed vehicles.

- b) Filtration:** The raw used oil undergoes physical filtration and centrifuging to remove solid particulate matter, metal shavings, and large sludge.

c) Dehydration

- **Evaporation:** The filtered oil is heated to drive off entrained water and light hydrocarbons (such as fuel and naphtha).
- **Preparation:** Removing these lighter compounds prevents foaming and interference during subsequent, high-temperature distillation steps.

d) Vacuum Distillation

- **Fractionation:** The dehydrated oil is passed through a vacuum distillation column (often utilizing thin-film evaporation). The vacuum lowers the boiling point of the oil, preventing thermal degradation.
- **Separation:** The oil is separated into different fractions based on molecular weight and viscosity, isolating high-value base oils from heavier asphaltic residues.

e) Polishing and Finishing

- **Hydrotreating / Chemical Treatment:** To remove lingering impurities, sulfur,

and odor, the base oil undergoes hydro-treating (a process using hydrogen and a catalyst) or regenerative media polishing.

- **Final Product:** The resulting base oil is virtually indistinguishable from virgin crude oil with enhanced properties like increase in viscosity, specific gravity etc. and is packed in jars of 1L, 2L, 5L, 20L, and 200L barrels. The lubricating oil produced at this stage is similar to that of Group 1 and group 2 class base lubricating oil.

3. BASELINE INFORMATION OF THE STUDY AREA

This chapter of the report addresses environmental, planning, social and economic profile of the area where the proposed project development is to be located.

3.1 Land Use Character

The proposed project site is located in an area whose land use character is generally agricultural with upcoming industrial establishments dotting the landscape. It is adjacent to Masani Eco Green waste Tyre Pyrolysis plant, Metraf Mineral Resources Limited and approximately 500 meters from Devki Steel Mill. The drier areas of the Nyika plateau in Kinango, Kasemeni, Samburu and some parts of Lunga Lunga divisions are held under group ranches.

3.2. Climate

The project area experiences a hot tropical climate influenced by its proximity to the Indian Ocean. Rainfall is bimodal, with the long rains occurring between March and May and the short rains between October and December. Average annual rainfall ranges between 800 mm and 1,200 mm, while temperatures generally vary between 23°C and 32°C. The area experiences relatively high humidity throughout the year.

3.3. Ambient air quality

Air pollution in Kwale County is on the rise due to industrial growth, high vehicular traffic density and urbanization. It is a major problem because it has adverse effects on human health, materials and environment. Air pollution contributes to formation of acid rain, affects soil by reducing its fertility, destruction of aquatic ecosystems and death of certain plants.

Initial baseline ambient air quality was undertaken prior to establishment of the facility to serve as a standard or reference line to monitor and measure future environmental changes and to safeguard public health. From the obtained results, the ambient air quality assessment indicated that the average concentrations of particulate matter (PM_{2.5} and PM₁₀) and the monitored gaseous pollutants, including Carbon Dioxide (CO₂), Volatile Organic Compounds (VOCs), Sulphur Dioxide (SO₂), and Nitrogen Dioxide (NO₂), at all monitoring locations were within the permissible limits stipulated under the EMCA Air Quality Regulations, 2024.

3.4 Topography and Drainage

The project site is situated on gently sloping terrain typical of the coastal lowlands. Surface runoff generally follows the natural gradient towards seasonal drainage channels. No

permanent rivers, wetlands, or other environmentally sensitive aquatic ecosystems were observed within the immediate project footprint.

3.5 Geology and Soils

The project area is underlain by sedimentary formations associated with the coastal geological belt. The soils are generally sandy to sandy loam, exhibiting moderate drainage characteristics and supporting agricultural activities. Baseline soil investigations undertaken prior to project implementation indicated no evidence of petroleum hydrocarbon contamination or elevated heavy metal concentrations, providing a suitable environmental baseline for future monitoring.

3.6 Pressure on existing infrastructure

3.6.1 Sewerage services

The project area has no sewerage service provider hence the common methods for disposal of sanitary wastes and waste water by the facility is through pit latrines, septic tanks and soak away pit systems. The sanitary wastewater from the facility shall be channeled to the septic tank system and arrangements are in place for regular exhaustion by a licensed transporter (exhauster) for disposal at the designated sewer service provider manholes, thereby preventing groundwater pollution.

3.6.2 Power Source

The main source of energy at the facility is grid power supply from Kenya Power and Lighting Company (KPLC). The facility shall consider backup measure such as standby generator and use of solar panels for the purpose of power saving and going green as well.

3.6.3 Water Supply

The facility shall be provided with water from Kwale Water and Sewerage Company Limited (KWAWASCO). The proponent is advised to exploit rain water harvesting to supplement the water supply from KWAWASCO for use in the facility.

3.6.4 Road/Transport Network

The road networks are greatly influenced by existence of important industrial, tourism and commercial activities. Except for the Mombasa-Nairobi highway, most of the roads are earth roads. The facility has a good road network and adequate transport linkages including access road from the main road to the facility. The operator is advised to liaise with KeNHA and NTSA

for the construction of the deceleration, acceleration lanes and erection of road signages at the highway for turning/entry of heavy commercial vehicles into/out of the facility.

3.7 Demography

Kwale County is mainly populated by the Digo and Duruma tribes belonging to the Mijikenda ethnic group. Other tribes include the Kamba, Arabs and Indians. According to the 2019 Kenya Population and Housing Census, Kwale County had a total population of 866,820 persons, comprising 425,121 males and 441,681 females. The proposed project site falls within Chengoni/Samburu Ward in Kinango Sub-County, which had a population of 50,248 persons, comprising 24,081 males and 26,165 females in 2019.

3.8 Biological environment

3.8.1 Flora and Fauna

There is no wildlife and/or wildlife corridor or presence of wild animals in the vicinity of the project site. Vegetation within the project site consists mainly of grasses, shrubs, and scattered trees characteristic of the coastal lowland ecosystem.

3.8.2 Environmentally Sensitive Area (ESA)

There is no sensitive environment adjacent to the proposed project site.

3.9 Socio-Economic Environment

The local economy is supported by agriculture, livestock keeping, quarrying, transport services, trade, and emerging industrial developments. The proposed project is expected to complement ongoing industrial growth by creating employment opportunities, increasing demand for local goods and services, and contributing to county and national economic development.

4. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

This section highlights the relevant international environmental principles, applicable national legislation, and the relevant government agencies & sectors relevant for the management of used oil.

4.1 Background to environmental management policies and laws

4.1.1 Sustainability

The principle of sustainability requires that natural resources should be utilized in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations.

It strives for equity in the allocation of the benefits of development and decries short-term resource exploitation which does not consider the long-term costs of such exploitation.

4.1.2 Principle of intergenerational equity

The principle of sustainability should be examined together with that of intergenerational equity, which focuses on future generations as a rightful beneficiary of environmental protection. Essentially, the principle of intergenerational equity advocates fairness, so that present generations do not leave future generations worse off by the choices they make today regarding development. Its implementation requires the utilization of natural resources in a sustainable manner while avoiding irreversible environmental damage.

4.1.3 Principle of prevention/Do-no-harm principle

The principle of prevention states that protection of the environment is best achieved by preventing environmental harm in the first place rather than relying on remedies or compensation for such harm after it has occurred. The reasoning behind this principle is that prevention is less costly than allowing environmental damage to occur and then taking mitigation measures.

4.1.4 Precautionary principle

The precautionary principle recognizes the limitations of science, as it is not always able to accurately predict the likely environmental impacts of resource utilization. It calls for precaution in the making of environmental decisions where there is scientific uncertainty.

Accordingly, it is closely related to the principle of prevention and can be viewed as the application of the principle of prevention where the scientific understanding of a specific environmental threat is not complete. The precautionary principle thus requires that all reasonable measures must be taken to prevent the possible deleterious environmental consequences of development activities. Further, it demands that scientific uncertainty should not be used as a reason for not taking cost-effective measures to prevent environmental harm.

4.1.5 Polluter pays principle

The polluter pays principle requires that polluters of natural resources should bear the full environmental and social costs of their activities. It seeks to internalize environmental externalities by ensuring that the full environmental and social costs of resource utilization are reflected in the ultimate market price for the products of such utilization. Since environmentally harmful products will tend to cost more, this principle promotes efficient and sustainable resource allocation as consumers are likely to prefer to the cheaper less polluting substitutes of such products.

4.1.6 Principle of public participation

The principle of public participation seeks to ensure environmental democracy and requires that the public, especially local communities should participate in the environment and development decisions that affect their lives. It requires that the public should have appropriate access to information concerning the environment that is held by public authorities and should be given an opportunity to participate in decision-making processes.

4.1.7 Principle of Common but Differentiated Responsibilities (CBDR)

It recognizes that environmental issues are of common concern and recognizes each state

contribution to the creation of an environmental programme and the ability of each state to prevent, reduce and control the threat.

4.2 Policy framework

The policy framework among others, proposes integration of environmental concerns into regional and local development plans, promotion of appropriate land uses and enforcement of EMCA, 1999 and its subsidiaries and other relevant legislations. The policy framework also advocates for efficient water harvesting, storage and usage. On human settlements and infrastructure, this policy framework recognizes the associated environmental issues. These include waste management, sanitation, diseases, land use changes in conservation areas, demand for water, energy, construction materials, pollution, land degradation, biodiversity loss, land and housing tenure, urban planning and design and electronic wastes. In managing operations of the Seal Sugar Mill Limited, consideration of the highlighted issues is vital towards contribution to the national sustainable development goals.

4.2.1 Environmental policy

The Kenya Government's environmental policy aims at integrating environmental aspects into national development plans. The broad objectives of the national environmental policy include:

- Optimal use of natural land and water resources in improving the quality of the human environment;
- Sustainable use of natural resources to meet the needs of the present generation while preserving their ability to meet the needs of future generations;
- Integrate environmental conservation and economic activities into the process of sustainable development;
- Meet national goals and international obligations by conserving bio-diversity, arresting desertification, mitigating effects of disasters, protecting the ozone layer and maintaining an ecological balance on earth.

4.2.2 The Occupational safety and Health Policy

This Policy lays emphasis on continual development and implementation of the Occupational Safety and Health systems and programs to reduce incidences of work-related accidents and

diseases. In addition, it seeks to offer equitable compensation to those who suffer physical injuries and contract occupational diseases. The Policy addresses the current challenges, gaps and future development of safety and health systems and programs in the country. It promotes basic principles of assessing occupational risks or hazards; combating occupational risks or hazards at source; and developing a national preventative safety and health culture that includes information, consultation, research and training. The policy also promotes continuous improvement of occupational safety and health by integrating Kenyan national laws and regulations with Regional Protocols, ILO Conventions, ISO standards and the best practices in the world. It sets up mechanisms for resource mobilization for occupational safety and health programs and activities and provides guidance to all stakeholders in the development and implementation of occupational safety and health systems and programs. NSM Enterprise Limited is committed to put in place occupational safety and health systems and programs to be in tandem with the national policy.

4.2.3 The Kenya Vision 2030 and the “BETA” Blueprint

The Kenya Vision 2030 is the national long-term development policy that aims to transform Kenya into a newly industrialized, middle-income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment. The Bottom-up Economic Transformation Agenda (BETA) is an economic blueprint that was hatched by the Government Regime to foster economic development and provide a solution to the various socio-economic problems facing Kenyans starting from those at grassroot level. Among the items that are intended for delivery include Food Security and Nutrition, Universal Health Care, affordable Housing and enhancing the Local manufacturing industry. The proposed development will explicitly play a role in realization of the pillar on affordable housing as soon as it starts its operations in Kwale County.

4.2.4 Sustainable Development Goals (SDGs)

MDGs are eight internationally-agreed goals for socio-economic development that emphasize the following: elimination of extreme poverty and hunger; universal primary education; gender equality; reduction in child mortality; improvement in maternal health; lower HIV/AIDS and major disease incidence; environmental sustainability; and better partnerships with international development partners. The facility has an opportunity to

contribute towards local achievement of some of these goals via employment opportunities creation, corporate support to community initiatives and contribution towards achieving environmental sustainability goal.

4.2.5 National Water Policy

The National Policy of Water which was promulgated in April 1999 as Sessional Paper No. 1 of 1999 calls for decentralization of operational activities from the central government to other sectors, including local authorities, the private sector and increased involvement of communities in order to improve efficiency in service delivery. It also tackles issues pertaining to water supply and sanitation facilities development, institutional framework and financing of the sector. According to the policy, in order to enable sustainable water supply and sanitation services, there is need to apply alternative management options that are participatory through enhanced involvement of others in the provision of these services but particularly the private sector. The overall objective of the National Water Policy is to lay the foundation for the rational and efficient framework for meeting the water needs for national economic development, poverty alleviation, environmental protection and social well-being of the people through sustainable water resource management.

4.2.6 National Sustainable Waste Management Policy

This Policy will advance Kenya towards a more sustainable and circular, green economy. It will move the country towards realization of the Zero Waste principle, whereby waste generation is minimized or prevented. It will help ensure that waste is collected, separated at the source, reused and recycled, and that the remaining waste stream is destined to a secure, sanitary landfill.

The objectives of this Policy are to: (i) Establish and maintain an effective legal and institutional framework to mainstream sustainable waste management measures and actions across relevant sectors and into integrated planning, budgeting, decision-making and implementation, at both the national and county levels. (ii) Promote sustainable waste management through implementation of the waste hierarchy and circular economy concepts. (iii) Enhance waste segregation, collection, transportation and audit of waste across the nation. (iv) Adopt inclusive management with clear financial and

accounting mechanisms at national and county levels to encourage investment initiatives in implementation of sustainable waste management activities. (v) Engage, strengthen and build partnerships with all stakeholders, including the private and informal sector, as well as the general public through education and provision of waste management services to promote responsible waste management behavior. (vi) Incentivize private sector investment in building and operating sustainable waste management infrastructure. (vii) Facilitate widespread public awareness, participation, action and oversight of Kenya's sustainable waste management policy, law, mechanisms, actions and investments at the national and county level. (viii) Formalize the waste picker sector and ensure safe working conditions through training, financing and facilitating participation in decision-making.

4.3 Legal and Institutional Framework

4.3.1 The Constitution of Kenya, 2010

In the constitution of Kenya, the environment is fundamentally protected under chapter 4 (Bill of rights) and chapter 5 (land and environment). These provisions enshrine the right to a healthy environment while imposing reciprocal duties on both the state and individuals to conserve natural resources for the present and future generations.

4.3.2 National Environment Management Authority

The Authority is established to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government in the implementation of all policies relating to the environment. Its mandate includes implementation on Environmental Management and Coordination (Waste Management) Regulations, 2024 which stipulates the disposal of Hazardous waste such as used oil/sludge. The Authority also administers Environmental and Social Impact Assessments (ESIA) under the provisions of Legal Notice 101 on Environmental (Impact Assessment and Audit) Regulations of 2003. According to regulations all waste recycling facilities should undertake ESIA's.

4.3.2.1 Environmental Management and Co-ordination Act, CAP 387 of the Laws of Kenya

An Act of Parliament to provide for the establishment of an appropriate legal and institutional framework for the management of the environment and for matters connected therewith and incidental there to.

Section 93 of the Act prohibits discharge of hazardous substances, chemicals, oil or mixture containing oil into any waters or any other segment of the environment.

Section 58 and the second schedule of the Act require that operators of waste oil handling facilities should undertake an Environment Impact Assessment before commencing the project.

4.3.2.2 Environmental Management and Coordination (Waste Management) Regulations, 2024

Regulation 22, the fourth and the fifth schedule of the waste management regulations categorize used oil as hazardous waste and give specifications for handling hazardous waste.

4.3.2.3 Environmental (Impact Assessment and Audit) Regulations, 2003

Regulation 4 and 31 stipulate the requirements for Environmental and Social Impact Assessment (ESIA) and Environmental Audit (EA) for facilities that are likely to have significant impact on the environment. Used oil and/or sludge facilities are required to undertake EIA as per the provisions of these regulations.

4.3.2.4 Environmental Management and Coordination (Water Quality) Regulations, 2024

The regulation restricts effluent discharge from facilities and prescribes effluent discharge standards that must be met prior to discharge into the environment. Operators of facilities are therefore required to install pollution prevention systems such as oil interceptor or oil-water separator where wastewater is contaminated with oil and grease. The oil and grease in the discharge should be nil as water contaminated with oil is very dangerous to aquatic life.

