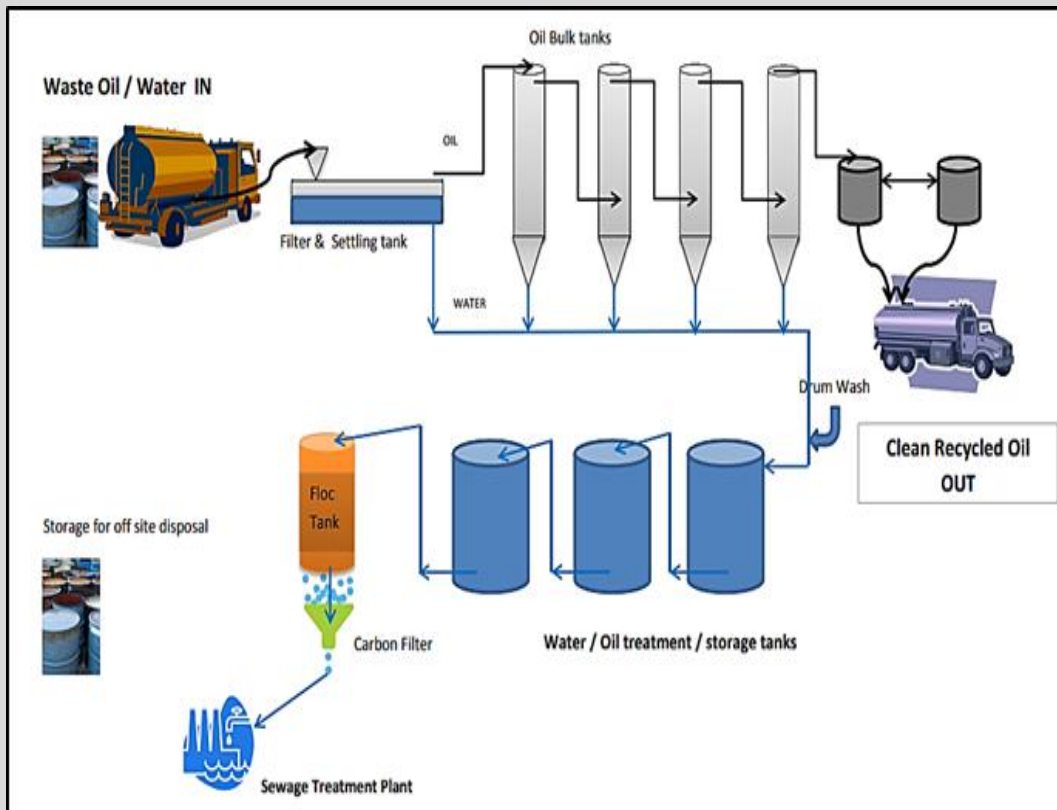


**ALI EMPEX ENTERPRISE
P. O. BOX 88689-80100
MOMBASA**

Environmental and Social Impact Assessment Study report for the proposed used lubricating oil recycling Plant (2000 Liter per 8 hours) on Plot L.R. Kwale/Mazeras/1034, Mazeras, Kwale County.



Location

**Lat Long: -3.955368, 39.535298
DMS: 3° 57' 19.33" S | 39° 32' 7.07" E
Elevation: 191.53 m asl.**

Consultants

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August 2019

DECLARATION

This ESIA study report has been prepared by NEMA registered Experts. We undersign and certify that the particulars in this report are correct to the best of our knowledge.

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PROPONENT

Signed for and on behalf of:

Ali Empex Enterprise

P. O. BOX 88689-80100

MOMBASA

Name of the Proprietor

Ali Omar Ali

Sign_____

DATE_____

EXECUTIVE SUMMARY

Background information

This study report documents the assessment of Environmental Impact of the proposed installation and operation of a waste oil recycling plant on Plot L.R. KWALE/MAZERAS/1034 located at Mazeras, Kwale County. This study report has been prepared in fulfillment of the Environmental Management and Coordination Act, (Revised 2015) and under the Legal Notice No. 101 (revised 2016). The intent of the exercise is to provide guidance to the proponent for acceptable project execution to minimize the risk to human health and the environment.

The problem statement

A release of used oil to the environment threatens ground and surface waters with oil contamination thereby endangering drinking water supplies and aquatic organisms. Spilled oil tends to accumulate in the environment, causing soil and water pollution. Spilled oil gets into the soil, leading to contaminated crops which enter into the food chain causing diseases to human. Contaminated soils also produce low yields leading to food insecurity. Oil decomposes very slowly; it reduces the oxygen supply to the micro-organisms that break the oil down into non-hazardous compounds. Toxic gases and harmful metallic dust particles are produced by the ordinary combustion of used oil. The high concentration of metal ions, lead, zinc, chromium and copper in used oil are toxic to ecological systems and to human health when they are emitted from the exhaust stack of uncontrolled burners and furnaces. Some of the additives used in lubricants contaminate the environment. Additionally, certain compounds in used oil are very dangerous to one's health. The PAH content of engine oil increases with operating time, because the PAH formed during combustion in petrol engines accumulates in the oil.

The proponent

The project proponent Ali Empex Enterprises is a duly registered sole proprietorship business entity in Kenya. The proponent has been in the business of collection and transportation of used oil to Power rex lubricants in Nairobi for many years. In its new strategy, the proponent intends to collect, process and recycle good-quality clear and black lubrication oils locally for reuse for a cleaner world. The cleansing and reuse of oils are among the best ways to utilize and transform industrial waste.

Location of the proposed project site

The proposed waste oil recycling plant site is at Mazeras, off Nairobi-Mombasa Highway on plot LR. No. Kwale/Mazeras/1034 in Kwale County (**GPS Lat Long: -3.955368, 39.535298**). The proposed site measures approximately 0.10 HA. The plot is accessed via a good murram road which is less than 500 Metres from the highway. Mazeras has industries in the neighbourhood of the proposed site such as Transeast Ltd, Kasemeni Slaughter House and a container yard 100 M from the site.

Project Objectives

The primary objectives of the project is to:

- To provide a suitable site for recycling/regeneration of used/waste oil much needed in Mazeras and wider coastal counties. The single major recycling plant is Power Rex Lubricants and is located in Nairobi 500Km away.
- To safely process and recycle used oil and reduce carbon footprint associated with transportation to Nairobi and product (lubricants) manufacturing.
- To abide by NEMA regulations on handling of hazardous waste and the draft guidelines on Management of used oil and oil sludge in Kenya
- Provide the proponent with a viable business investment and provide job opportunities to the local population

EIA Objectives.

The main objective of the EIA is to ensure adequate identification of potentially negative effects, propose mitigation measures and propose an environmental management plan for the proposed installation and operation of the used oil recycling facility. The summary of these objectives is as follows;

Neighbourhood description

The immediate neighbourhood of proposed waste oil processing plant site is sparsely populated. However, there is substantial human settlement in the wider Kasemeni Location. The immediate neighbourhood lacks substantial industrial development. Lack of employment opportunities is an economic characteristic of the area. The main economic activities and source of livelihood in the area is subsistence farming, rearing of some livestock and quarrying. Residents from the Kasemeni Location work in the quarries for economic gain. There are quarries in the location are that are situated at Kokotoni, North of Mazeras. Livestock keeping is an important economic activity in the area, and combines well with the subsistence agriculture. People keep few local breeds of chicken, cattle, goats and sheep.

The recycling process

Ali Empex Enterprises intends to be widely engrossed in offering an optimum quality range of recycled Lubricating Oil. Distillation to produce re-refined base oil suitable for use as this process is very similar to the process undergone by virgin oil.

Pre-treatment or Dewatering

Pre-treatment of used oil involves removing any water within the oil, known as dewatering. One way of doing this is by placing it in large settling tanks, which separates the oil and water. Dewatering is a simple process relying on the separation of aqueous and oil phases over time under the influence of gravity.

Filtering & Demineralization

The purpose of filtering and demineralization is to remove inorganic materials and certain additives from used oil to produce a cleaner burner fuel or feed for re-refining. The demineralized oil is filtered to remove suspended fine particles and run off to storage as a clean burner fuel. It can be further diluted with a lighter petroleum product (called cutter stock) to produce a range of intermediate to light fuel oils depending on the fuel viscosity requirements of the burner.

Distillation:

Distillation (or Fractionation) is the physical separation of components of lubricating oil by boiling range. Depending on the type of distillation, the boiling ranges can produce gases and gasoline at the lower boiling points with heavy lubricating oils being distilled at higher boiling points. Distillation is the core process for a facility capable of producing re-refined base-oils to virgin base-oil quality.

Vacuum Distillation:

Vacuum distillation is considered the key process in used oil re-refining. The feedstock can be separated into products of similar boiling range to better control the physical properties of the lube base stock "distillate cuts" that will be produced from the vacuum tower products.

Project Activities, description and inputs

The project activities shall entail

- Delivery of used oil
- Temporary storage of the delivered used oil
- Pre-treatment of the used oil
- Refinement of the used oil into specified products
- Storage of the finished product
- Sale and dispatch of the finished product

Environmental Impacts and mitigation measures

Positive Impacts

The following major positive impacts will accrue from the proposed project

- Long-term positive impact on environment due to used oil recycling
- Provision of employment opportunities
- Provision of used oil recycling services
- Revenue generation to the proponent.
- Socio-economic benefits of the project

- Support to other business establishments

Negative impacts during site preparation and installation phase

Impact of extraction of construction materials

- The contractor will obtain raw materials for the construction materials from compliant and licensed sources
- The contractor will procure quantities that are sufficient for the intended works only and recycle as far as practical to curtail wastage.
- The contractor will commit to extensive use of recycled raw materials as will be appropriate and in a manner that does not compromise the safety of the used oil recycling plant.

Occupational health and safety hazards

- The contractor will provide workers with appropriate Personnel Protective Equipment (PPE) and ensure their use
- Workers will be trained on safety equipment use and first aid facilities availed on site
- Contractor to comply with the requirements of the Occupational Safety and Health Act (OSHA) by registering the site as a work place
- Appropriate precautionary signage will be strategically displayed at the construction site
- All visitors to the site will be provided with PPE and accompanied by site staff.