4.3.2.5 Environmental Management and Coordination (Air Quality) Regulations, 2024

The regulation prohibits any person through their activities to directly or indirectly cause immediate or subsequent air pollution by emitting any liquid, solid or gaseous substance in levels exceeding those set out in the First Schedule of the regulation.

4.3.2.6 Extended Producer Responsibility regulations, 2024 Legal notice 176/2024

These regulations extend the responsibility of a producer over a product and its packaging during the life cycle of the product or its packaging and provide a framework for the establishment and operation of mandatory extended producer responsibility schemes. The regulations operationalize the polluter pays principle and give effect to section 13 of the Solid Waste Management Act. The plant interacts directly with the oils supply chain; must participate in sectoral EPR schemes for used oil and ensure proper take-back, collection, tracking and reporting.

4.3.2.7 Technical Guidelines on the Management of Used Oil and Oil Sludge in Kenya

These guidelines will contribute to reduction of pollution because they provide direction on safe management of waste oil & oil sludge. In particular they expound on the requirements stipulated in Part IV and specified in the fourth schedule of the Environmental Management and Coordination (Waste Management) Regulations of 2006 on management of hazardous waste. The National Environment Management Authority (NEMA) has issued these technical guidelines in an effort to making professional recycling a strict environmental requirement with emphasis on proper handling, storing, transportation and recycling processes. Specifically, the objectives are: To ensure effective and efficient collection and transportation systems for used, oil and oil sludge; To promote eco-friendly technologies for recycling of used oil; To create awareness on hazards associated with handling used oil; To provide guidance on infrastructure for management of used oil.

4.3.3 Ministry of Energy and Petroleum

The Ministry of Energy and Petroleum is charged with Energy policy development, hydropower development, geothermal exploration and development, thermal power development, oil and gas exploration, oil/gas and minerals sector capacity development,

rural electrification programme, petroleum products import/export/marketing policy management, renewable energy promotion and development, energy regulation, security and conservation, fossil fuels exploration and development.

4.3.3.1 The Petroleum Act, 2019

The Petroleum Act, 2019 is presently the primary legislation in Kenya that contains provisions for the management of the petroleum sub-sector and empowers the Minister responsible for Energy to promulgate regulations for the environmentally sound management of petroleum related facilities and infrastructure. Waste-oil recycling plants by virtue of handling petroleum products automatically become petroleum facilities and therefore subject to this legislation. Specifically, the need for procuring appropriate license from the Energy and Petroleum Regulatory Authority (EPRA).

4.3.3.2 The Kenya Bureau of Standards

The Kenya Bureau of Standards (KEBS) is a government agency established under the Standards Act, CAP 496 and is responsible for governing and maintaining the standards and practices of metrology in Kenya.

Standards, therefore, help to make sure that products and services are fit for the purpose and are comparable and compatible. KEBS formulates standards on lubricants and the products of used oil.

4.3.3.3 Standards Act, CAP 496

An Act of Parliament to promote the standardization of specifications of commodities and codes of practice.

- a) KS EAS 976:2020: The Petroleum Industry – Storage and Distribution of Petroleum Products in above ground Bulk Installations:** This standard covers the layout and design plans of bulk petroleum depots and the installation of equipment of the types normally used for the handling, storage and distribution of petroleum products and their derivatives, other than equipment that are used for storage and dispensing on consumer premises (including service stations) and for which relevant standards exist.

- b) KS 1968: 2006: The Petroleum Industry- Electrical installations in the distribution and marketing sector – Code of Practice:** This standard covers the recommended safe practice in the design, construction, installation and maintenance of electrical and earthing and bonding systems intended to be used in flammable and combustible liquid storage, pumping, distribution and marketing facilities. The standard provides for classification of hazardous locations depending on the presence of flammable gases or liquids
- c) KS EAS 977:2020: The Petroleum Industry- the Installation of underground storage tanks, pumps, dispensers and pipe work at service stations and consumer installations – Code of Practice:** This standard covers provisions for the installation of underground storage tanks of individual capacity not exceeding 85,000L, pump dispensers and pipe work at service stations and consumer installations excluding LPG storage tanks. It provides that an Environmental Impact Assessment should be done before construction and installation of underground tanks for service and filling stations, commercial and consumer installations.
- d) KS 200-1:2002: Specification for storage tanks for petroleum industry – Part 1: Carbon steel welded horizontal cylindrical storage tanks (Second Edition):** It specifies the requirement for the design and construction of carbon steel fusion welded horizontal cylindrical storage tanks with dishes and flat flanged ends for the storage of liquids. The standard includes both above-ground tanks with saddle support and underground tanks. It gives the details of the range of dishes and flanged ends upon which the range of standard diameter tank size have been based. It also gives the overall lengths related to tanks with butt-welded circumferential seams and flat-flanged ends.

4.3.4 Directorate of Occupational Safety and Health Services

The department is mandated to administer all requirements pertaining to the protection of workers from occupational hazards and ensure safe working environment. The Directorate administers the Occupational Safety and Health Act, 2007 and various regulations subsidiary thereunder.

4.3.4.1 Occupational Safety and Health Act, 2007

This Act of Parliament was enacted to provide for the health, safety and welfare of persons employed in workplaces, and for matters incidental thereto and connected therewith.

At every workplace where chemicals or other toxic substances are manipulated, the employer shall develop a suitable system for the safe collection, recycling and disposal of chemical wastes, obsolete chemicals and empty containers of chemicals to avoid the risks to safety, health of employees and to the environment.

4.3.4.2 Medical Examination Rules 2005, (Legal Notice No. 24)

These rules provide for occupiers to mandatorily undertake pre-employment, periodic and termination medical evaluations of workers handling hazardous waste. The employees charged with handling of waste-oil may potentially be exposed to hazardous substances. This regulation requires that they undergo medical evaluations regularly.

4.3.4.3 Hazardous Substances Rules 2007, (Legal Notice No. 60)

The regulation requires proponents to have a Hazard Communication program implemented at their workplace. The Proponent is required to maintain an inventory of all chemicals together with Material Safety Data Sheets (MSDS) for the chemicals stored/handled in their workplace. As a minimum the MSDS shall comply with the requirement of being disclosed fully to the employees handling the chemical by the Proponent. All unused, obsolete or expired chemicals must be disposed of in an environmentally sound manner. All containers containing chemicals must be labeled appropriately as per the regulations. Training of employees on the hazards associated with handling chemicals safely in the workplace will be provided at the Proponent's cost.

4.3.4.4 Safety & Health Committee Rules, 2004 Legal Notice No. 31

The Legal Notice provides for functions and duties of the health and safety committee, the purpose of meetings and recording minutes, and the roles of the office bearers. It further describes the duties of the occupier and those of the Health and Safety Adviser. Safety and health committee shall be formed and trained when the facility is operational.

4.3.4.5 Fire Risk Reduction Rules, 2007 Legal Notice No. 59

The Rules provides that an employer/occupier having flammable substances must have fire resistant facility. The occupier to store highly flammable substances in fixed storage tanks, closed vessels, cupboards except for vehicles transporting the same. Flammable materials have to be kept in separate labeled stores.

4.3.4.6 First Aid in the Workplace Regulations, 2024, Legal Notice No. 79

These rules provide for first-aid box content with respect to size of a workplace and under whose charge the first-aid box should be placed.

4.3.4.7 Electric Power (Special) Rules, 1979 Legal Notice No. 340

The rules provide for electrical safety with regards to electrical power installations, use and handling. These rules apply to generation, transformation, conversion, switching, controlling, regulating, distribution and use of electricity.

4.3.4.8 Building Operations and Works of Engineering Construction Rules, 1984 Legal Notice No. 40

These rules provide for the safety, health and welfare of workers in construction sites relating to building operations and works of engineering construction undertaken by way of trade or business, or for the purpose of any industrial or commercial undertaking, and any line or siding which is used in connection therewith and for the purposes thereof. The rules apply whether the building operations and works of engineering construction undertaken by or on behalf of the Government or a public body or private developer. During the construction phase, the proponent will be expected to ensure safety, health and welfare of workers and all persons lawfully present at the construction site.

4.3.4.9 Noise Prevention and Control Rules, 2005. Legal Notice No. 25

The rules provide that 'No worker shall be exposed to noise level excess of the continuous equivalent of 90 dB (A) for more than 8 hours within any 24 hours duration'. They further provide for protection from exposure to high noise levels.

4.3.4.10 Work Injury Benefits Act, No. 17 of 2007

This law provides for compensation to employees for work-related injuries and diseases contracted in the course employment and for connected purposes. The employer will have an insurance cover for the facility to cater for compensation of injuries sustained by employees while at work.

4.3.5 Ministry of Health

The mandate of Ministry of Health is to support the attainment of the health goals of the people of Kenya by implementing priority interventions in public health.

The Department of Environmental Health and Sanitation aims to reduce disease burden arising from environmental pollution from general environmental health pollutants.

4.3.5.1 Public Health Act CAP 242

The Act demands the adoption of practicable measures to prevent injurious and unhealthy conditions in the site. The Act requires the proponent to enhance effective management of Nuisances i.e. noxious matter or wastewater as will be discharged from the proposed project throughout the project cycle. For instance, the effluent will be discharged into a septic tank. The solid waste shall be handled by a NEMA licensed waste handler/transporter on regular basis and disposed accordingly.

The Act further states that “No person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.” And that “any noxious matter, or waste water, flowing or discharged from any premises, wherever situated, into any public street, or into the gutter or side channel of any street, or into any mullah or watercourse, irrigation channel or bed thereof not approved for the reception of such discharge.”

4.3.6 Water Resources Authority (WRA)

The Water Resource Management Authority (WRMA) is a state corporation under the Ministry of Environment, Water and Natural Resources established under the Water Act 2016 and charged with being the lead agency in water resources management.

4.3.6.1 The Water Act, 2016

This is a primary legislation governing the management, conservation and use of water resources and sewerage services in Kenya. It prescribes the need for the licensee to construct and maintain drains, sewers and other works for intercepting, treating or disposing of any foul water arising or flowing upon land for preventing pollution of water sources within his/her jurisdiction.

4.3.7 County Governments Act, 2012

This is a foundational legislation on devolution and outlines the powers, functions and responsibilities of devolved county governments and establishes structures for citizen participation, public service and local administration. In this regard, the proponent shall work in liaison with the County Government to ensure compliance with land use requirements within the county and obtain the necessary licenses and permits.

5.0 PUBLIC PARTICIPATION

5.1 Introduction

Public consultation and participation process is a policy requirement by the Government of Kenya and a mandatory procedure as stipulated by EMCA, Cap387 section 58, on Environmental Impact Assessment. This chapter describes the process undertaken in the public consultation and participation followed to identify the key issues and impacts of the proposed development. The objectives of the public consultation and participation were:

- Disseminate and inform the stakeholders about the project with Special reference to its key components and location.
- Gather comments, suggestions and concerns of the interested and affected parties about the project.
- This process also facilitated the identification of any other critical issues, which may bring conflicts and delay project implementation.
- Incorporate the information collected in the study report.

In addition, the process enabled,

- The establishment of a communication channel between the general public and the team of consultants, the project proponents and the Government.
- The concerns of the stakeholders are known to the decision-making bodies at an early phase of project development.

5.2 Methodology used in public consultation

In undertaking the exercise, the consultants applied the following methodologies:

- The determination of the project Area of Influence (AOI) and the Project Affected Persons (PAPs)
- Key informant interviews and discussions
- Field surveys, photography and observations
- Conducted two public participation meetings with the PAPs.
- During these engagements, structured questionnaires were administered to further collect stakeholders' views, concerns, and recommendations regarding the proposed project.

5.3 Outcome of Public Participation

As part of the stakeholder engagement process, the consultants conducted two public participation meetings in collaboration with representatives of the National Government Administration Officers (NGAO). The first meeting was held on 27th May, 2026 and was attended by twenty-five (25) participants, comprising fourteen (14) male and eleven (11) female respondents. The second meeting was held on 3rd June, 2026 and recorded an attendance of fifty-three (53) participants, comprising twenty-eight (28) male and twenty-five (25) female respondents. In addition, structured questionnaires were administered during the public meetings to further capture stakeholders' views, concerns, and recommendations regarding the proposed project.

The proposed development was positively received by the Project Affected Persons (PAPs) and other stakeholders during the public participation exercise. Participants expressed their support for the project, noting that the proposed recycling of used oil is a commendable circular economy initiative that will promote the environmentally sound management of used oil, reduce environmental pollution, enhance resource recovery, and support industrial development.

However, the PAPs stakeholders emphasized on:

- Need for the proponent to implement meaningful Corporate Social Responsibility (CSR) initiatives that benefit the local community, including the provision of educational bursaries for deserving students and support for community development programmes.
- They further requested the proponent to ensure that the facility is operated in an environmentally responsible manner by implementing effective pollution prevention and control measures to safeguard public health and the surrounding environment. The PAPs independently gave their views, opinions and suggestions. ***(The formal meeting notices, meeting attendance register, minutes as well as public participation questionnaires are annexed to this report as annex 5a, 5b, 5c and 5d respectively).***

6.0 CLIMATE CHANGE RISKS, VULNERABILITY ASSESSMENT, ADAPTATION AND MITIGATION ACTIONS

6.1 Introduction

Climate change impacts are increasingly recognized worldwide, prompting various sectors, to assess vulnerability, adapt to changing conditions, and mitigate adverse effects. The Proponent must adhere to national climate obligations to protect the environment, enhance resilience, and minimize its carbon footprint. Conducting a vulnerability assessment is essential for developing adaptive management strategies that support sustainable human and natural systems amid extreme climatic events.

This assessment will evaluate how the proposed project's operations may be adversely affected by environmental stressors and outline effective adaptive/mitigation strategies to reduce climate risks and vulnerability.

6.2 Climate Change Risks and Vulnerability Assessment

6.2.1 Extreme Weather Events

Kenya has faced a series of extreme weather events, including prolonged droughts and severe flooding, which significantly impacted agriculture, infrastructure, and energy production.

6.2.2 Rising Temperatures

Kenya experienced above-normal temperatures across most regions in 2023, continuing a long-term warming trend in line with global climate change patterns. This upward trend in temperatures aligns with global patterns of climate change, reflecting the broader impacts of increasing greenhouse gas concentrations and other anthropogenic influences on the climate system. Dependence on grid electricity makes the institution vulnerable to power outages and rising costs, particularly during extreme temperatures.

6.2.3 Rainfall Variability

Climate change has introduced greater variability in rainfall patterns, resulting in both droughts and floods that can disrupt local water supplies and infrastructure. The year 2023

saw higher than normal rainfall in coastal, western, and central highlands, while other regions experienced significant dry spells.

6.2.4 Severe Flooding

Heavy rains have led to widespread flooding causing displacement, property damage, and loss of life in the previous years.

6.2.5 Drought Conditions

The beginning of 2023 was marked by ongoing drought conditions, a result of five consecutive failed rainy seasons since November 2020. This prolonged drought severely affected water availability, agriculture, and livestock, leading to food insecurity and economic hardship for many communities. Lack of sufficient rainfall has continued to strain resources and posed significant challenges to the livelihoods of millions of Kenyans. Prolonged dry periods and increased evaporation could limit access to water, affecting institution's essential services like sanitation and landscaping.

6.2.6 Socio-economic Impacts

Extreme weather conditions have widespread socioeconomic impacts, particularly on agriculture and hydropower generation, exacerbating food insecurity and energy challenges. Floods affected 38 counties across Kenya towards the end of year 2023 and the same prevailing adverse weather even crossed over to 2024, resulting in loss of lives, injuries, displacements, and destruction of key infrastructure. An increase in contaminated water also led to secondary effects, including vector and waterborne disease outbreaks.

6.2.7 Environmental Impacts and vulnerability

The environmental footprint of development projects can be substantial, involving energy consumption, water usage, waste generation, and disruption of local biodiversity.

To mitigate these impacts, facilities can adopt sustainable practices, such as implementing energy-efficient systems, promoting water conservation, and establishing comprehensive recycling programs. Engaging home owners, employees and tenants in sustainability initiatives can foster environmental stewardship and awareness, preparing them to contribute positively to their communities and the planet.