Air pollution from construction dust

- The contractor will secure the site using appropriate dust screens and replace worn out screens.
- Building materials that are likely to produce dust such as ballast shall be sprinkled with water before use.
- Dusty surfaces at the construction site will be sprinkled with water.
- Schedule dusty activities for less windy conditions
- Employ sound project planning to accomplish generating activities quickly
- Employees will be provided with dust masks.
- Maintain slow speeds for traffic accessing the project site

Solid waste generation

- Procure the services of a NEMA licensed waste handler to manage solid wastes from the construction site
- Deploy adequate waste collection bins throughout the construction site
- All recyclable materials should be collected and reused on site or delivered to recyclers
- Procure only sufficient quantities of materials to avoid generation of waste from surplus
- Strictly observe the ban on secondary packaging and single use plastics

Noise impact

- Delivery of raw materials to site to be done only during the day of weekdays
- Noisy equipment and machinery will be located directionally away from the residential neighbours

- Workers on site should be provided with PPE to attenuate high noise levels associated with the deployed equipment and noisy activities
- Use of serviceable vehicles and machinery is also expected to reduce noise levels
- Ensuring that noisy construction equipment are fitted with silencers where possible
- The site will be fully enclosed to contain noises that may emanate from the works
- Deploy a hoarding barrier to contain the noise generated from the project site

Impact on flora and fauna

- Limit excavations and earthworks to the spatial extent of the project site only
- Minimize earthworks to as minimal as necessary
- Undertake screen planting around the project site and establish ornamental bushes to counter the impact of concrete embankment

Effluent generation

- Provide for portable toilet facilities to service the workforce from a NEMA licensed effluent disposal contractor.

Traffic management

- Heavy commercial vehicles delivering raw materials shall observe designated speed limits for the area.
- Proper signage and warnings shall be placed on the access road to forewarn other motorists on the use of the road by delivery vehicles and earthmovers
- Delivery of raw materials for the construction shall only be undertaken during weekdays and during off peak hours
- All materials will be offloaded on the site and not on road reserves to the inconvenience of the neighbours
- Speed limits of 20KPH will be observed once a heavy commercial vehicle joins the access road
- The project contractor in conjunction with safety officer shall draw a detailed traffic management plan.
- Commercial vehicles delivering oversized load shall be accompanied by escort vehicles
- Route analysis for oversized deliveries shall be conducted to avert traffic incidents

Water use and management

- The contractor will ensure water conservation in all construction activities
- Water will be recycled and reused as far as is practical within the project site
- Monitor water consumed at the site and adjust accordingly
- Repurpose used water for dust suppression and not fresh water

Negative impacts during the operation phase of the used oil recycling plant

Operational risks

- Regular tests to ensure integrity of the installations (especially the tanks) through contracted engineering firms and certificates to that effect issued
- The used oil recycling plant and installations will strictly follow provisions of API 650 and Kenya Standards KS 1969:2006 & KS 2506:2014 respectively
- Inventory management / stock reconciliation should be done daily to ensure no leakages and to monitor available stocks
- Put in place emergency procedures to deal with specific risks that may arise from the proposed facility

Fire and explosion Hazards

- Develop and implement a fire action and evacuation plan tailored for the facility
- A secondary emergency exit and a fire assembly point will be designated within the premises
- Flammable substances will be appropriately stored, labelled and restricted to authorized persons only
- Provide fire-fighting equipment and fire alarms at strategic locations within the buildings. These will be regularly inspected and maintained by a reputable fire security company.
- Fire drills will be conducted at least biannually to ensure that workers are conversant with the action to take in the event of fire or explosions.
- Fire awareness materials and warning signage will be placed in strategic locations within the plant to educate the workers on fire awareness.
- Prepare an emergency response plan to be prominently displayed at the facility through a reputable Occupational Health and Safety consultancy firm.
- Allow sufficient safety distance between installations and areas prone to fire risks
- Carry out an Occupational Health and Safety Audit and fire safety audit in line with the OSHA, No. 15 of 2007

Effluent generation

- Install efficient drainage systems to convey oil laden water and storm water
- Installation of Oil water Interceptor
- Apply for an Effluent Discharge License from NEMA
- Install an effluent treatment plant (ETP) to effectively manage the waste water prior to disposal
- Conduct monthly monitoring of the effluent discharged from the ETP against Standards set out in schedule III of Water Quality Regulations, 2006
- Station a dedicated operator at the ETP to carry out regular monitoring and oversee operations for optimal operation of the ETP
- Conduct regular inspections for pipe blockages or damages and fix appropriately

Solid wastes

- Deploy adequate waste segregation bins throughout the facility to facilitate separation of hazardous from non-hazardous wastes for proper handling
- Engage a NEMA licensed solid waste handler to manage non-hazardous wastes from the facility and proper records kept for collection and disposal.
- Engage a NEMA licensed hazardous waste handler to manage wastes from the facility
- The proponent will provide for solid waste management through a hierarchy of options that includes reduction at source, separation of wastes to make it easier to undertake recycling.
- Comply with the provisions of Legal Notice No. 121 of 2006
- Strictly observe the ban on single use and secondary plastic packaging

Spill management

- The entire facility will be imperviously paved using cabro blocks to mitigate possible soil and water pollution in case of severe spillages
- Provide spill response kits within the facility such as sorbents sand to aid in speedy cleanup
- Any oily materials shall be segregated, sheltered away and disposed by the contracted hazardous waste handler
- Strictly account for all the delivered used oil by transporters and suppliers by careful scrutiny of tracking documentation
- Ensure that adequate spill containment is provided at all times in case of severe leakage of oils and finished product. The containment shall be of at least 20% the capacity of the holding vessel
- Ensure that the tanks are regularly inspected and maintained to detect and prevent any leaks
- Regularly desludge and maintain the oil interceptor in good working order
- Sound engineering strategies to be put in place to avoid spills. Observe the tank and piping standards as specified by KEBS and API
- Ensure runoff from the facility complies with the standards set out in schedule III of Legal Notice No. 120, Water Quality Regulations of 2006 through analysis of discharge from interceptor

Noise generation

- The background noise along Mombasa-Nairobi highway and adjacent commercial/industrial establishments is in keeping with that to be generated by vehicles accessing the station.
- Endeavor to conduct operations with minimal noise as is practical
- Install only compact machinery that are muffled to minimize noise as much as possible
- Discourage unnecessary hooting and engine revs as much as possible
- Encourage transporters to use transport in good state of maintenance
- Provide suitable PPE to workers working in noisy areas of the facility
- Carry out baseline and regular noise mapping exercise through NEMA licensed contractors to ensure compliance with schedule I of Legal Notice No. 61 of 2009

Use of water resource

- Create awareness among workers on the importance of conservation of water resources
- All water for use shall be metered to determine consumption levels
- Rain water harvesting is recommended as a measure to provide for water for general cleaning
- Apply and obtain a water abstraction permit from WRA and adhere to the abstraction limits if a borehole shall be drilled on site
- Recycle the treated water from the ETP for non-human consumptive purposes such as fire-fighting, general cleaning, landscaping etc.
- Install low capacity cisterns in sanitary conveniences to keep flush volumes at minimal

Use of Energy resource

- Proponent should consider installation of solar external lighting systems to complement electricity supply from the national grid.
- Procurement of energy saving appliances that have a low energy rating.
- Provide energy saving tips for each of the sections of the facility so that occupants are aware of their obligations to conserve energy
- Explore energy efficient production technologies in the recycling process
- Monitor energy use during operations and maintain records
- Maintain the standby generator in good working condition to guarantee its efficiency

Occupational Health and safety

- Develop and implement a policy on health and safety at the workplace as well as an effective Emergency Response Plan (ERP) and enlighten the staff on safety measures and procedures.
- The workers should be provided with appropriate gear (PPE) and trained on occupational health and safety in line with the Occupational Safety and Health Act No. 15 of 2007.
- Appropriate warning signage to be put up strategically
- Restrict access to operational areas to authorized personnel only
- Provide documentation of all incidences and accidents occurring on the site including near misses.
- Conduct annual health and safety audits in line with Occupational Safety and Health Act No. 15 of 2007
- Provide well stocked First Aid kits and train staff members in first aid administration.
- Implement a hazard communication program implemented at their workplace.
- The Proponent is required to maintain an inventory of all Material Safety Data Sheets (MSDS) for the chemicals stored in their workplace and fully disclose fully disclosed to the employees handling the chemical
- All unused, obsolete or expired chemicals must be disposed off 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 and oil safely in the workplace through regular toolbox talks
- A workable fire action plan will be developed and implemented, fire break distances will also be observed for high risk sections of the station
- Endeavor to fully comply with the provision of the Occupational Safety and Health Act No. 15 of 2007

Safety of visitors, neighbors and general public

- The facility will be secured and manned on a 24hours basis by a contracted security firm.
- Access to the facility is restricted to authorized personnel only.
- All visitors to the facility must be provided with protective clothing at all times.
- It will be the responsibility of the proponent to ensure that first-aid services are provided to employees at all times.

Traffic concerns

- The proponent will ensure that the road reserve near the facility is kept clear of traffic.
- Ensure that all vehicles calling at the station are accommodated within premises and don't block the road
- Adequate parking space has been provided within the facility
- Implement a compliance policy among supplier to only receive used oil packaged and transported in the prescribed manner
- Enlighten the delivery and dispatch trucks to observe slow speed when traversing the access road

Vapour emissions and air quality

- All venting systems and procedures have to be designed according to required standards
- Include Vapor Recovery Systems and carbon filters on vents
- Installation of gas detector to detect any leaks that may arise from the recycling process
- Regular air quality monitoring by a NEMA accredited laboratory will be undertaken to ascertain compliance with Legal Notice No. 34, Air Quality Regulations, 2014
- Workers in hazardous areas will be provided with adequate PPE and their usage strictly enforced
- Carry out periodic health survey among the workers and liaise with local health facilities to conduct passive surveillance among nearby residents for ailments related to these emissions

Decommissioning phase

Proponent will undertake safety and environmental audit to identify and mitigate any impacts that may arise from any left-over material and substances that could be harmful to people and/or the environment. Negative impacts associated with this phase are as follows

- Economic decline
- Solid wastes
- Insecurity
- Safety risks

Decommissioning strategy

During the decommissioning stage, it will be imperative for the proponent to conduct a decommissioning environmental audit to effectively mitigate the negative impacts associated with the decommissioning impacts. The following shall be undertaken during decommissioning

Dismantling and demolitions: The plant shall be methodically emptied and dismantled upon end of project life. Machinery, equipment and components shall be hauled away after which structures shall be demolishes. Electrical cabling and utilities shall be discontinued and associated underground routings filled back

Site decontamination: Site decontamination shall be achieved through clean-up of the area, removal and disposal of any residual oils and sludge, and stabilizing the area. Soil media that is freshly contaminated with oil during the decommissioning phase shall be excavated away and disposed or incinerated

Site restoration: Site restoration shall entail returning site conditions to as near baseline as practical. This can be achieved by revegetating the site and using bio-remediative measures such use of plants that absorb and breakdown the pollutants (Phytoremediation)

Conclusion and recommendation

Used oil can cause very serious environment problems when they are not eliminated in an environmentally sound manner. As it is not possible to avoid these wastes which are results of modern life, the best solution is to eliminate them by causing the minimum harm for the nature. Used oil management is as one the most important environmental problem in Kenya of late years as the issue of eliminating solid wastes in a healthy and economical way has gained more importance.