6.3 Adaptation, Mitigation and Optimization Strategies

The Proponent is committed to environmental assessments to monitor and reduce its ecological impacts and intends to implement several measures to adapt to climate change risks, safeguard environmental quality, community health, and long-term facility performance. The key climate-related risks, potential impacts, and recommended adaptation measures for the used oils recycling plant are summarized in the table below:

Climate Risk	Potential Impacts	Adaptation / Mitigation/optimization Measures
Extreme Rainfall & flooding	Flooding of processing and storage areas, contamination of stormwater with used oil; damage to equipment and disruption of operations.	Elevate electrical rooms and critical equipment; construct and regularly maintain adequate stormwater drainage systems; install impermeable bunds around storage tanks; install surge protectors and emergency spill containment systems.
Drought & Water Scarcity	Reduced availability of water for equipment cleaning, dust suppression, firefighting, cooling, and sanitation.	Install water-efficient fixtures; harvest rainwater; recycle process water where feasible; implement water conservation measures and monitor water use.
High temperatures and heatwaves	Increased evaporation of volatile hydrocarbons; heat stress among workers; reduced equipment efficiency; increased risk of fire.	Provide adequate ventilation; install insulation on heated equipment; schedule strenuous outdoor work during cooler hours; provide shaded rest areas, drinking water, and heat stress awareness training.
Strong winds and	Damage to roofs,	Design structures to withstand local wind

storms	storage structures, pipelines, and electrical installations; increased risk of debris causing equipment damage.	loads; securely anchor storage tanks and equipment; conduct routine structural inspections; maintain emergency repair procedures
Lightning strikes	Ignition of flammable vapors, fire outbreaks, damage to electrical systems, and interruption of operations.	Install lightning protection and earthing systems; fit surge protection devices on electrical equipment; inspect and maintain lightning protection systems regularly.
Rising ambient temperatures	Increased energy demand for cooling and ventilation; accelerated degradation of seals, hoses, and equipment components.	Use energy-efficient equipment; implement preventive maintenance; install natural ventilation where practical; monitor equipment operating temperatures.
Increased frequency of wildfires (where applicable)	Fire spread to the facility, smoke impacts on workers, and operational disruptions.	Maintain vegetation clearance around the facility; establish fire breaks where necessary; maintain firefighting equipment; coordinate with local emergency services.
Climate-induced supply chain disruptions	Delays in receiving used oil, spare parts, or dispatching recycled products due to damaged transport infrastructure.	Diversify suppliers and transport routes; maintain adequate inventory of critical spare parts; develop business continuity and emergency response plans.
Climate resilience		Integrate climate resilience considerations into the facility design and operational procedures.

		• Develop and implement a Climate Change Adaptation Plan as part of the ESMP. • Regularly inspect and maintain stormwater drainage systems, bunds, and spill containment structures. • Promote energy efficiency through the use of energy-efficient motors, LED lighting, and regular energy audits. • Incorporate renewable energy technologies, such as solar photovoltaic systems, where technically and economically feasible. • Train employees on climate-related risks, emergency preparedness, and adaptive management practices. • Periodically review climate risks and update adaptation measures based on evolving climate projections and operational experience.
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6.3.1 Flood Risk Reduction

a) Enhance Drainage Systems

Functional drainage systems will help manage storm water effectively and minimize flooding risks. The proponent will effectively improve the system by perforating the perimeter wall to facilitate excess water flow and prevent flooding in the parking areas. Additionally, the consideration of installing a rainwater roof catchment system comprising of gutter and drop pipes will demonstrate the proponent's commitment to further enhance storm water management.

b) Permeable Surfaces

Permeable surfaces tend to remain cooler than conventional concrete or asphalt, mitigating urban heat island effects and creating more comfortable outdoor spaces. Furthermore, they can be integrated with native plants to support local wildlife and promote biodiversity, while their various designs enhance the visual appeal of landscapes.

The Proponent will incorporate permeable surfaces/open spaces in the landscaped and parking areas, significantly enhancing water management and environmental sustainability by allowing rainwater to infiltrate the ground, thus facilitate natural groundwater recharge and support local ecosystems. These surfaces will help reduce surface runoff, minimize erosion and the risk of flooding. Additionally, as water will filter through permeable the materials, pollutants and sediments will be removed, improving the quality of water that reaches rivers and aquifers.

6.3.2 Compliance with National and International Climate Obligations

National Compliance

The proponent will adhere to EMCA, 1999 and the Environmental (Impact Assessment and Audit) Regulations, 2003 by conducting environmental audits and reporting findings to the National Environment Management Authority (NEMA).

International Commitments

The proponent will ensure the operations of the facility align with global climate commitments, contributing to Kenya's Nationally Determined Contributions (NDCs) under the Paris Agreement.

6.3.3 Monitoring and Evaluation

A comprehensive monitoring and evaluation framework will assess the effectiveness of the aforementioned measures using key performance indicators. The proponent is responsible for monitoring the effectiveness of these measures and will be guided by the established key performance indicators, which include;

- Energy consumption reduction; - Measure reductions in electricity and fossil fuel use over time.

- Water conservation targets; - Track water use and ensure water-saving goals are being met.
- Waste reduction; - Monitor the reduction of waste sent to designated dump sites and the increase in recycling and composting efforts.
- Flood management; - Conduct regular checks on the drainage systems before and after the rainy season to ensure they are functioning effectively.
- Awareness Creation; - Conduct regular meetings with the workers to assess and enhance their awareness on climate change risks

6.3.4 Reporting

The Climate Change Act, 2016 requires private entities to perform their climate change duties and prepare a report on the actions they have taken, is taking or intends to take to ensure future performance of those duties. The proponent shall comply with the necessary climate change obligations as discussed in this ESIA study report.

7.0 POTENTIAL IMPACTS AND PROPOSED MITIGATION MEASURES

7.1 Introduction

The environmental baseline information and the project characteristics discussed earlier, form the basis for impact identification and evaluation. The potential impacts expected from the project could either be termed as positive, negative, direct, indirect, short-term, long-term, temporary, and permanent depending on their area of impact and their persistence in the environment. This assessment is done for all the project phase namely; construction, occupation and decommissioning phases.

7.2 Impacts during the Construction Phase

7.2.1 Positive Impacts

7.2.1.1 Employment Opportunities

During the construction phase, job opportunities to both skilled and casual workers will be available. Several workers including casual laborers, masons, carpenters, joinery workers, electricians and plumbers are expected to work at the project site from the project start period to its completion date. Apart from casual labor, semi-skilled and unskilled labor and formal employees are equally expected to obtain gainful employment opportunities during the project installation phase. Approximately 30 workers will be employed during the construction phase.

7.2.1.2 Gains in the Local and National Economy

The proposed project will improve income/economic status of people within the project neighborhood. There will be gains in the local and national economy. Through consumption of locally available building materials including concrete, timber and cement. The consumption of these materials, fuel oil and others will attract taxes including VAT which will be payable to the government. The cost of the materials will be payable directly to the producers.

7.2.1.3 Increased business within the surrounding

The construction crew and residents will buy various commodities from the neighboring business premises. This would boost the businesses of the local people and hence of their families.

IMPACTS DURING THE CONSTRUCTIONPHASE	
Possible Impacts	Mitigations to be enhanced
Natural resource depletion	• Implement a robust landscaping and tree planting scheme as an offset to the tree cover uprooted or removed during excavation works. • Source materials from supplies that use environmentally friendly processes in their operation. • Ensure that damage or loss of material at the site is kept minimal through proper storage. • The tender documents should specify required standards and certification for procurement of all materials and appliances. • Implement water conservation measures such as controlled water use for curing and dust suppression. • Reuse excavated soil and construction debris where feasible.
Loss of tree cover and ground exposure	• Specify location for trucks and equipment, and areas of the site which should be kept free from traffic, equipment and storage. • Designate access route within the site. • Design and implement an appropriate landscaping and tree planting program to help in re- vegetation of part of the project site after construction that focuses on increasing the green area. • Protecting the existing vegetation as much as possible.
Noise and excessive vibrations	The proponent shall: • Ensure compliance with Environmental Management and Coordination (Noise and Excessive Vibrations Pollution) (Control) Regulations, 2009 during construction phase. • Sensitize vehicle drivers and machinery operators to switch off vehicles or machinery not being used. • Ensure that all heavy-duty equipment is insulated or placed in enclosures to minimize noise levels.

	• Ensure regular maintenance and servicing of the trucks and construction machinery. • Install temporary noise barriers where necessary. • Consider substituting existing equipment with quieter compliant equipment; retro-fitting existing equipment with damping materials, mufflers, or enclosures. • Ensure strict use of ear protection devices like earplugs and earmuffs in areas of high noise levels. • Ensure the trucks and machinery are not left on idling mode when not in operation. • Conduct periodic noise surveys to ensure that noise levels do not exceed 75dB (A). • Appropriate authorization will be required before any blasting or excessive vibration operation. • Ensure periodic monitoring of noise and vibration levels within and without the site to ensure compliance.
Water consumption	• The proponent will consider the installation of water-conserving automatic taps or push type taps. Moreover, any water leaks resulting from damaged pipes and/or faulty taps will be promptly fixed by qualified staff. • Prompt reuse and recycling of water as much as possible where necessary. • Install a water meter at water inlet point to monitor and determine total water usage. • Sensitize construction workers on the importance of proper water management. • Establish on-site storage tanks to supplement supply and manage water during peak construction and installation activities.
Pressure on existing utilities	The proponent shall: • Seek necessary approvals from the Kwale Water and Sewerage Company (KWAWASCO) for connection of their water supply to the development. • Sensitize the workers on efficient water utilization. • Acquire necessary authorization from KPLC prior to connection of electricity supply to the site. • Assign traffic marshals to direct traffic as may be required. • Consider the need for backup measures such as solar heating system and standby genset to supplement electricity supply. • The proponent shall install a setback gate to prevent traffic snarl up along the adjoining road traffic and therefore enhance convenience.

Air pollution (Gaseous emissions, dust, fumes)	The proponent shall ensure: • Stock piles of construction materials are covered to reduce dust emissions especially during windy conditions. • Gaseous emissions are controlled by ensuring that all fuel powered construction equipment is serviced and maintained on a regular basis. • Provision of adequate and appropriate Personnel Protective Equipment (PPE) to the workforce. • Construction activities are mainly undertaken during the day. • Monitor stack and ambient air quality regularly and ensure emissions are within permissible limits in line with EMC (Air Quality) Regulations, 2024. • Appropriate pollution control systems are employed to ensure compliance with the emissions standards. • The proponent is further advised to design the stack of the in line with part XIV of the 5th schedule of EMC (Air quality) Regulations of 2024 with emphasis on insulation, height and periodic maintenance. • Obtain emissions license for the facility. • All vehicles and machinery not being utilized will be switched off to reduce emissions of fumes and dust. • Sprinkle water on the access roads to suppress dust. • Ensure maintenance of the trucks and construction machinery. • Installation of double-netted dust screens at the construction site.
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Solid waste generation (Debris and other wastes generated from the construction site)

- Through accurate estimation of quantities of materials required, order materials in the sizes and quantities they will be needed, rather than cutting them to size, or having large quantities of residual materials.
- Opt for machinery and materials with minimal packaging materials and request suppliers to use recyclable packaging whenever possible.
- Provide facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements.
- Dispose waste more responsibly by engaging a NEMA licensed waste handler for the collection, transportation and disposal.
- Maintain proper waste tracking documents.
- The handling, storage, transportation and treatment of hazardous wastes shall be undertaken in line with regulation 16 -23 of the waste management regulation of 2024.
- The proponent shall ensure that all excavated material, debris and general construction waste are collected, reused, recycled, reprocessed and disposed of as appropriate.
- The general solid wastes generated shall be segregated in line with the Sustainable Waste Management Act, 2022 and the National Color-Coding System as indicated in the table below;

NO.	COLOR	TYPE OF WASTE
1.	Green	Organic Waste
2.	Blue	Recyclable Waste
3.	Black	General Waste
4.	Red	E-Wastes

Vector breeding grounds	• The proponent will put in place efficient storm water and waste management systems that will prevent the accumulation of rain water and uncontrolled waste, as well as an efficient collection system and off-site disposal. • If necessary, fumigation of the open drains shall be undertaken by licensed firms to control pest.
Temporary scenic/ Visual Blight	• Ensure minimal footprint of construction activities. • Project workers and activities restricted to site. • Designate specific areas for material storage and ensure that stockpiles are neatly arranged, covered where necessary, and kept at minimal heights. • Progressively restore disturbed areas as construction progresses, including landscaping and re-vegetation where applicable. • Erect appropriate perimeter hoarding, fencing, or scaffold around the site to screen unsightly activities and materials from public view. • Ensure exposed surfaces are stabilized immediately after construction.
Traffic disruptions within the driveways and adjoining roads	• Construction activities that might substantially disrupt traffic e.g. delivery of materials should not be performed during peak travel periods to the maximum extent practicable. • The proponent shall ensure that the project does not encroach on any way-leave and road reserves. • Warning signs should be used as appropriate to provide notice of road hazards and other pertinent information to motorists and the general public. • Signage and barricades should be used as part of the typical construction traffic controls. • Traffic marshals will direct traffic as may be required. • Adherence to County Government Traffic by laws and Kenya traffic laws.

Sanitary wastewater	The Proponent shall: • Provide construction workers with an adequate number of portable toilets lined with impermeable materials to prevent wastewater from leaching into the ground, thereby protecting soil and groundwater resources and minimizing potential public health risks. • Ensure portable toilets are maintained in a clean and hygienic condition. • Put arrangements in place with NEMA licensed waste service provider for regular exhaustion. • Prevent discharge of untreated wastewater into stormwater drains or neighbouring properties. • Decommission temporary sanitation facilities immediately after completion of construction.
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Management of construction workers	• Keep a site worker register with names, ID numbers, job roles, next of kin, and medical details. • Set clear expectations including work quality, timelines, code of conduct and site safety protocols with emphasis on compliance with laws and regulations, professionalism, ethical conduct, appropriate conduct on the job site and ensuring environmental and social responsibility. • Eating facilities for the construction workers shall be provided at the construction site to mitigate on the proliferation of informal and illegal kiosks within the area and along the road reserve. • Conduct regular stakeholder consultations with neighboring residents, local businesses, and community leaders to address any emerging concerns related to the facility operations. • Promote local employment opportunities, giving priority to qualified individuals from the surrounding community. • Implement and enforce codes of conduct for employees to minimize social disturbances such as noise, disorderly behavior, or littering. • Train construction workers on safety procedures. • Regularly update workers on project progress, changes and any potential issues. • Assign tasks based on individual skills and expertise. • Streamline workplace communication channels. • Establish a Grievance Redress Mechanism (GRM) to receive, record, and address any complaints from neighbouring facilities promptly. • Support community initiatives (e.g., environmental clean-ups, tree planting, or cultural events) as part of Corporate Social Responsibility (CSR). • Ensure gender equality and inclusivity in workforce recruitment and other facility operations. • All employees are required to attend an induction-training prior to commencing work on site to ensure they are familiar with the No Gender Based Violence (GBV) and No Sexual Harassment (SH)policies and Code of Conduct. • Gangways to be clearly marked for pedestrian and vehicle traffic on site.
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Climate Change, vulnerability and risk assessment of the project	• Climate change Mitigation and adaptation-a number of measures will be incorporated to cope and adapt to climate change risks. For example, i. Creation of landscaped area and tree planting to reduce urban heat island phenomenon. ii. Design of Climate smart infrastructure to be installed and avoidance of climate sensitive infrastructure. iii. Installation of renewable energy sources such as solar Photovoltaic (PV) systems. iv. Employ other institutional, behavioral and nature-based adaptation actions. • Climate Resilience- The design of the proposed facility shall incorporate green building technologies whereby it shall be well ventilated, adequately lit from natural sunlight and therefore resource efficient and environmentally responsible. In addition, administrative strategies such as awareness among the management and construction workers will be undertaken and sustained within the facility. • The Proponent shall adhere to the national climate obligations to combat climate change, protect the environment, enhance climate resilience, and minimize its carbon footprint.
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Occupational and safety hazards	The Proponent shall: • Register the workplace with DOSHS and other relevant authorities. • Design and put in place a project signboard as per the Ministry of Public Work Standards, indicating the EIA license and other information. • Ensure that appropriate buffers (hoarding and dust screens) are installed to protect members of the public from flying objects. • Provide adequate sanitary facilities for the construction workforce and ensure proper decommissioning of the facilities once construction is complete. • It is recommended the sanitary conveniences at the facility conform to the provisions of the Occupational Safety and Health Act as read together with LD 280 on sanitary convenience standards. The standards give an indication on the minimum number of toilets depending on the number of people at work; 1 for up to 5; 2 toilets for up to 25; and 3 toilets for up to 50. • The proponent shall ensure the sanitary facilities are properly maintained to guarantee cleanliness, accessibility and adequacy with separation for both male and female with appropriate signages. • Provide adequate supply of both quantity and quality of wholesome drinking water. • Ensure maintenance of suitable washing facilities and changing rooms. • Ensure provision of well-equipped First Aid kits. • Ensure provision of appropriate PPEs to the construction workforce as well as undertaking adequate training. • Emergency response procedure including the contacts of emergency responders such the Red Cross, St Johns and nearby hospitals are displayed. • Ensure provision of suitable protective clothing and appliances including where necessary, suitable gloves, footwear, goggles and head covering, and maintained for the use of workers in any process involving exposure to wet or to any injurious or offensive substances/conditions. • The workers, immediate neighbours and other stakeholders are sensitized on the dangers and risk associated with the construction works for enhanced self- responsibility on personal safety.
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	• Enforce adherence to safety procedures and preparing contingency plan for accident response. In addition, safety education and training shall be emphasized. • Scaffolds and work platforms are installed in the prescribed standards throughout construction phase • Install guardrails, toe boards, and handrails on platforms, scaffolds and walkways. • Canopies to be constructed for work at height to reduce impact of workers falling off and to intercept objects falling from higher grounds. • Regular training of the construction workforce on occupational safety issues. • Training of first aiders and provision of well-equipped first aid facilities. • Ensure strict adherence to the provisions of the Occupational Safety and Health Act, 2007 as well as the Building Operations and Works of Engineering Construction Regulations.
Social and human rights concerns (Gender inequality, PWDs accessibility among others)	• The Proponent shall put in place a Grievance Redress Mechanism (GRM) accessible to all Project Affected Persons to address emerging issues, complaints and conflicts to enhance harmonious co-existence. • Equal employment opportunities will be provided for both men and women. • There will be enhanced gender sensitivity to reduce gender discrimination during the construction activities. • The sanitary facilities and changing rooms should be clean, accessible, adequate and convenient with separation for both female and male gender. • Universal Accessibility: Provide wheelchair ramps and accessible washrooms within the development; and ensure parking spaces include designated slots for persons with disabilities. • There shall be zero tolerance to child labour.