The proponent shall adhere to all relevant national and international environmental, health and safety standards, policies and regulations that govern execution and operation of such projects. It is recommended that the project proponent fully implement the EMP and that NEMA considers the project for licensing provided the proponent adheres to the licensing Conditions.

For compliance and substantive assurance of environmental integrity the proponent should ensure

- i. Adherence to the formulated EMMP to mitigate the predicted negative environmental impacts during the proposed actions
- ii. Adherence to the technical guidelines on the management of used oil and oil sludge in Kenya.

The proposed activity can be a sustainable development if all the mitigation measures advanced herein are adhered to. On the basis of the findings of this report, we recommend that the project be licensed subject to committed implementation of the proposed EMP as well as operationalization of the monitoring program proposed

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DEFINITIONS OF TERMS

| | |
|------------------------|--|
| Recycling: | The reprocessing, reclaiming and regeneration (re-refining) of used oils by use of an appropriate selection of physical and chemical methods of treatment |
| Oil Sludge | A non-flowing mixture of solids and liquids. |
| Storage | Temporary placement of used oil/sludge in a suitable location or facility where isolation, environmental and health protection and human control are provided in order to ensure that it is subsequently retrieved for treatment and conditioning and/or disposal. |
| Lubricating oil | An oily substance that is used to cover or treat machinery so as to lessen friction. |
| Re-use | The reuse of used oil after reprocessing |
| Used oil | Any semi-solid or liquid product consisting totally or partially of mineral oil or synthesized hydrocarbons (synthetic oils) that has been used and as a result of such use is contaminated by impurities rendering it unsuitable for its original use |
| Treatment | Chemical or physical operations designed to produce from used oil, or to make used oil more suitable for production of fuel oils, lubricants, or other used oil-derived product |

1 INTRODUCTION AND PROJECT BACKGROUND

1.1 Background information

This study report documents the assessment of Environmental Impact of the proposed installation and operation of a waste oil recycling plant on Plot L.R. KWALE/MAZERAS/1034 located at Mazeras, Kwale County. This study report has been prepared in fulfillment of the Environmental Management and Coordination Act, (Revised 2015) and under the Legal Notice No. 101 (revised 2016). The intent of the exercise is to provide guidance to the proponent for acceptable project execution to minimize the risk to human health and the environment.

In this regard, Environmental Impact Assessment is a planning tool now generally accepted as an integral component of sound decision-making. The purpose of Environmental Impact Assessment is to give the environment its due place in the decision-making process by clearly evaluating the environmental consequences of the proposed activity before real action is taken. Early identification and characterization of critical environmental impacts allows the public and the government to form a view about the environmental acceptability of the proposed installation and operation of the waste oil recycling facility and what conditions should apply to mitigate or reduce those risks and impacts.

Ali Empex Enterprises commissioned an ESIA study to assess the impacts of proposed action and make recommendations thereon. The ESIA has made a series of recommendations installation and operation among others. As legislative requirements provide for the preparation of an Environmental Impact Assessment for projects that might have adverse effects upon the environment, the proposed project will be undertaken subject to the statutory EIA process.

1.2 The proponent

The project proponent Ali Empex Enterprises is a duly registered sole proprietorship business entity in Kenya. The proponent is in the business of collection and transportation of used oil to Power rex lubricants in Nairobi for many years. In its new strategy, the proponent intends to collect, process and recycle good-quality clear and black lubrication oils locally for reuse for a cleaner world. The cleansing and reuse of oils are among the best ways to utilize and transform industrial waste.

1.3 Location of the proposed project site

The proposed waste oil recycling plant site is at Mazeras, off Nairobi-Mombasa Highway on plot LR. No. Kwale/Mazeras/1034 in Kwale County (**GPS Lat Long: -3.955368, 39.535298**). The proposed site measures approximately 0.10 HA. The plot is accessed via a good murrum road which is less than 500 metres from the highway. Mazeras has industries in the neighbourhood of the proposed site such as Transeast Ltd, Kasemeni Slaughter House and a container yard 100 M from the site.

1.4 Used oil and used oil recycling

There have typically been five types of ways to dispose of used oils: dumping, burning, re-refining, cracking and the hybrid process. In time the history has been first to use waste oil as dust suppressant on dirt roads and to burn it in space heaters and cement kilns but, because of the environmental impacts, governments in most developed countries have outlawed the dumping of used oils and is putting in ever tougher laws to eliminate dumping and

control the burning of used/waste oils. There were various re-refining techniques have been developed over time to reuse the good components of the regenerable used oils and many are popular but they have high capital and have high operating costs. They recover the oils but the concentrated additives and contaminants need to be disposed of.

When oils are collected separately, energy is saved in the processing and the carbon footprint of the product is reduced. This makes it possible to save natural resources and achieve savings in costs. A prerequisite for the upgrading, regeneration, and consequent material utilization of oils is that oil wastes of different types are kept separate. Regeneration is the best possible way to recycle lubricant oils. Bitumen, which comes as a by-product, is utilized in the manufacture of roofing felt and fuels bonded with the oil are used as industrial fuel.

1.5 The problem statement

A release of used oil to the environment threatens ground and surface waters with oil contamination thereby endangering drinking water supplies and aquatic organisms. Spilled oil tends to accumulate in the environment, causing soil and water pollution. Spilled oil gets into the soil, leading to contaminated crops which enter into the food chain causing diseases to human. Contaminated soils also produce low yields leading to food insecurity.

Oil decomposes very slowly; it reduces the oxygen supply to the micro-organisms that break the oil down into non-hazardous compounds. Toxic gases and harmful metallic dust particles are produced by the ordinary combustion of used oil. The high concentration of metal ions, lead, zinc, chromium and copper in used oil are toxic to ecological systems and to human health when they are emitted from the exhaust stack of uncontrolled burners and furnaces. Some of the additives used in lubricants contaminate the environment. Additionally, certain compounds in used oil are very dangerous to one's health. The PAH content of engine oil increases with operating time, because the PAH formed during combustion in petrol engines accumulates in the oil.

1.6 Project Objectives

The primary objectives of the project is to:

- To provide a suitable site for recycling/regeneration of used/waste oil much needed in Mazeras and wider coastal counties. The single major recycling plant is Power Rex Lubricants and is located in Nairobi 500Km away.
- To safely process and recycle used oil and reduce carbon footprint associated with transportation to Nairobi and product (lubricants) manufacturing.
- To abide by NEMA regulations on handling of hazardous waste and the draft guidelines on Management of used oil and oil sludge in Kenya
- Provide the proponent with a viable business investment and provide job opportunities to the local population

1.7 ESIA Objectives.

The main objective of the ESIA is to ensure adequate identification of potentially negative effects, propose mitigation measures and propose an environmental management plan for the proposed installation and operation of the used oil recycling facility. The summary of these objectives is as follows;

- To identify and describe the project components and activities
- To review relevant legislative and institutional provisions with regard to the proposed project
- To identify the potential environmental and health effects associated with establishment and operation of the proposed project
- To propose sufficient mitigation measures against the identified negative effects
- To prepare environmental management plan for the entire project cycle of the proposed project
- To conduct meaningful public and stakeholder participation for the proposed project
- To propose measures to prevent health and safety hazards and to ensure security in the working environment for the employees, residents and for the management in case of emergencies. This encompasses prevention and management of the foreseeable accidents and hazards
- To prepare an Environmental Impact Assessment report for submission to NEMA.
- Obtain an Environmental Impact Assessment license from NEMA for the proposed project.

1.8 Terms of Reference (ToRs) For the EIA.

The ToRs for this report are in accordance with NEMAs' Environmental (Impact Assessment and Audit) regulations, 2003 (Revised. 2016) and the Environmental Management and Co-ordination Act, 1999 (revised. 2015) these are, to:

- Describe location/site, objectives, scope, and nature of the proposed project;
- Describe the proposed project actions during installation, operation and decommissioning.
- Establish the suitability of the proposed project in the proposed location;
- Review and establish all relevant baseline information as will be required by NEMA;
- Describe and analyse the policy, legal and institutional framework including but not limited to Kenyan policies, laws, regulation and guidelines related to the proposed waste oil recycling facility
- Undertake description of the proposed project activities;
- Analyze the and evaluate the efficacy of the procedure and technologies during the recycling process;
- Identify and analyze project activities alternatives including but not limited to Project site alternatives, no project alternatives and technological alternatives;
- Identify and predict actual potential and significant impacts on human health and environment anticipated to be generated by the installation and operation of the used oil recycling facility, both positive and negative throughout the project cycle;
- Recommend sufficient mitigation measures for all the potential negative impacts identified
- Analyze occupational health and safety issues associated with the proposed used oil recycling;
- Develop an Environmental Management and Monitoring Plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment, including the cost, timeframe and responsibility to implement the measures;
- Prepare a comprehensive EIA study report in accordance with EMCA Cap 387 and its attendant regulations.

1.9 Methodology

In undertaking the ESIA study, the Consultant employed a participatory and multi-disciplinary approach. This involved desk studies and review of all relevant available documents on the project activities and components. The Experts also reviewed all the available and relevant national legal environmental documents, standards and guidelines.

A reconnaissance and follow up visits were conducted to check the physical set up of the site and to collect views from stakeholders and neighbouring residents. Attached at the appendix are samples of questionnaires survey.

Assessing the significance of issues may include some or all of the following:

- Potential impacts of the proposed waste oil recycling plant project in relation to Kenyan and International environmental standards;
- The sensitivity of the receiving environment or receptor locations;
- The reversibility and/or duration of the potential impact; and
- The potential concerns and issues identified by stakeholders.