Security concerns	• The proposed project site shall be surrounded by an 8 to 10 feet boundary wall and a lockable entrance gate which will be manned 24 hours. • Implement access control systems by managing entry using ID badges, key cards or biometric systems. • Conduct a comprehensive risk assessment of the construction site. • The facility shall contract the services of a registered security firm. • Ensure proper visitor management by implementing the visitor policy that prescribe the need for registration, badges and designated waiting areas. • Ensure designated entrances and parking lots for employees potentially with separate access points. • There will be installation of a functional security lighting system and a CCTV coverage & surveillance. • Install alarm systems and integrate them with surveillance and access control systems.
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7.2.2 Negative impacts

7.3 Impacts during the operational phase

7.3.1 Positive impacts

7.3.1.1 Employment Opportunities

During the operational phase, the proposed used oil recycling facility will create both direct and indirect employment opportunities for skilled, semi-skilled, and unskilled personnel. Employment opportunities will include plant operators, laboratory technicians, maintenance personnel, drivers, security staff, cleaners, administrative staff, and management personnel. In addition, indirect employment will be generated through activities such as transportation, equipment maintenance, waste handling, and the supply of goods and services, thereby contributing to improved household incomes and local livelihoods.

7.3.1.2 Promotion of Local Business and Economic Growth

The operation of the facility will stimulate economic activities within the surrounding area through increased demand for goods and services. Local businesses, including food vendors,

retail shops, fuel stations, accommodation facilities, transport providers, and equipment suppliers, are expected to benefit from the increased patronage by employees, contractors, and visitors. The project will also create market opportunities for enterprises involved in the collection and transportation of used oil.

7.3.1.3 Promotion of Sustainable Waste Management and Environmental Protection

The proposed facility will provide an environmentally sound solution for the collection, treatment, and recycling of used oil that would otherwise be improperly disposed of through open dumping, burning, or discharge into soils and water bodies. By recovering valuable lubricating oil resources, the project will reduce environmental pollution, conserve natural resources, and promote the principles of circular economy and sustainable waste management.

7.3.1.4 Conservation of Natural Resources and Support for Industrial Development

The recycling of used oil into reusable products will reduce the demand for virgin petroleum-based lubricants, thereby conserving finite natural resources and lowering the environmental footprint associated with crude oil extraction and refining. The project will also enhance the availability of recycled oil products for industrial and commercial consumers, supporting local manufacturing and contributing to Kenya's industrialization and resource efficiency objectives.

7.3.2 Negative impacts

The anticipated negative impacts during the operational phase of the proposed used oil recycling facility have been discussed in the table below;

IMPACTS DURING THE OPERATIONAL PHASE	
Possible Impacts	Mitigations to be enhanced
Unsustainable environmental and procurement practices	• Adopt green procurement by procurement goods and services with minimal adverse environmental impacts considering their life cycle in order to reduce their ecological footprints, promote circular economy and support sustainability. • Source materials from supplies that use environmentally friendly processes in their operation.

	• Ensure that damage or loss of material at the site is kept minimal through proper storage. • The tender documents should specify required standards and certification for procurement of all materials and appliances.
Management of air pollution (Stack emissions, fugitive emissions, odors, VOCs, vapors, fumes from machinery or processing activities)	• Initial baseline ambient air quality was undertaken prior to establishment of the facility to serve as a standard or reference line to monitor and measure future environmental changes and to safeguard public health. • From the obtained results, the ambient air quality assessment indicated that the average concentrations of particulate matter (PM_{2.5} and PM₁₀) and the monitored gaseous pollutants, including Carbon Dioxide (CO₂), Volatile Organic Compounds (VOCs), Sulphur Dioxide (SO₂), and Nitrogen Dioxide (NO₂), at all monitoring locations were within the permissible limits stipulated under the EMCA Air Quality Regulations, 2024. The ambient air quality assessment report is attached to this report as annex 6. • The Proponent shall install suitable complete air pollution systems for the used oil recycling facility such as: i. Implement dust/particulate control mechanisms and strict oil/water separators to prevent the evaporation of volatile hydrocarbons into the ambient air. ii. Design the exhaust stacks in line with part XIV of the 5th schedule of EMC (Air quality) Regulations of 2024 with emphasis on insulation, height and periodic maintenance. iii. Fumes from the process shall be channeled through an exhaust system equipped with a scrubbing equipment. iv. Vapor Recovery Units (VRUs): These systems capture hydrocarbon vapors from the headspace of storage tanks during loading and unloading. Instead of venting them, the VRUs compress and liquefy the vapors so they can be routed back into the production line or used as fuel.

	v. Closed-Vent Systems: All processing equipment, dehydration units, and distillation columns shall be sealed and piped directly into a centralized collection manifold, ensuring no gases vent directly to the air. vi. Regenerative Media Polishing: The base oils shall be channeled through automatic media-based polishing systems (like clay, silica gel, or zeolites) to adsorb volatile compounds and eliminate remaining foul odors • It is recommended that NSM Enterprise Limited be carrying out bi-annual monitoring of the ambient air quality, stack emissions and fugitive emissions and compare with the baseline data to note any variations and corrective actions to be undertaken as required in the EMC (Air Quality) Regulations, 2024. • The operator shall apply for and obtain an annual emissions License as required. • Use covered containers for handling and transporting used oil.
Management of spills, leaks and non-refinable used oil	• Baseline soil quality investigations were undertaken prior to establishment of the facility to serve as a standard or reference line to monitor and measure future environmental changes and to safeguard public health. • From the obtained results, all the analyzed heavy metals, namely arsenic, cadmium, chromium, molybdenum, nickel and lead; and soil nutrients including phosphorus, calcium, magnesium, iron, boron, copper and zinc were all below the applicable laboratory guideline values, indicating no evidence of contamination. In addition, Total Petroleum Hydrocarbons (TPH) were not detected, confirming the absence of petroleum contamination at the site. The baseline soil quality analysis report is annexed to this report as annex 7. • The proponent shall: i. Pave the loading and offloading area with an impervious material to prevent any spills from contaminating ground water and soil. ii. Design all storage tanks, loading and offloading area within impermeable secondary containment (bund

	walls) capable of containing at least 110% of the largest tank volume to prevent accidental oil leaks and spills from flowing to other areas. iii. Provide automatic overfill protection, level gauges and high-level alarms for storage tanks. iv. Provide strategically located spill kits containing absorbent pads, booms, sand, sawdust and recovery equipment. v. Incorporate an Oil–Water Separator (OWS) system to manage oily wastewater generated from plant operations, equipment washing, spill wash-downs, and surface runoff from oil-handling and storage areas. vi. Regularly empty sludge tanks and maintain the oil interceptor in good working condition. vii. Conduct regular tests on the used oil tanks to curb possible tank failure. viii. Undertake a Hazard and Operability (HAZOP) Study to inform the formulation of a Spill Prevention and an Emergency Response plan with a demonstrated capacity to control the worst-case disaster scenario to safeguard the recipient properties and communities. ix. Maintain and keep records of incoming used oil by date, volume and source. x. Non-recyclable used oil shall be managed in strict accordance with the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2024. xi. Such oils will be treated as hazardous waste and shall be disposed of through licensed high temperature incineration facilities approved by NEMA. xii. Use covered containers for handling and transporting used oil. xiii. Recover oil from separators and return it to the refining process where technically feasible. xiv. Maintain good housekeeping practices to minimize spills and leaks. xv. Leak Detection and Repair (LDAR): A significant portion of VOCs escape through tiny leaks in valves,
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	pumps, flanges, and compressors. The facility shall run strict LDAR programs using toxic gas analyzers to routinely scan thousands of connection points. xvi. Ensure compliance with the Technical Guidelines on the Management of Used Oil and oil Sludge in Kenya, 2016 during facility operations with emphasis on the handling, collection, transportation, tracking, storage, site requirements, standard infrastructure, complaint management system and record keeping.
Noise and excessive vibrations	The proponent shall: • Ensure that the equipment used are well maintained in accordance with the EMC (Noise and Excessive Vibration Pollution Control) Regulations, 2009. • Install acoustic enclosures or silencers to control noise from the machinery and equipment. • Schedule equipment maintenance to avoid worn-out and noisy components. • Endeavor to conduct operations with minimal noise as practicable. • Provide staff and workers with ear protection in areas with high noise levels. • Establish rules, regulations and management policies for all the workers. • Sensitize the staff and workers on the rules, regulations and management policy for compliance and to avoid noise-related activities. • Conduct periodic noise surveys and assessments.
Energy Consumption	• Adopt cleaner production approaches such as: i. Upgrade to energy-efficient motors, LED lighting and variable frequency drives (VFDs). ii. Explore energy efficient production technologies to reduce the facility's carbon footprint. iii. Monitor energy use during operations and keep records. iv. Procurement of energy saving appliances that have a low energy rating. • The proponent is advised to consider exploring the use of renewable energy sources such as installation of solar

	Photovoltaic (PV) systems to complement energy supply from the national grid. • Sensitize the staff and workers on the importance of proper energy use, management and conservation. • There is need to undertake energy audits by accredited energy auditors to inform on appropriate energy conservation measures and a record of such audits kept available for inspection.
Wastewater management (sanitary, process and equipment cleaning)	• The project area has no sewerage service provider hence the common methods for disposal of sanitary wastes is through pit latrines, septic tank systems. • The sanitary wastewater shall be channeled to a septic tank system and with arrangements in place for regular exhaustion by a NEMA Licensed transporter (exhauster) for disposal at the designated sewer service provider manholes. • A polymer additive should be added to the wastewater settling tank to increase the density of sludge produced in order to decrease the solid content of the effluent. • Spill Containment: All storage tanks and truck loading and offloading zones shall feature impervious concrete floors with bund walls to prevent contaminated runoff from reaching the environment. • Process wastewater generated from equipment cleaning, oil-water separation, storage tank cleaning, floor washing, condensate and other refining operations shall be directed through a closed drainage system to an oil-water separator for the removal of free oil and grease. • The recovered oil shall be returned to the production process where practicable, while the separated sludge shall be handled as hazardous waste and disposed of through NEMA-licensed hazardous waste handlers.
Management of Solid Wastes (office, spent filter media, packaging waste)	• Periodic collection will be undertaken by a NEMA Licensed waste transporter. • Opt for packaging materials that are recyclable and the same should be undertaken through licensed recycling facilities. • The handling, storage, transportation, and treatment of hazardous waste shall be undertaken in line with regulation 16-23 of the waste management regulations of

	2024 with emphasis on implementation of a waste segregation program to ensure hazardous wastes are handled appropriately, reducing contamination of non-hazardous waste streams. The proponent has been advised to ensure waste segregation is done in line with the Sustainable Waste Management Act, 2022 and the National Color-Coding System as indicated in the table below; <table><tr><th>NO.</th><th>COLOR</th><th>TYPE OF WASTE</th></tr><tr><td>1.</td><td>Green</td><td>Organic Waste</td></tr><tr><td>2.</td><td>Blue</td><td>Recyclable Waste</td></tr><tr><td>3.</td><td>Black</td><td>General Waste</td></tr><tr><td>4.</td><td>Red</td><td>E-Wastes</td></tr></table>	NO.	COLOR	TYPE OF WASTE	1.	Green	Organic Waste	2.	Blue	Recyclable Waste	3.	Black	General Waste	4.	Red	E-Wastes
NO.	COLOR	TYPE OF WASTE														
1.	Green	Organic Waste														
2.	Blue	Recyclable Waste														
3.	Black	General Waste														
4.	Red	E-Wastes														
Pressure on existing utilities	- The proponent shall seek necessary approvals from the Kwale Water and Sewerage Company Limited (KWAWASCO)for connection of their water supply to the facility. - The proponent will acquire necessary authorization from KPLC prior to connection of electricity supply to the site. - The proponent shall incorporate the deceleration and acceleration lanes at the entry and exit points of the facility. - The proponent shall install a setback gate to prevent traffic snarl up along the adjoining road traffic and therefore enhance convenience. - Sensitize the workers on efficient water utilization. - The proponent will consider the need for backup measures such as solar heating system and standby gen set to supplement the required utilities.															
Climate Change, vulnerability and risk assessment of the project	- Climate change Mitigation and adaptation-a number of measures will be incorporated to cope and adapt to climate change risks. For example; - Enhancement of the landscaped areas, greenery/green spaces within the facility to reduce urban heat island phenomenon.															

	• Design of Climate smart infrastructure to be installed and avoidance of climate sensitive infrastructure. • Installation of renewable energy sources such as solar Photovoltaic (PV) systems. • Employ other institutional, behavioral and nature-based adaption actions. • Climate Resilience-The design of the units shall incorporate green building technologies in which it shall be well ventilated, adequately lit from natural sunlight therefore resource efficient and environmentally responsible. In addition, administrative strategies such as awareness among the management, workers, tenants and occupants will be undertaken and sustained within the facility. • The Proponent shall adhere to the national climate obligations to combat climate change, protect the environment, enhance climate resilience, and minimize its carbon footprint.
Convenience and access to Sanitary facilities	• It is recommended the sanitary conveniences at the facility conform to the provisions of the Occupational Safety and Health Act as read together with LD 280 on sanitary convenience standards. The standards give an indication on the minimum number of toilets depending on the number of people at work; 1 for up to 5; 2 toilets for up to 25; and 3 toilets for up to 50. • The proponent shall ensure the sanitary facilities are properly maintained to guarantee cleanliness, accessibility and adequacy with separation for both male and female with appropriate signages. • The proponent shall sustain provision of reliable, clean, adequate and safe water at sanitary facilities for handwashing.
Impacts on traffic and site accessibility	• The trucks carrying used oil will be advised to access the site at intervals to reduce traffic congestion along the access road and the adjacent Mombasa-Nairobi Highway. • Design a dedicated deceleration lane for vehicles entering the facility and an acceleration lane where required by the road authority.