The determination of ‘significance’ incorporates judgments of the above together with the potential magnitude of the impact. In addition, the frequency of impacts upon the receiving environment is a factor in determining the significance.

The main output is an EIA study report comprising of executive summary, assessment methodology, project description, study area, legal and Institutional framework, and anticipated impacts and an Environmental Management and Monitoring Plan (EMMP).

2 PROJECT SITE DESCRIPTION, ACTIVITIES AND INPUTS

2.1 The overall project

The proposed project involves installation, operation and decommissioning of a used oil recycling facility. The facility shall be installed within Mazeras area, off the Mombasa-Nairobi Highway on a 0.10Ha parcel of land (approx.). The equipment cost about 50,000 US Dollars (Ksh 5,000,000). The land space required for the equipment is 60 by 80 Ft while roof space required is 10 by 15 Ft only for Machine Area. The equipment has the capacity to process 250 Litres of used oil per hour.

See the catalogue attached.

2.2 The proposed project location

The proposed waste oil recycling plant site is at Mazeras, off Nairobi-Mombasa Highway on plot LR. No. Kwale/Mazeras/1034 in Kwale County (GPS Lat Long: -3.955368, 39.535298).

2.3 The proposed site description

The proposed site measures approximately **0.10 Ha**. The site falls within a Kasemeni location on the side of Kwale County. The plot is accessed via a good murram road which is approximately 250 from the highway. Mazeras has industries in the neighbourhood of the proposed site such as Transeast Ltd, Kasemeni Slaughter House and a container yard 100 meters from the site. The site is fenced with a boundary wall. A change of use is being sought by the proponent to endorse the site for use as a light Industry.



2.3.1 Neighbourhood description

The immediate neighbourhood of proposed waste oil processing plant site is sparsely populated. However, there is substantial human settlement in the wider Kasemeni Location. The immediate neighbourhood lacks substantial industrial development. Lack of employment opportunities is an economic characteristic of the area. The main economic activities and source of livelihood in the area is subsistence farming, rearing of some livestock and

quarrying. Residents from the Kasemeni Location work in the quarries for economic gain. There are quarries in the location are that are situated at Kokotoni, North of Mazeras. Livestock keeping is an important economic activity in the area, and combines well with the subsistence agriculture. People keep few local breeds of chicken, cattle, goats and sheep.



Plate 1: A view of a neighbouring facility



Plate 2: A filling station located 100 metres from the project site





Photo log of the site photos

2.4 The recycling process

Ali Empex Enterprises intends to be widely engrossed in offering an optimum quality range of recycled Lubricating Oil. Distillation to produce re-refined base oil suitable for use as this process is very similar to the process undergone by virgin oil.

2.4.1 Pre-treatment or Dewatering

Pre-treatment of used oil involves removing any water within the oil, known as dewatering. One way of doing this is by placing it in large settling tanks, which separates the oil and water. Dewatering is a simple process relying on the separation of aqueous and oil phases over time under the influence of gravity. The used oil is allowed to stand in a tank (raw waste oil) and free water drops to the bottom where it can be drained, treated and discharged appropriately to sewer or stormwater depending on quality and local regulations.