	• Provide separate entry and exit gates to reduce conflicts between inbound and outbound traffic. • Ensure all tankers comply with EPRA and traffic safety requirements. • Provide adequate truck holding and parking areas within the site so vehicles do not queue on the highway. • Ensure entrance gates are set back sufficiently from the highway to accommodate waiting trucks. • Install road markings and reflective signage in accordance with highway standards. • The transporter shall have in place an Emergency Response Plan (Spill contingency plan, spill control equipment, a fire control plan and evacuation plan) in case of truck rollover incidents, spillages, fires and explosions. • Ensure compliance with the Technical Guidelines on the Management of Used Oil and oil Sludge in Kenya, 2016 during used oil transportation with emphasis on license acquisition, vehicle labelling, flush points testing before delivery, tracking, complaint management system and record keeping.
Extended Producer Responsibility (EPR)	• The proponent shall ensure registration as a producer (recycler), obtain EPR Certificate of registration and annual license to operate an EPR scheme, thus guarantee Extended Producer obligations. • To lessen the administrative and financial burden of operating an individual EPR scheme, the proponent will transfer the entire EPR obligation to a Producer Responsibility Organization (PRO) as a collective EPR compliance scheme. • The proposed used oil recycling facility shall implement an EPR take-back mechanism to facilitate the environmentally sound collection, transportation, recycling, and disposal of used lubricating oils and used oil containers generated by consumers, commercial enterprises, industries, and institutions. • Used oil generators shall be encouraged to return used oil to designated collection centers or arrange for collection

	by licensed transporters for delivery to the recycling facility.
Increased surface/stormwater generation	• Harvest rainwater from the roof for non-portable uses e.g. landscaping and cleaning. • Ensure observance of the open spaces and greenery requirements to enhance rainwater infiltration. • The facility should have standard drainage systems for the stormwater and ensure a complete separation from the process wastewater. • Implementation of climate change adaptation and mitigation strategies.
Cleaner production approaches	Source & Process Optimization • Segregation at Source: Proactively separate used oil from other hazardous fluids (like solvents, glycols, or brake fluids) during collection. Unmixed oil requires less energy and fewer chemicals to re-refine. • Modern Dehydration & Distillation: Replace polluting acid-clay treatments with advanced, closed-loop re-refining technologies. Techniques such as thin-film evaporation and vacuum distillation remove water and lighter contaminants without generating hazardous acid sludge. • Adoption of modern technologies such as automation, robotics, and remote monitoring to reduce the risk of human error and improve safety. • Centrifuges and Fine Filtration: Utilize high-speed centrifuges and microfiltration to remove mechanical contaminants (metal fragments, dust, and sludge) mechanically, drastically reducing the need for chemical additives. Resource & Energy Efficiency • Closed-Loop Heat Integration: Implement heat exchangers in the distillation process to capture and reuse thermal energy, significantly lowering the plant's overall fuel and electricity consumption. • Solvent Recycling: For facilities utilizing solvent extraction to de-asphalt the oil, install internal solvent

	recovery systems to minimize solvent loss and prevent toxic airborne emissions. Waste Minimization & Byproduct Recovery • Catalyst & Clay Optimization: Use highly selective, long-lasting catalysts or doped materials (e.g., spent catalysts and modified clays) to crack and treat the oil, minimizing the volume of spent solid waste produced. • Bottom Sludge Management: Oil sludge (non-flowing mixtures of solids and liquids) poses the highest environmental threat. Implement co-processing, such as routing heavy bottom residues into cement manufacturing kilns, instead of sending them to landfills. • Leak Detection and Repair (LDAR): A significant portion of VOCs escape through tiny leaks in valves, pumps, flanges, and compressors. The facility shall run strict LDAR programs using toxic gas analyzers to routinely scan thousands of connection points. Good Housekeeping • Strict Leak Detection: Routinely monitor pumps, valves, and pipelines to prevent fugitive emissions and spills. Install impermeable flooring and secondary containment around storage tanks. • Comprehensive Tracking: Maintain accurate inventories to track oil inputs, outputs, and waste generation rates.
Workplace safety and health risks	The proponent will: • Ensure that the completed buildings/yards/premises are fitted with safety facilities including fire detectors, firefighting equipment, unobstructed fire exits, adequate access and buffers. • All employees shall be provided with the appropriate Personal Protective Equipment, enforce their use. • Warning & Safety signage to be displayed at strategic areas within the facility. • Develop and implement a safety and health policy, emergency response plan and Standard Operating

	Procedures (SOPs) for critical site activities within the facility. • Sensitize employees to adhere to standard work procedures to minimize accidents. • Conduct first aid training among the workers and provide well-stocked first aid kits. • Provide and keep an accident/incident register occurring on the facility including near misses and actions taken to prevent future occurrences. • Workers handling waste oils must undergo mandatory medical examination and surveillance for chemical exposure. • Conduct annual occupational safety and health audits, fire safety audits and risk assessments and other statutory safety audits. • A safety and health policy will be formulated. • Firefighting equipment are strategically placed to ensure easy access within the facility along with periodic servicing of the same. • There shall be designated fire assembly points and Emergency evacuation plans including fire/emergency exits. • Provide adequate and appropriate personal protective equipment (PPE) for the workers and conduct training on proper use. • Ensure adequate supply of both quantity and quality of wholesome drinking water for the estate workers. • Provisions will be made for workers' changing rooms. • Frequent cleaning and maintenance will be undertaken to ensure hygienic environment. • Shared sanitary facilities and changing rooms are clean, accessible, adequate and convenient with separation for both female and male gender. • Undertake periodic inspection of the plant and equipment/machinery by DOSHS approved persons in prescribed periods of time. • Undertake indoor occupational noise measurements and surveys at the facility on annual basis.
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	• Display the Material Safety Data Sheets (MSDSs) for the chemicals used in the facility in prominent places to allow for easy access by the employees. • Carry out annual occupational hygiene measurements and surveys to inform the process of implementing the recommended measures.
Fire risks	The proponent shall: • Undertake a Hazard and Operability (HAZOP) Study to inform the formulation of a spill prevention and an Emergency Response plan with a demonstrated capacity to control the worst-case disaster scenario to safeguard the recipient properties and communities and/or undertake a fire risk assessment to determine the emergencies that may arise and therefore inform on the formulation of an Emergency Response Plan (ERP). • Install fire extinguishers, fire hose reels and sand buckets at strategic locations around the plant and train employees on the use of the same. • Ensure the firefighting equipment are serviced regularly by the contracted fire service providers. • Train all workers on fire safety, use of extinguishers, and evacuation procedures. • Conduct regular fire drills, fire safety audits and emergency preparedness exercises and implement fire emergency response plan and evacuation procedures. • Install smoke detectors and heat sensors in critical areas. • Prohibit open flames and smoking (with "No Smoking" and "Flammable Materials" signage) displayed within the site.) • Clearly label flammable materials. • Designate and clearly mark a fire assembling point at a safe place within the site. • Provide informative fire safety and warning signage within the facility. • Maintain adequate separation distances between tanks, processing equipment and buildings in accordance with KEBS, EPRA and OSHA requirements.

Occupational risks related to mechanical failures	• Develop and implement a preventive maintenance programme for all plant and machinery, including pumps, boilers, reactors, distillation units, compressors, conveyors, storage tanks, pipelines, valves, and generators. • Conduct routine inspection, servicing, calibration, and testing of equipment in accordance with the manufacturers' recommendations. • Install automated monitoring and control systems to continuously monitor critical operating parameters such as pressure, temperature, flow rates, liquid levels, and vacuum conditions, with alarms and automatic shutdown mechanisms in the event of abnormal operating conditions. • Ensure that all rotating equipment is properly lubricated, aligned, and balanced to minimize wear, vibration, and unexpected breakdowns. • Regularly inspect pipelines, hoses, flanges, valves, and storage tanks for signs of corrosion, leakage, fatigue, or mechanical damage, and undertake prompt repairs or replacements. • Install pressure relief valves, emergency shut-off valves, and burst protection devices on pressurized systems to prevent equipment failure due to overpressure. • Maintain an adequate inventory of critical spare parts to facilitate timely replacement of worn or damaged components and minimize production downtime. • Train operators and maintenance personnel on proper equipment operation, routine inspection procedures, fault identification, and emergency shutdown protocols. • Establish and implement Standard Operating Procedures (SOPs) for equipment operation, maintenance, startup, shutdown, and emergency response. • Maintain comprehensive maintenance records and periodically review equipment performance to identify recurring faults and opportunities for improvement. • Conduct periodic non-destructive testing (NDT) of critical equipment such as pressure vessels, boilers,
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	storage tanks, and pipelines to detect hidden defects before failure occurs. • Install spill containment systems, including bund walls, drip trays, and secondary containment, around oil handling and processing equipment to contain leaks resulting from mechanical failures. • Develop and implement an Emergency Response Plan (ERP) outlining procedures for responding to equipment failures, oil spills, fires, explosions, and other process-related emergencies. • Ensure that emergency response equipment, including spill kits, absorbent materials, firefighting equipment, and first aid facilities, is readily available and regularly inspected. • Carry out periodic risk assessments and equipment integrity audits to identify potential failure modes and implement corrective actions before failures occur. • Ensure all pressure vessels, boilers, lifting equipment, and other statutory plant are inspected and certified by authorized inspectors in accordance with the Occupational Safety and Health Act (OSHA), 2007 and applicable regulations. • Ensure adequate housekeeping around machinery to prevent the accumulation of oil residues, debris, and combustible materials that may contribute to equipment malfunction or fire.
Emergency preparedness	• The facility shall undertake a risk assessment to determine the emergencies that may arise and therefore inform on the formulation of an Emergency Response Plan (ERP). • The ERP shall provide procedures for likely emergencies including poisonous gas leaks, fire, equipment malfunction/fall etc. and determine the appropriate prevention, mitigation, preparedness, response and recovery procedures. • Performance of regular fire drills, safety inspections and monitoring shall be undertaken by the facility and a record made available for inspection.

	Exits and Exit Routes • Keep safeguards designed to protect workers during an emergency (e.g., sprinkler systems, alarm systems, fire doors, exit lighting) in proper working order. • Ensure exit signs are illuminated and clearly visible at all times. • Keep exit routes and exits free and unobstructed; ensure that exit doors are not locked or blocked. • Ensure exit routes are adequately lit. • Exit routes must not go through a room that can be locked, e.g., a bathroom, nor may it lead into a dead-end corridor. • Mark doorways or passages along an exit route that could be mistaken for an exit with "Not an Exit" or "Fire Exit" language identifying their actual use, e.g., "closet." • If the direction of travel to the nearest exit is not immediately apparent, post signs along the exit access indicating the direction of travel to the nearest exit.
Social risks	• There shall be strict enforcement of the facility rules and regulations by the management. • New employees are encouraged to subscribe the management rules and regulations. • All workers are required to report any disciplinary or conduct-related issues to the management for appropriate action. • Establish a Grievance Redress Mechanism (GRM) accessible to receive, record, and promptly address any complaints, emerging issues or conflicts, therefore enhance harmonious co-existence with the local community. • Support community initiatives (e.g., scholarships, environmental clean-ups, tree planting, or cultural events) as part of Corporate Social Responsibility (CSR). • The proponent shall develop a deliberate local content policy on the use of local human resources, materials, goods and services. • All employees are required to attend an induction-training prior to commencing of work at the factory to

	ensure they are familiar with the No Gender Based Violence (GBV) and No Sexual Harassment (SH) policies and Code of Conduct.
Security Concerns	• The access gate shall be manned by a 24hours security personnel. • The facility shall be surrounded by an 8 to 10 feet high boundary wall, a lockable main entrance gate and a multi-zone electric fencing. • The facility will feature an installed functional security lighting system and CCTV coverage & surveillance. • All vehicles and visitors moving in and out of the facility shall be subjected to inspection by the security guards. • There shall be proper visitor management protocol that includes visitor registration, issuance of badges and designated waiting areas. • The workers shall continuously be sensitized on safety requirements including being aware of their surrounding and report any unusual or suspicious activity/behaviour. • Install alarm systems and integrate them with surveillance and access control systems. • The facility shall practice the <i>Nyumba Kumi</i> security co-management model.

8. ANALYSIS OF PROJECT ALTERNATIVES

This chapter presents an evaluation of alternatives as an essential part of the assessment and decision making. The site, technology, design, material use and no-project alternatives have been analyzed in the report to identify and select alternatives that offer the greatest overall benefits and avoid undesirable impacts.

8.1 No Project Alternative

A no project alternative is a decision not to pursue a project and implies that the status quo is maintained. This situation normally arises where; 1) the feasibility study has failed to give a greenlight to an investment proposal; 2) the environmental and related adverse impacts of a project far-out way the positive impacts; 3) there are extreme conditions such as insecurity/hostilities within the area among others. In this case, the No Project Option is the least preferred from the socio-economic, planning and partly environmental perspective.

8.2 Relocation Option/ siting alternative

This section analyses the Relocation option to a different site. However, a site suitability assessment confirmed that; 1) the project conforms to the zoning policy and land use character of the area. 2) There are supportive infrastructure and logistics in close proximity to the site, such as road, energy, water, sewer, rail and airport; 3) there is room for future expansion. In consideration of the above, relocation of the project is not a viable option.

8.3 The proposed development alternative

Under the proposed development alternative, the developer of the proposed project would be issued with an ESIA License and other operational authorizations. In this case, NEMA in consultation with relevant Lead Agencies will review and consider the proposed used oil recycling facility on plot L.R. NO. KWALE/SAMBURU/SOUTH SAMBURU-GORA in Samburu, Kwale County. The proponent is however required to comply with the recommendations of this study report and conditions attached to the various government authorizations.

8.4 Analysis of Alternative Technology

There exists a number of used oil recycling technologies such as vacuum distillation, thin-film evaporation, solvent extraction, pyrolysis, membrane filtration and acid/clay treatment. Among the technologies above, vacuum distillation and clay treatment is the most preferred technology because it;

- i. Effective in the removal of impurities, water, and degradation products from used oil.
- ii. Recovers high-quality base oil fractions for reuse.
- iii. Provides enhanced environmental protection by preventing soil and water contamination.
- iv. Enables waste oils recycling and energy recovery, adding value beyond storage.
- v. Ensures compliance with international best practices and environmental regulations

8.5 Analysis of Alternative Inputs (Eco-Friendly Construction Materials & Energy Efficiency)

Selection of materials will be based on the quality standards, cost effectiveness and their environmental credentials. For example: Use of environmentally friendly construction materials and energy-efficient systems, such as solar power, rainwater harvesting, and reinforced tanks with protective linings. The advantages of these materials include:

- i. Reduced environmental footprint.
- ii. Long-term operational savings.
- iii. Enhanced public perception and CSR standing.
- iv. Recommended for companies prioritizing sustainability and long-term cost efficiency.

8.6 Water Supply

Water is becoming a scarce resource day by day in most parts of the country. Therefore, the proponent has considered various options of sustaining water supply.

- **Alternative one-KWAWASCO Water supply**

The proposed site is served by Kwale Water and Sewerage Company Limited (KWAWASCO). To augment this option and in order to address the frequent rationing, the proponent is advised to have adequate storage tanks installed for uninterrupted supply of water.

- **Alternative Two- Rain Water Harvesting**

A lot of water can also be harvested from roofs to be used for flushing toilets and general cleaning by the workers and for gardening. This will mainly supplement the piped water supply from Kwale Water and Sewerage Company Limited (KWAWASCO).

- **Alternative three-Tanker/Browsers Water Supply**

Several commercial water supply companies operate in Kwale. These are usually licensed by Water Resources Authority (WRA) to supply water to clients. The proponent can use these services as a supply option. However, this option is not sustainable since it's expensive and there is no guaranteed supply of clean water.

- **Alternative four - Combined Water Supply**

This is the option preferred by the proponent since it is a combination of the KWAWASCO water supply, rainwater harvesting and delivery by the water browsers. The combined water supply is selected to provide uninterrupted water supply to the facility.

9.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

9.1 Introduction

The ESMP is an important tool for ensuring project sustainability, environmental conservation and social protection during the project phases (planning, construction, operation and decommissioning). It is therefore important to integrate in the ESIA process, a monitoring and management plan that includes the monitoring of the progress of mitigation measures being implemented. Furthermore, emerging environmental issues which were not earlier considered or anticipated and may pose adverse impacts are also monitored. The proponent shall also ensure that the contractor understands and implements all specified mitigation measures especially during the construction and operational phases.

This section gives details of the ESMP with prescription on the recommendations for corrective measures/activities, their costs, responsibility, timeframe, monitorable indicators and mechanism for implementation which will assist in mitigating and managing the adverse impacts while optimizing the positive impacts associated with the project as provided in the table below:

CONSTRUCTION PHASE						
No	Adverse impacts	Mitigation Measures	Responsibility	Monitoring Frequency	Performance indicators monitoring activity	Approximate Cost Per year (Kshs)
1.	Natural resource depletion	- Source material from supplies that use environmentally friendly processes in their operation. - Ensure accurate budgeting and estimation of actual construction material requirement to ensure that the least amount of material necessary is ordered. - Ensure that damage or loss of material at construction site is kept minimal through proper storage. - The tender documents should specify required standards and certification for procurement of all materials and appliances; - Steel scaffolding should be used in preference to timber/wood and the Contractor should ensure that sufficient quantities of scaffolding are available	Proponent Contractor Head of Procurement	Continuous	Procurement and store records	Staff Time

		even by way of hire at the time of construction. • All construction materials should be from approved sources; for example, hard stone for building should be obtained from bona fide commercial quarries;				
2.	Loss of vegetation and ground exposure	• Implement a robust landscaping and tree planting scheme as an offset to the tree cover uprooted or removed during excavation works. • Proper demarcation and delineation of the project site. • Specify location for trucks and equipment, and areas of the site which should be kept free from traffic, equipment and storage. • Designate access route within the site. • Design and implement an appropriate landscaping and tree planting program that focuses on increasing the green area to help in re-	Proponent Contractor Design Consultant	Continuous	Number of trees that have been planted. Installed signages. Infrastructure for control of soil erosion. Installed double-netted dust screens. Percentage of land dedicated to open space/greenery Maintenance records	50,000

		vegetation of part of the project. Protect the existing indigenous vegetation as much as possible.				
3.	Noise and excessive vibrations	The proponent shall: - Ensure compliance with Environmental Management and Coordination (Noise and Excessive Vibrations Pollution) (Control) Regulations, 2009 during construction phase. - Sensitize vehicle drivers and machinery operators to switch off vehicles or machinery not being used. - Ensure that all heavy-duty equipment is insulated or placed in enclosures to minimize noise levels. - Ensure regular maintenance and servicing of the trucks and construction machinery. - Install temporary noise barriers where necessary. - Consider substituting existing equipment with quieter compliant	Proponent Contractor KCG DOSHS NEMA	Continuous	Minutes of the sensitization meetings. Vehicle and machinery maintenance records. Enforced PPEs usage by the workers. Noise survey reports.	50,000

		equipment; retro-fitting existing equipment with damping materials, mufflers, or enclosures. • Ensure strict use of ear protection devices like earplugs and earmuffs in areas of high noise levels. • Ensure the trucks and machinery are not left on idling mode when not in operation. • Conduct periodic noise surveys to ensure that noise levels do not exceed 75dB (A). • Appropriate authorization will be required before any blasting or excessive vibration operation. • Ensure periodic monitoring of noise and vibration levels within and without the site to ensure compliance.				
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4.	Water consumption	• The proponent will consider the installation of water-conserving automatic taps or push type taps. Moreover, any water leaks resulting from damaged pipes and/or faulty taps will be promptly fixed by qualified staff. • Prompt reuse and recycling of water as much as possible where necessary. • Install a water meter at water inlet point to monitor and determine total water usage. • Sensitize construction workers on the importance of proper water management. • Establish on-site storage tanks to supplement supply and manage water during peak installation activities.	Proponent Contractor KWAWASCO	Continuous	Meter readings. Minutes of sensitization meetings.	Staff time (However, the cost of installation of the water meter will be determined by the operator in consultation with the installation company)
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5.	Pressure on existing utilities	The proponent shall: • Seek necessary approvals from the Kwale Water and Sewerage Company (KWAWASCO) for connection of their water supply to the development. • Sensitize the workers on efficient water utilization. • Acquire necessary authorization from KPLC prior to connection of electricity supply to the site. • Assign traffic marshals to direct traffic as may be required. • Consider the need for backup measures such as solar heating system and standby genset to supplement electricity supply. • The proponent shall install a setback gate to prevent traffic snarl up along the adjoining road traffic and therefore enhance convenience.	Proponent NEMA KPLC KeNHA KWAWASCO	Continuous	KWAWASCO Approval KeNHA approval KPLC approval Minutes of sensitization meetings	50,000
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6.	Air pollution (Gaseous emissions, dust, fumes)	The proponent shall ensure: • Stock piles of construction materials are covered to reduce dust emissions especially during windy conditions. • Gaseous emissions are controlled by ensuring that all fuel powered construction equipment is serviced and maintained on a regular basis. • Provision of adequate and appropriate Personnel Protective Equipment (PPE) to the workforce. • Construction activities are mainly undertaken during the day. • Monitor stack and ambient air quality regularly and ensure emissions are within permissible limits in line with EMC (Air Quality) Regulations, 2024. • Appropriate pollution control systems are employed to ensure compliance with the emissions standards.	Proponent Contractor NEMA NEMA designated laboratory	Continuous	Installed dust screen. Installed signages. Vehicle and equipment maintenance report. Monitoring reports	100,000
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		• The proponent is further advised to design the stack of the in line with part XIV of the 5th schedule of EMC (Air quality) Regulations of 2024 with emphasis on insulation, height and periodic maintenance. • Obtain emissions license for the facility. • All vehicles and machinery not being utilized will be switched off to reduce emissions of fumes and dust. • Sprinkle water on the access roads to suppress dust. • Ensure maintenance of the trucks and construction machinery. • Installation of double-netted dust screens at the construction site.				
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7.	Solid waste generation (Debris and other wastes generated from the construction site)	• Through accurate estimation of quantities of materials required, order materials in the sizes and quantities they will be needed, rather than cutting them to size, or having large quantities of residual materials. • Opt for machinery and materials with minimal packaging materials and request suppliers to use recyclable packaging whenever possible. • Provide facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements. • Dispose waste more responsibly by engaging a NEMA licensed waste handler for the collection, transportation and disposal. • Maintain proper waste tracking documents. • The handling, storage, transportation and	Proponent Contractor NEMA KCG NEMA licensed waste handler	Continuous	Evidence of a licensed waste transporter. Waste tracking documents and other waste records. Minutes of workers induction on proper waste management. Installed color coded waste receptacles.	100,000
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		treatment of hazardous wastes shall be undertaken in line with regulation 16 -23 of the waste management regulation of 2024. • The proponent shall ensure that all excavated material, debris and general construction waste are collected, reused, recycled, reprocessed and disposed of as appropriate. • The general solid wastes generated shall be segregated in line with the Sustainable Waste Management Act, 2022 and the National Color-Coding System.				
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8.	Vector breeding grounds	- The proponent will put in place efficient storm water and waste management systems that will prevent the accumulation of rain water and uncontrolled waste, as well as an efficient collection system and off-site disposal. - If necessary, fumigation of the open drains shall be undertaken by licensed firms to control pest.	Proponent Contractor A fumigating firm	Continuous	A well-designed drainage system Contractual agreement with fumigating firm	50,000
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9.	Temporary scenic/ Visual Blight	• Ensure minimal footprint of construction activities. • Project workers and activities restricted to site. • Designate specific areas for material storage and ensure that stockpiles are neatly arranged, covered where necessary, and kept at minimal heights. • Progressively restore disturbed areas as construction progresses, including landscaping and re-vegetation where applicable. • Erect appropriate perimeter hoarding, fencing, or scaffold around the site to screen unsightly activities and materials from public view. • Ensure exposed surfaces are backfilled and stabilized immediately after construction.	Proponent Contractor	Continuous	Fenced/secure site. Presence of scaffold at the project site. Landscaping and number of trees planted.	100,000
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10.	Traffic disruptions within the driveways and adjoining roads	- Construction activities that might substantially disrupt traffic e.g. delivery of materials should not be performed during peak travel periods to the maximum extent practicable. - The proponent shall ensure that the project does not encroach on any way-leave and road reserves. - Warning signs should be used as appropriate to provide notice of road hazards and other pertinent information to motorists and the general public. - Signage and barricades should be used as part of the typical construction traffic controls. - Traffic marshals will direct traffic as may be required. - Adherence to County Government Traffic by laws and Kenya traffic laws.	Contractor	Continuous	Presence of traffic marshals. A record of traffic related incidences. Installed traffic signage.	20,000
11.	Sanitary wastewater	The Proponent shall: Provide construction workers with an adequate number of portable toilets	Proponent Contractor	Continuous	Adequate sanitary provisions at the site.	50,000

		lined with impermeable materials to prevent wastewater from leaching into the ground, thereby protecting soil and groundwater resources and minimizing potential public health risks. • Ensure portable toilets are maintained in a clean and hygienic condition. • Put arrangements in place with NEMA licensed waste service provider for regular exhaustion. • Prevent discharge of untreated wastewater into stormwater drains or neighbouring properties. • Decommission temporary sanitation facilities immediately after completion of construction.	DOSHS		Contractual agreement with NEMA licensed waste service provider.	
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12.	Management of construction workers	• Keep a site worker register with names, ID numbers, job roles, next of kin, and medical details. • Set clear expectations including work quality, timelines, code of conduct and site safety protocols with emphasis on compliance with laws and regulations, professionalism, ethical conduct, appropriate conduct on the job site and ensuring environmental and social responsibility. • Eating facilities for the construction workers shall be provided at the construction site to mitigate on the proliferation of informal and illegal kiosks within the area and along the road reserve. • Conduct regular stakeholder consultations with neighboring residents, local businesses, and community leaders to address any emerging concerns related to the facility operations.	Proponent Contractor	Continuous	Minutes of workers training meetings. Workers' register Standard operating procedures on work behaviour	Staff time
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		• Promote local employment opportunities, giving priority to qualified individuals from the surrounding community. • Implement and enforce codes of conduct for employees to minimize social disturbances such as noise, disorderly behavior, or littering. • Train construction workers on safety procedures. • Regularly update workers on project progress, changes and any potential issues. • Assign tasks based on individual skills and expertise. • Streamline workplace communication channels. • Establish a GRM to receive, record, and address any complaints from neighbouring facilities promptly. • Support community initiatives (e.g., environmental clean-ups, tree planting, or cultural events) as part of				
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		Corporate Social Responsibility (CSR). • Ensure gender equality and inclusivity in workforce recruitment and other facility operations. • All employees are required to attend an induction-training prior to commencing work on site to ensure they are familiar with the No Gender Based Violence (GBV) and No Sexual Harassment (SH)policies and Code of Conduct.				
13.	Climate Change, vulnerability and risk assessment of the project	• Climate change Mitigation and adaptation-a number of measures will be incorporated to cope and adapt to climate change risks. For example, i. Creation of landscaped area and tree planting to reduce urban heat island phenomenon.	Proponent Contractor	Continuous	The area under greenery and open space. Landscaped area and number of trees that have been planted. Minutes of the sensitization meetings.	Cost covered under 2 above.

		ii. Design of Climate smart infrastructure to be installed and avoidance of climate sensitive infrastructure. iii. Installation of renewable energy sources such as solar Photovoltaic (PV) systems. iv. Employ other institutional, behavioral and nature-based adaptation actions. Climate Resilience- The design of the proposed facility shall incorporate green building technologies whereby it shall be well ventilated, adequately lit from natural sunlight and therefore resource efficient and environmentally responsible. In addition, administrative strategies such as awareness among			Proof of climate smart design of the facility.	
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		the management and construction workers will be undertaken and sustained within the facility. • The Proponent shall adhere to the national climate obligations to combat climate change, protect the environment, enhance climate resilience, and minimize its carbon footprint.				
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14.	Occupational and safety hazards	The Proponent shall: • Register the workplace with DOSHS and other relevant authorities. • Design and put in place a project signboard as per the Ministry of Public Work Standards, indicating the EIA license and other information. • Ensure that appropriate buffers (hoarding and dust screens) are installed to protect members of the public from falling objects. • Provide adequate sanitary facilities for the construction workforce and ensure proper decommissioning of the facilities once construction is complete. • It is recommended the sanitary conveniences at the facility conform to the provisions of the Occupational Safety and Health Act as read together with LD 280 on sanitary convenience standards. The standards give an indication on the minimum	Proponent Contractor DOSHS	Continuous	Workplace registration certificate Safety and health policy in place. Emergency response plan in place. Presence of adequate sanitary facilities, wholesome drinking water and changing rooms for workers. Compliance to the DOSHS requirements.	100,000
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		number of toilets depending on the number of people at work; 1 for up to 5; 2 toilets for up to 25; and 3 toilets for up to 50. • The proponent shall ensure the sanitary facilities are properly maintained to guarantee cleanliness, accessibility and adequacy with separation for both male and female with appropriate signages. • Provide adequate supply of both quantity and quality of wholesome drinking water. • Ensure maintenance of suitable washing facilities and changing rooms. • Ensure provision of well-equipped First Aid kits. • Ensure provision of appropriate PPEs to the construction workforce as well as undertaking adequate training. • Emergency response procedure including the contacts of emergency responders such the Red				
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		Cross, St Johns and nearby hospitals are displayed. • Ensure provision of suitable protective clothing and appliances including where necessary, suitable gloves, footwear, goggles and head covering, and maintained for the use of workers in any process involving exposure to wet or to any injurious or offensive substances/conditions. • The workers, immediate neighbours and other stakeholders are sensitized on the dangers and risk associated with the construction works for enhanced self-responsibility on personal safety. • Enforce adherence to safety procedures and preparing contingency plan for accident response. In addition, safety education and training shall be emphasized. • Scaffolds are installed throughout construction phase to reduce impact of				
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		workers falling off and to intercept objects falling from higher grounds. • Regular training of the construction workforce on occupational safety issues. • Training of first aiders and provision of well-equipped first aid facilities. • Ensure strict adherence to the provisions of the Occupational Safety and Health Act, 2007.				
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15.	Social and human rights concerns (Gender inequality, PWDs accessibility among others)	• The Proponent shall put in place a GRM accessible to all PAPs to address emerging issues, complaints and conflicts to enhance harmonious co-existence. • Equal employment opportunities will be provided for both men and women. • There will be enhanced gender sensitivity to reduce gender discrimination during the construction activities. • The sanitary facilities and changing rooms should be clean, accessible, adequate and convenient with separation for both female and male gender. • Universal Accessibility: Provide wheelchair ramps and accessible washrooms within the development; and ensure parking spaces include designated slots for persons with disabilities.	Proponent Contractor	Continuous	GRM in place Adherence to the 1/3 gender rule in the hiring of workers. Available sanitary accommodation for both genders Zero tolerance to child labour	Cost covered under 13 above
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16.	Security concerns	• The proposed project site shall be surrounded by an 8 to 10 feet boundary wall and a lockable entrance gate which will be manned 24 hours. • Implement access control systems by managing entry using ID badges, key cards or biometric systems. • Conduct a comprehensive risk assessment of the construction site. • The facility shall contract the services of a registered security firm. • Ensure proper visitor management by implementing the visitor policy that prescribe the need for registration, badges and designated waiting areas. • Ensure designated entrances and parking lots for employees potentially with separate access points.	Proponent Contractor Contracted security firm NPS NGAO	Continuous	Evidenced of installed CCTV surveillance, alarm systems, access control systems and other security infrastructure. Minutes of the security meetings.	100,000
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		• There will be installation of a functional security lighting system and a CCTV coverage & surveillance. • Install alarm systems and integrate them with surveillance and access control systems.				
17.	Increased Surface/Storm water Runoff Generation	• Ensure that no stormwater is directed into the sewer system to avoid overloading the sewerage system; • Harvest rainwater from the roof for non-portable uses e.g. cleaning and watering Plants • Ensure observance of the open space and greenery requirements to enhance rain water infiltration. • Implementation of climate change adaptation and mitigation strategies.	Facility management KCG	Continuous	Installed efficient drainage system. Installed rain water harvesting infrastructure.	Covered under 2 above.
OPERATIONAL PHASE						
No	Adverse impacts	Mitigation Measures	Responsibility	Monitoring Frequency	Performance indicators monitoring	Approximate Cost Per year (Kshs)

					activity	
1.	Unsustainable environmental and procurement practices	• Adopt green procurement by procurement goods and services with minimal adverse environmental impacts considering their life cycle in order to reduce their ecological footprints, promote circular economy and support sustainability. • Source materials from suppliers that use environmentally friendly processes in their operation. • Ensure that damage or loss of material at the site is kept minimal through proper storage. • The tender documents should specify required standards and certification for procurement of all materials and appliances.	Facility management	Continuous	Green procurement policy in place	Staff time

2.	Management of air pollution (Stack emissions, fugitive emissions, odors, VOCs, vapors, fumes from machinery or processing activities)	- Initial baseline ambient air quality was undertaken prior to establishment of the facility to serve as a standard or reference line to monitor and measure future environmental changes and to safeguard public health. - From the obtained results, the ambient air quality assessment indicated that the average concentrations of particulate matter (PM_{2.5} and PM₁₀) and the monitored gaseous pollutants, including Carbon Dioxide (CO₂), Volatile Organic Compounds (VOCs), Sulphur Dioxide (SO₂), and Nitrogen Dioxide (NO₂), at all monitoring locations were within the permissible limits stipulated under the EMCA Air Quality Regulations, 2024.	Facility management NEMA NEMA designated laboratory	Continuous	Baseline ambient air quality report. Monitoring reports Installed air pollution control systems in place. Emissions License in place. The area under greenery and open space.	150,000
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		• The Proponent shall install suitable complete air pollution systems for the used oil recycling facility such as: i. Implement dust/particulate control mechanisms and strict oil/water separators to prevent the evaporation of volatile hydrocarbons into the ambient air. ii. Design the exhaust stacks in line with part XIV of the 5th schedule of EMC (Air quality) Regulations of 2024 with emphasis on insulation, height and periodic maintenance. iii. Fumes from the process shall be channeled through an exhaust system equipped with a scrubbing equipment. iv. Vapor Recovery Units (VRUs): These systems capture hydrocarbon				
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		vapors from the headspace of storage tanks during loading and unloading. Instead of venting them, the VRUs compress and liquefy the vapors so they can be routed back into the production line or used as fuel. v. Closed-Vent Systems: All processing equipment, dehydration units, and distillation columns shall be sealed and piped directly into a centralized collection manifold, ensuring no gases vent directly to the air. vi. Regenerative Media Polishing: The base oils shall be channeled through automatic media-based polishing systems (like clay, silica gel, or zeolites) to adsorb volatile				
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		compounds and eliminate remaining foul odors • It is recommended that NSM Enterprise Limited be carrying out bi-annual monitoring of the ambient air quality, stack emissions and fugitive emissions and compare with the baseline data to note any variations and corrective actions to be undertaken as required in the EMC (Air Quality) Regulations, 2024. • The operator shall apply for and obtain an annual emissions License as required. • Use covered containers for handling and transporting used oil.				
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3.	Management of spills, leaks and non-refinable used oil	- Baseline soil quality investigations were undertaken prior to establishment of the facility to serve as a standard or reference line to monitor and measure future environmental changes and to safeguard public health. - From the obtained results, all the analyzed heavy metals, namely arsenic, cadmium, chromium, molybdenum, nickel and lead; and soil nutrients including phosphorus, calcium, magnesium, iron, boron, copper and zinc were all below the applicable laboratory guideline values, indicating no evidence of contamination. In addition, Total Petroleum Hydrocarbons (TPH) were not detected, confirming the absence of petroleum contamination at the site. - The proponent shall:	Facility management NEMA designated laboratory	Continuous	Baseline soil analysis report. Spill incident reports. Maintenance schedules for the interceptor. Presence of impermeable secondary containment. Availability of spill kits containing absorbent pads, booms, sand, sawdust and recovery equipment. Hazard and Operability (HAZOP) Study report. Adherence to the Technical Guidelines on the Management of	150,000
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		i. Pave the loading and offloading area with an impervious material to prevent any spills from contaminating ground water and soil. ii. Design all storage tanks, loading and offloading area within impermeable secondary containment (bund walls) capable of containing at least 110% of the largest tank volume to prevent accidental oil leaks and spills from flowing to other areas. iii. Provide automatic overfill protection, level gauges and high-level alarms for storage tanks. iv. Provide strategically located spill kits containing absorbent pads, booms, sand, sawdust and recovery equipment.			Used Oil and oil Sludge in Kenya, 2016 on site requirements.	
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		v. Incorporate an Oil-Water Separator (OWS) system to manage oily wastewater generated from plant operations, equipment washing, spill wash-downs, and surface runoff from oil-handling and storage areas. vi. Regularly empty sludge tanks and maintain the oil interceptor in good working condition. vii. Conduct regular tests on the used oil tanks to curb possible tank failure. viii. Undertake a Hazard and Operability (HAZOP) Study to inform the formulation of a Spill Prevention and an Emergency Response plan with a demonstrated capacity to control the worst-case disaster scenario to				
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		safeguard the recipient properties and communities. ix. Maintain and keep records of incoming used oil by date, volume and source. x. Non-recyclable used oil shall be managed in strict accordance with the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2024. xi. Such oils will be treated as hazardous waste and shall be disposed of through licensed high temperature incineration facilities approved by NEMA. xii. Use covered containers for handling and transporting used oil. xiii. Recover oil from separators and return it				
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		to the refining process where technically feasible. xiv. Maintain good housekeeping practices to minimize spills and leaks. xv. Leak Detection and Repair (LDAR): A significant portion of VOCs escape through tiny leaks in valves, pumps, flanges, and compressors. The facility shall run strict LDAR programs using toxic gas analyzers to routinely scan thousands of connection points. • Ensure compliance with the Technical Guidelines on the Management of Used Oil and oil Sludge in Kenya, 2016 during facility operations with emphasis on the handling, collection, transportation, tracking,				
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		storage, site requirements, standard infrastructure, complaint management system and record keeping.				
4.	Noise and excessive vibrations	The proponent shall: • Ensure that the equipment used are well maintained in accordance with the EMC (Noise and Excessive Vibration Pollution Control) Regulations, 2009. • Install acoustic enclosures or silencers to control noise from the machinery and equipment. • Schedule equipment maintenance to avoid worn-out and noisy components. • Endeavor to conduct operations with minimal noise as practicable. • Provide staff and workers with ear protection in areas with high noise levels. • Establish rules, regulations and management policies for all the workers.	Facility management KCG DOSHS	Continuous	Noise level Measurements reports. Noise related complaints. Equipment maintenance schedules. Enforced use PPEs.	100,000

		• Sensitize the staff and workers on the rules, regulations and management policy for compliance and to avoid noise-related activities. • Conduct periodic noise surveys and assessments.				
5.	Energy Consumption	• Adopt cleaner production approaches such as: i. Upgrade to energy-efficient motors, LED lighting and variable frequency drives (VFDs). ii. Explore energy efficient production technologies to reduce the facility's carbon footprint. iii. Monitor energy use during operations and keep records. iv. Procurement of energy saving appliances that have a low energy rating. • The proponent is advised to consider exploring the use of renewable energy sources such as installation	Facility management KPLC EPRA	Continuous	Installed solar panels. Energy Audit reports (if applicable.) Minutes of the workers' sensitization meetings.	TBD 100,000

		of solar Photovoltaic (PV) systems to complement energy supply from the national grid. • Sensitize the staff and workers on the importance of proper energy use, management and conservation. • There is need to undertake energy audits by accredited energy auditors to inform on appropriate energy conservation measures and a record of such audits kept available for inspection.				
6.	Wastewater management (sanitary, process and equipment cleaning)	• The project area has no sewerage service provider hence the common methods for disposal of sanitary wastes is through pit latrines, septic tank systems. • The sanitary wastewater shall be channeled to a septic tank system and with arrangements in place for regular exhaustion by a	Facility management. NEMA NEMA licensed waste transporter	Continuous	Maintenance schedules. Records of septic tank exhaustion. Contractual agreement with NEMA-licensed hazardous waste handlers.	100,000

		NEMA Licensed transporter (exhauster) for disposal at the designated sewer service provider manholes. • A polymer additive should be added to the wastewater settling tank to increase the density of sludge produced in order to decrease the solid content of the effluent. • Spill Containment: All storage tanks and truck loading and offloading zones shall feature impervious concrete floors with bund walls to prevent contaminated runoff from reaching the environment. • Process wastewater generated from equipment cleaning, oil-water separation, storage tank cleaning, floor washing, condensate and other refining operations shall be directed through a closed drainage system to an oil-water separator for the				
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		removal of free oil and grease. The recovered oil shall be returned to the production process where practicable, while the separated sludge shall be handled as hazardous waste and disposed of through NEMA-licensed hazardous waste handlers.				
7.	Management of Solid Wastes (office, spent filter media, packaging waste)	- Periodic collection will be undertaken by a NEMA Licensed waste transporter. - Opt for packaging materials that are recyclable and the same should be undertaken through licensed recycling facilities. - The handling, storage, transportation, and treatment of hazardous waste shall be undertaken in line with regulation 16-23 of the waste management regulations of 2024 with emphasis on implementation of a waste	Facility management NEMA licensed waste transporters. NEMA KCG	Continuous	Evidence of a licensed waste collector. Waste tracking documents and other waste records. Minutes on residents/workers induction on proper waste management. Installed color coded waste receptacles.	100,000

		segregation program to ensure hazardous wastes are handled appropriately, reducing contamination of non-hazardous waste streams. The proponent has been advised to ensure waste segregation is done in line with the Sustainable Waste Management Act, 2022 and the National Color-Coding System.				
8.	Pressure on existing utilities	- The proponent shall seek necessary approvals from the Kwale Water and Sewerage Company Limited (KWAWASCO) for connection of their water supply to the facility. - The proponent will acquire necessary authorization from KPLC prior to connection of electricity supply to the site. - The proponent shall incorporate the deceleration and	Facility management KWAWASCO KeNHA KPLC	Continuous	KWAWASCO approval. Maintenance schedules. KPLC authorization. KeNHA approval. Installed deceleration and acceleration lanes. Minutes of sensitization meetings.	100,000

		acceleration lanes at the entry and exit points of the facility. • The proponent shall install a setback gate to prevent traffic snarl up along the adjoining road traffic and therefore enhance convenience. • Sensitize the workers on efficient water utilization. • The proponent will consider the need for backup measures such as solar heating system and standby gen set to supplement the required utilities.				
9.	Climate Change, vulnerability and risk assessment of the project	• Climate change Mitigation and adaptation-a number of measures will be incorporated to cope and adapt to climate change risks. For example; • Enhancement of the landscaped areas, greenery/green spaces within the facility to reduce	Facility management Contracted landscaper	Continuous	The area under greenery and open space. Number of trees that have been planted and maintained. Minutes of the sensitization meetings.	50,000

		urban heat island phenomenon. • Design of Climate smart infrastructure to be installed and avoidance of climate sensitive infrastructure. • Installation of renewable energy sources such as solar Photovoltaic (PV) systems. • Employ other institutional, behavioral and nature-based adaption actions. • Climate Resilience-The design of the units shall incorporate green building technologies in which it shall be well ventilated, adequately lit from natural sunlight therefore resource efficient and environmentally responsible. • The Proponent shall adhere to the national climate obligations to combat climate change, protect the environment, enhance			Proof of climate smart design of the facility.	
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		climate resilience, and minimize its carbon footprint.				
10.	Convenience and access to Sanitary facilities	• It is recommended the sanitary conveniences at the facility conform to the provisions of the Occupational Safety and Health Act as read together with LD 280 on sanitary convenience standards. The standards give an indication on the minimum number of toilets depending on the number of people at work; 1 for up to 5; 2 toilets for up to 25; and 3 toilets for up to 50. • The proponent shall ensure the sanitary facilities are properly maintained to guarantee cleanliness, accessibility and adequacy with separation for both male and female with appropriate signages. • The proponent shall sustain provision of reliable, clean,	Facility Management DOSHS	Continuous	• Provision of sanitary facilities. • Conformity to the sanitary convenience standards.	Staff time and covered under operational cost

		adequate and safe water at sanitary facilities for handwashing.				
11.	Impacts on traffic and site accessibility	- The trucks carrying used oil will be advised to access the site at intervals to reduce traffic congestion along the access road and the adjacent Mombasa-Nairobi Highway. - Design a dedicated deceleration lane for vehicles entering the facility and an acceleration lane where required by the road authority. - Provide separate entry and exit gates to reduce conflicts between inbound and outbound traffic. - Ensure all tankers comply with EPRA and traffic safety requirements. - Provide adequate truck holding and parking areas within the site so vehicles do not queue on the highway.	Facility management KeNHA Traffic marshals	Continuous	Traffic logs Complaints Register Adherence to Technical Guidelines on the Management of Used Oil and oil Sludge in Kenya, 2016 during used oil transportation.	50,000

		• Ensure entrance gates are set back sufficiently from the highway to accommodate waiting trucks. • Install road markings and reflective signage in accordance with highway standards. • The transporter shall have in place an Emergency Response Plan (Spill contingency plan, spill control equipment, a fire control plan and evacuation plan) in case of truck rollover incidents, spillages, fires and explosions. • Ensure compliance with the Technical Guidelines on the Management of Used Oil and oil Sludge in Kenya, 2016 during used oil transportation with emphasis on license acquisition, vehicle labelling, flush points testing before delivery, tracking, complaint				
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		management system and record keeping.				
12.	Extended Producer Responsibility (EPR)	- The proponent shall ensure registration as a producer (recycler), obtain EPR Certificate of registration and annual license to operate an EPR scheme, thus guarantee Extended Producer obligations. - To lessen the administrative and financial burden of operating an individual EPR scheme, the proponent will transfer the entire EPR obligation to a Producer Responsibility Organization (PRO) as a collective EPR compliance scheme. - The proposed used oil recycling facility shall implement an EPR take-back mechanism to facilitate the environmentally sound collection, transportation, recycling, and disposal of used lubricating oils and	Facility management NEMA	Continuous	EPR Certificate of registration and annual license. Subscription to a Producer Responsibility Organization (PRO). Used oil containers takeback measures in place.	50,000

		used oil containers generated by consumers, commercial enterprises, industries, and institutions. • Used oil generators shall be encouraged to return used oil to designated collection centers or arrange for collection by licensed transporters for delivery to the recycling facility.				
13.	Increased surface/stormwater generation	• Harvest rainwater from the roof for non-portable uses e.g. landscaping and cleaning. • Ensure observance of the open spaces and greenery requirements to enhance rainwater infiltration. • The facility should have standard drainage systems for the stormwater and ensure a complete separation from the process wastewater. • Implementation of climate change adaptation and mitigation strategies.	Facility management	Continuous	A well-maintained drainage system Climate change adaptation and mitigation strategies in place. Well maintained open spaces and greenery.	50,000

14.	Cleaner production approaches	Source & Process Optimization • Segregation at Source: Proactively separate used oil from other hazardous fluids (like solvents, glycols, or brake fluids) during collection. Unmixed oil requires less energy and fewer chemicals to re-refine. • Modern Dehydration & Distillation: Replace polluting acid-clay treatments with advanced, closed-loop re-refining technologies. Techniques such as thin-film evaporation and vacuum distillation remove water and lighter contaminants without generating hazardous acid sludge. • Adoption of modern technologies such as automation, robotics, and remote monitoring to	Facility management	Continuous	Resource and energy records. Waste records. No. of incidences or near misses. General housekeeping as visible by the naked eye.	Included in the operational cost.
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		reduce the risk of human error and improve safety. • Centrifuges and Fine Filtration: Utilize high-speed centrifuges and microfiltration to remove mechanical contaminants (metal fragments, dust, and sludge) mechanically, drastically reducing the need for chemical additives. Resource & Energy Efficiency • Closed-Loop Heat Integration: Implement heat exchangers in the distillation process to capture and reuse thermal energy, significantly lowering the plant's overall fuel and electricity consumption. • Solvent Recycling: For facilities utilizing solvent extraction to de-asphalt the oil, install internal solvent recovery systems to minimize solvent loss and				
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		prevent toxic airborne emissions. Waste Minimization & Byproduct Recovery • Catalyst & Clay Optimization: Use highly selective, long-lasting catalysts or doped materials (e.g., spent catalysts and modified clays) to crack and treat the oil, minimizing the volume of spent solid waste produced. • Bottom Sludge Management: Oil sludge (non-flowing mixtures of solids and liquids) poses the highest environmental threat. Implement co-processing, such as routing heavy bottom residues into cement manufacturing kilns, instead of sending them to landfills. • Leak Detection and Repair (LDAR): A significant portion of VOCs				
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		escape through tiny leaks in valves, pumps, flanges, and compressors. The facility shall run strict LDAR programs using toxic gas analyzers to routinely scan thousands of connection points. Good Housekeeping • Strict Leak Detection: Routinely monitor pumps, valves, and pipelines to prevent fugitive emissions and spills. Install impermeable flooring and secondary containment around storage tanks. • Comprehensive Tracking: Maintain accurate inventories to track oil inputs, outputs, and waste generation rates.				
15.	Workplace safety and health risks	The proponent will: • Ensure that the completed buildings/yards/premises are fitted with safety	Facility management	Continuous	Workplace registration certificate. Safety and health	200,000

		facilities including fire detectors, firefighting equipment, fire exits, adequate access and buffers. • All employees shall be provided with the appropriate Personal Protective Equipment, enforce their use. • Warning & Safety signage to be displayed at strategic areas within the facility. • Develop and implement a safety and health policy, emergency response plan and Standard Operating Procedures (SOPs) for critical site activities within the facility. • Install guardrails, toe boards, and handrails on platforms, scaffolds, and walkways. • Sensitize employees to adhere to standard work procedures to minimize accidents.	Safety and Health committee Emergency responders DOSHS		committee in place. Safety and health policy in place. Enforced use of PPEs by the workers. Emergency response plan in place. Presence of adequate sanitary facilities for workers, wholesome drinking water and changing rooms. Installed and serviced firefighting equipment. Availability of a first aid kit. Fire safety audits and risk	
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		• Conduct first aid training among the workers and provide well-stocked first aid kits. • Provide and keep an accident/incident register occurring on the facility including near misses and actions taken to prevent future occurrences. • Workers handling waste oils must undergo mandatory medical surveillance for chemical exposure. • Conduct annual occupational safety and health audits, fire safety audits and risk assessments and other statutory safety audits. • A safety and health policy will be formulated. • Firefighting equipment are strategically placed to ensure easy access within the facility along with			assessment reports. Material Safety Data Sheets (MSDSs) for the chemicals in used displayed at the facility. Compliance to the DOSHS requirements.	
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		periodic servicing of the same. • There shall be designated fire assembly points and Emergency evacuation plans including fire/emergency exits. • Provide adequate and appropriate personal protective equipment (PPE) for the workers and conduct training on proper use. • Ensure adequate supply of both quantity and quality of wholesome drinking water for the estate workers. • Provisions will be made for workers' changing rooms. • Frequent cleaning and maintenance will be undertaken to ensure hygienic environment. • Shared sanitary facilities and changing rooms are clean, accessible, adequate and convenient with separation for both female and male gender.				
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		• Undertake periodic inspection of the plant and equipment/machinery by DOSHS approved persons in prescribed periods of time. • Undertake indoor occupational noise measurements and surveys at the facility on annual basis. • Display the Material Safety Data Sheets (MSDSs) for the chemicals used in the facility in prominent places to allow for easy access by the employees. • Carry out annual occupational hygiene measurements and surveys to inform the process of implementing the recommended measures.				
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16.	Fire risks	The proponent shall: - Undertake a Hazard and Operability (HAZOP) Study to inform the formulation of a spill prevention and an Emergency Response plan with a demonstrated capacity to control the worst-case disaster scenario to safeguard the recipient properties and communities and/or undertake a fire risk assessment to determine the emergencies that may arise and therefore inform on the formulation of an Emergency Response Plan (ERP). - Install fire extinguishers, fire hose reels and sand buckets at strategic locations around the plant and train employees on the use of the same. - Ensure the firefighting equipment are serviced	Facility management Safety and Health committee Emergency responders DOSHS	Continuous	Installed "No Smoking" and "Flammable Materials" signages. Fire safety policy in place. Emergency Response Plan in place. Fire drills and fire safety audit reports. Installed firefighting equipment. Minutes of workers' training on fire safety.	Cost covered under 15 above.
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		regularly by the contracted fire service providers. • Train all workers on fire safety, use of extinguishers, and evacuation procedures. • Conduct regular fire drills, fire safety audits and emergency preparedness exercises and implement fire emergency response plan and evacuation procedures. • Install smoke detectors and heat sensors in critical areas. • Prohibit open flames and smoking (with "No Smoking" and "Flammable Materials" signage) displayed within the site.) • Clearly label flammable materials. • Designate and clearly mark a fire assembling point at a safe place within the site. • Provide informative fire safety and warning signage within the facility.				
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		• Maintain adequate separation distances between tanks, processing equipment and buildings in accordance with KEBS, EPRA and OSHA requirements.				
17.	Occupational risks related to mechanical failures	• Develop and implement a preventive maintenance programme for all plant and machinery, including pumps, boilers, reactors, distillation units, compressors, conveyors, storage tanks, pipelines, valves, and generators. • Conduct routine inspection, servicing, calibration, and testing of equipment in accordance with the manufacturers' recommendations. • Install automated monitoring and control systems to continuously monitor critical operating parameters such as pressure, temperature, flow	Facility management Safety and Health committee Emergency responders DOSHS	Continuous	Safety checklists. Incident reports. Risk assessment reports. Standard Operating Procedures (SOPs) Equipment maintenance reports. Safety signages in place. Lockout/Tagout (LOTO) procedures in place.	Cost covered under 15 above.

		rates, liquid levels, and vacuum conditions, with alarms and automatic shutdown mechanisms in the event of abnormal operating conditions. • Ensure that all rotating equipment is properly lubricated, aligned, and balanced to minimize wear, vibration, and unexpected breakdowns. • Regularly inspect pipelines, hoses, flanges, valves, and storage tanks for signs of corrosion, leakage, fatigue, or mechanical damage, and undertake prompt repairs or replacements. • Install pressure relief valves, emergency shut-off valves, and burst protection devices on pressurized systems to prevent equipment failure due to overpressure. • Maintain an adequate inventory of critical spare				
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		parts to facilitate timely replacement of worn or damaged components and minimize production downtime. • Train operators and maintenance personnel on proper equipment operation, routine inspection procedures, fault identification, and emergency shutdown protocols. • Establish and implement Standard Operating Procedures (SOPs) for equipment operation, maintenance, startup, shutdown, and emergency response. • Maintain comprehensive maintenance records and periodically review equipment performance to identify recurring faults and opportunities for improvement.				
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		• Conduct periodic non-destructive testing (NDT) of critical equipment such as pressure vessels, boilers, storage tanks, and pipelines to detect hidden defects before failure occurs. • Install spill containment systems, including bund walls, drip trays, and secondary containment, around oil handling and processing equipment to contain leaks resulting from mechanical failures. • Develop and implement an Emergency Response Plan (ERP) outlining procedures for responding to equipment failures, oil spills, fires, explosions, and other process-related emergencies. • Ensure that emergency response equipment, including spill kits, absorbent materials, firefighting equipment, and				
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		first aid facilities, is readily available and regularly inspected. • Carry out periodic risk assessments and equipment integrity audits to identify potential failure modes and implement corrective actions before failures occur. • Ensure all pressure vessels, boilers, lifting equipment, and other statutory plant are inspected and certified by authorized inspectors in accordance with the Occupational Safety and Health Act (OSHA), 2007 and applicable regulations. • Ensure adequate housekeeping around machinery to prevent the accumulation of oil residues, debris, and combustible materials that may contribute to equipment malfunction or fire.				
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18.	Emergency preparedness	- The facility shall undertake a risk assessment to determine the emergencies that may arise and therefore inform on the formulation of an Emergency Response Plan (ERP). - The ERP shall provide procedures for likely emergencies including poisonous gas leaks, fire, equipment malfunction/fall etc. and determine the appropriate prevention, mitigation, preparedness, response and recovery procedures. - Performance of regular fire drills, safety inspections and monitoring shall be undertaken by the facility and a record made available for inspection. Exits and Exit Routes - Keep safeguards designed to protect workers during an emergency (e.g.,	Facility management Safety and Health committee Emergency responders DOSHS	Continuous	Emergency response plan documented and in place. Safety and health committee in place. Enforced use of PPEs by the workers. Installed and serviced firefighting equipment. Availability of a first aid kit. Fire safety audits and risk assessment reports. Designated fire assembly points. Reports on fire drills.	Covered under 15. above.
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		sprinkler systems, alarm systems, fire doors, exit lighting) in proper working order. • Ensure exit signs are illuminated and clearly visible at all times. • Keep exit routes and exits free and unobstructed; ensure that exit doors are not locked or blocked. • Ensure exit routes are adequately lit. • Exit routes must not go through a room that can be locked, e.g., a bathroom, nor may it lead into a dead-end corridor. • Mark doorways or passages along an exit route that could be mistaken for an exit with "Not an Exit" or language identifying their actual use, e.g., "closet." • If the direction of travel to the nearest exit is not immediately apparent, post signs along the exit access				
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		indicating the direction of travel to the nearest exit.				
19.	Social risks	• There shall be strict enforcement of the facility rules and regulations by the management. • New employees are encouraged to subscribe the management rules and regulations. • All workers are required to report any disciplinary or conduct-related issues to the management for appropriate action. • Establish a Grievance Redress Mechanism (GRM) accessible to receive, record, and promptly address any complaints, emerging issues or conflicts, therefore enhance harmonious co-existence with the local community. • Support community initiatives (e.g., scholarships, environmental clean-ups,	Facility management GRM Committee	Continuous	Code of conduct in place. Minutes of induction meetings on the code of conduct. Evidence of Grievance Redress. No. of CSR initiatives undertaken. Zero tolerance to Gender Based Violence (GBV) and Sexual Harassment (SH).	50,000

		tree planting, or cultural events) as part of Corporate Social Responsibility (CSR). • The proponent shall develop a deliberate local content policy on the use of local human resources, materials, goods and services. • All employees are required to attend an induction-training prior to commencing of work at the factory to ensure they are familiar with the No Gender Based Violence (GBV) and No Sexual Harassment (SH) policies and Code of Conduct.				
20.	Security Concerns	• The access gate shall be manned by a 24hours security personnel. • The facility shall be surrounded by an 8 to 10 feet high boundary wall, a lockable main entrance gate and a multi-zone electric fencing.	Security manager Contracted security firm. NPS NGAO	Continuous	Evidence of installed CCTV surveillance and other security infrastructure. Minutes of the security meetings.	TBD by the management.

		• The facility will feature an installed functional security lighting system and CCTV coverage & surveillance. • All vehicles and visitors moving in and out of the facility shall be subjected to inspection by the security guards. • There shall be proper visitor management protocol that includes visitor registration, issuance of badges and designated waiting areas. • The workers shall continuously be sensitized on safety requirements including being aware of their surrounding and report any unusual or suspicious activity/behaviour. • Install alarm systems and integrate them with surveillance and access control systems.				
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		The facility shall practice the <i>Nyumba Kumi</i> security co-management model.				
DECOMMISSIONING PHASE						
No.	Objectives	Action Required	Responsible Party	Monitoring Frequency	Monitorable Indicators	COST (Kshs)
1.	To restore the area occupied by the facility or better than its original status	Develop a decommissioning Plan and submit to NEMA for approval.	Proponent EIA/EA Expert Contractor	One off	Decommissioning plan developed. Approval obtained from NEMA.	TBD
		An EIA may be required for decommissioning where site restoration is the objective.	NEMA	Continuous	EIA License obtained from NEMA.	TBD
		All structures, partitions and equipment's that will not be used for other purposes must be removed, reused, recycled, and repaired as far as possible.		Continuous	Submission of decommissioning report.	TBD
		Rehabilitation including replacement of topsoil and re-vegetation.		Continuous	Improved visual quality of the project area	TBD
2.	Change of use of the used oil recycling facility in line with the area zoning specifications.	- Submission of an after-use plan - Application for change of user	Proponent NEMA KCG	One-off	Change of user approval	TBD

10. AN IDENTIFICATION OF GAPS IN KNOWLEDGE AND UNCERTAINTIES

During the assessment and report preparation phases, no specific gaps in knowledge or uncertainties were identified. The proponent has proactively planned to secure all required approvals from key organizations such as NEMA, Kenya Investment Authority, National Construction Authority, Kenya Power and Lighting Company, Kenya National Highways Authority, Kwale Water and Sewerage Company Limited (KWAWASCO), Kenya Bureau of Standards, Energy and Petroleum Regulatory Authority (EPRA), Kwale County Government, and the Directorate of Occupational Safety & Health Services.

The proponent will ensure compliance with current zoning regulations to align with the updated land use requirements. Additionally, comprehensive mitigation measures will be implemented to address potential negative impacts, ensuring that the project adheres to all relevant legal and regulatory standards.

11.CONCLUSION AND RECOMMENDATIONS

The proposed used oil recycling facility will contribute to significant positive impacts in the area during its construction and operational phases. The positive impacts include: Creation of employment opportunities, improved growth of the economy, promotion of the circular economy through resource recovery, reduction in environmental pollution associated with the improper disposal of used oil, conservation of natural resources through the recovery and reuse of waste oil, enhanced hazardous waste management and compliance with environmental regulations, stimulation of industrial growth and investment within the petroleum recycling sector, business opportunities for licensed used oil collectors, transporters, suppliers, and other service providers, generation of revenue to the National and County Governments through taxes, permits & statutory levies and contribution to Kenya's green growth, cleaner production, and sustainable industrial development objectives.

It is equally evident that, although the project will contribute to various positive impacts, some negative impacts are inevitable and the purpose of conducting this assessment is to outline measures to mitigate them or where possible eradicate them completely. The negative impacts of this project include; pressure on existing infrastructure, occupational safety and health concerns; management of solid waste, sanitary waste and associated social risks.

It is our informed recommendation that the proponent be allowed to proceed with the implementation of the proposed project provided that the outlined mitigation measures in this report are adhered to and the Environmental and Social Management Plan (ESMP) is implemented effectively. An initial environmental audit will also be carried out within a period of 12 months after occupation to check compliance of the project to the ESMP, set policies, standards and laws.

The proponent is further advised to contract licensed experts to undertake the Environmental, Health and Safety Monitoring during the construction phase of the project to enhance harmony among the workers, neighbors and the regulatory authorities.

REFERENCES

- ❖ Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009, government printer, Nairobi.
- ❖ Guangji Hua, Jianbing Lia, Guangming Zeng, Recent development in the treatment of oily sludge from petroleum industry: A review, *Journal of Hazardous Materials* 261 (2013) 470–490
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- ❖ Kenya gazette supplement Acts Public Health Act (Cap. 242) government printer, Nairobi.
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- ❖ Kenya gazette supplement number 177, Environmental Management and Coordination (Water Quality) Regulations, 2024, Government printer, Nairobi
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- ❖ Kenya gazette supplement number 199, Environmental Management and Coordination (Management of toxic and hazardous chemicals and materials) Regulations, 2024, Government printer, Nairobi
- ❖ Kenya gazette supplement number 68, Climate Change Act, 2016 Government printer, Nairobi.
- ❖ Kenya gazette supplement number 147, Climate Change (amendment) Act, 2023 Government printer, Nairobi
- ❖ Technical Guidelines on the Management of Used Oil and Oil Sludge in Kenya, 2016
- ❖ The Occupational Safety and Health Act, 2007, Government Printers, Nairobi

ANNEXES

Annex 1: Land ownership documents

Annex 2: Architectural designs

Annex 3: Certified BQs and QS Practicing License

Annex 4: Copy of TORs Approval

Annex 5: Evidence of public participation including:

- i. Formal meeting notices**
- ii. Meeting attendance register**
- iii. Minutes**
- iv. Public participation questionnaires**

Annex 6: Baseline Ambient Air Quality Analysis Report

Annex 7: Baseline soil quality analysis report

Annex 8: Quantitative Risk Assessment Report

Annex 9: Company KRA Pin

Annex 10: Certificate of incorporation

Annex 11: Experts' Practicing License