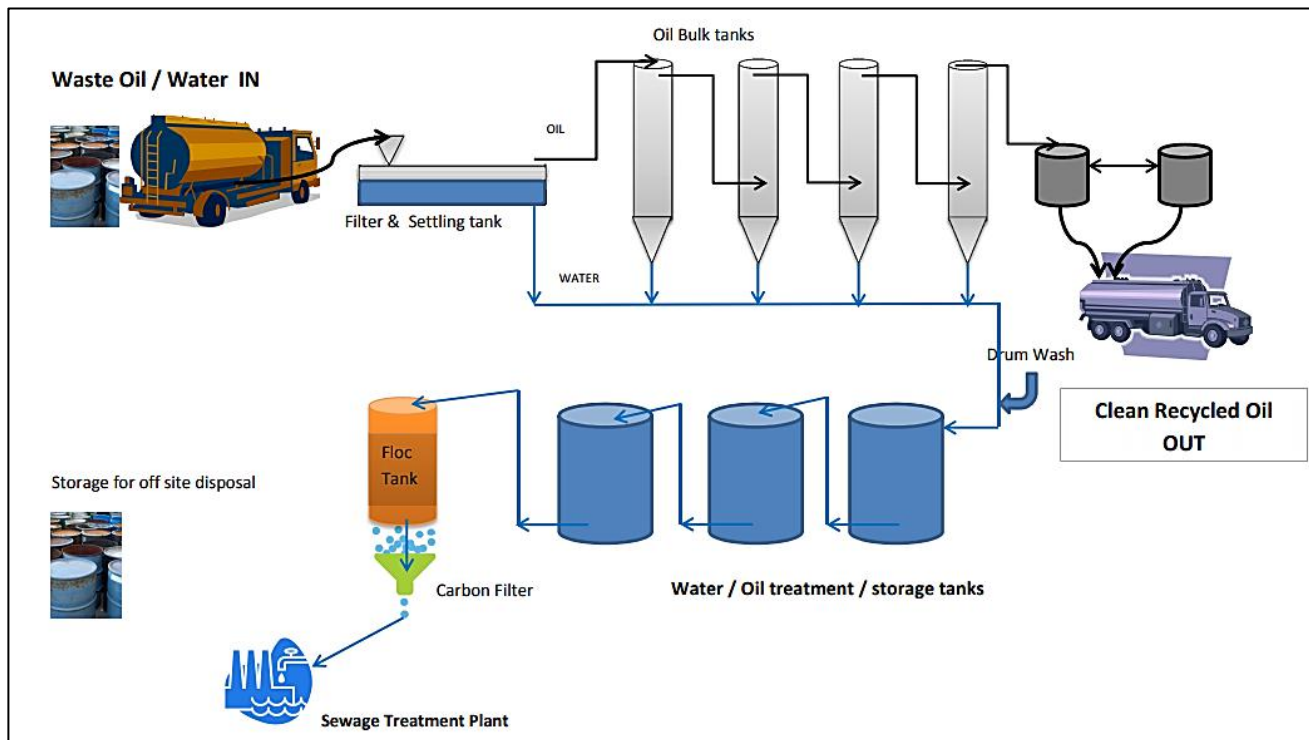


Fig 2.5: Typical dewatering process flow diagram

2.4.2 Filtering & Demineralization

The purpose of filtering and demineralization is to remove inorganic materials and certain additives from used oil to produce a cleaner burner fuel or feed for re-refining. The dewatered used oil is transferred to a reaction tank and reacted with Sulphuric acid and surfactant then heated and stirred. This allows the mixture to separate into two "phases" i.e. oil and aqueous phase. The contaminants accumulate in the aqueous phase and settle at the bottom of the tank and drained off as slurry. The slurry is then dried off and disposed

The demineralized oil is filtered to remove suspended fine particles and run off to storage as a clean burner fuel. It can be further diluted with a lighter petroleum product (called cutter stock) to produce a range of intermediate to light fuel oils depending on the fuel viscosity requirements of the burner.

2.4.3 Distillation:

Distillation (or Fractionation) is the physical separation of components of lubricating oil by boiling range. Depending on the type of distillation, the boiling ranges can produce gases and gasoline at the lower boiling points with heavy lubricating oils being distilled at higher boiling points. Distillation is the core process for a facility capable of producing re-refined base-oils to virgin base-oil quality.

2.4.4 Vacuum Distillation:

Vacuum distillation is considered the key process in used oil re-refining. If atmospheric distillation is utilized, the oil from the atmospheric distillation column is the feedstock for the vacuum distillation column. In vacuum

distillation, the feedstock can be separated into products of similar boiling range to better control the physical properties of the lube base stock "distillate cuts" that will be produced from the vacuum tower products. The major properties that are controlled by vacuum distillation are viscosity, flash point and carbon residue. The viscosity of the lube-oil base-stock is determined by the viscosity of the distillate in terms of its relative viscosity separation, e.g. light, medium and heavy oil.

The used oil feedstock (usually from the atmospheric distillation unit) is heated in a furnace and flows as a mixture of liquid and vapour to the heated vacuum distillation column where the vapour portion begins to rise and the liquid falls. Steam can be added to assist vaporization.

As the hot vapours rise through the column they cool and some condense to a liquid and flow back down the column. Similarly, some of the downward flowing liquids are re-vaporized by contacting the rising hot vapours. Special devices in the column allow this upward flow of vapours and downwards flow of liquids to occur continuously. At various points in the column, special trays are installed which permit the removal of the liquid from the column

2.5 Project Activities, description and inputs

2.5.1 Delivery of used oil

The used oil will be obtained from sellers both commercial and small-scale suppliers. The proponent shall ensure that the used oil is delivered in specified containers and suitably equipped trucks. Further the suppliers shall be required to adhere to NEMA regulations for handling and transport of hazardous material, the draft waste oil guidelines in addition to operational licenses from NEMA

Temporary storage of the delivered used oil

The delivered used oil shall be temporarily store on site awaiting processing. The used oil so delivered shall be held in above ground storage tanks meeting tank standards set by KEBS

2.5.2 Pre-treatment of the used oil

Used oil shall be pre-treated as described in section **2.4.1** of this report

2.5.3 Refinement of the used oil into specified products

Refinement to finished products shall be as describes in sections **2.4.2 - 2.4.4** of this report

2.5.4 Storage of the finished product

Finished product shall be stored in appropriate storage tanks with respect to the physical and chemical properties of the product

2.5.5 Sale and dispatch of the finished product

Dispatch of the finished product shall strictly observe standard procedure for loading, containment and transport as specified by EPRA and KEBS

2.6 Project inputs

- i. Labor- professional staff who will be involved in handling of the used oil as per the technical guidelines on the management of used oil and oil sludge in Kenya.
- ii. The refining plant and attendant appliances and equipment once installed.
- iii. Used oil and refined product transport tankers
- iv. Personal Protective Equipment such Ear Protection, Face mask, Goggles, Safety Glasses Gloves, Helmet, face and gas masks, overalls, safety harness, Reflective Jackets, Safety shoes, P.V.C. gloves, Leather Apron, Leather Gloves
- v. Fire and emergency response installations suppression systems, spill containment and clean-up equipment

2.7 Project Cost

The plant will cost about 6 Million outside labour and installation works. See attached technical details.

2.8 Summary of the plant specification

| | | |
|--|---|------------|
| Mild Steel Distillation Vessel | Up to 2000 Liter Charging Capacity, Approx. 3200 Liter Total Capacity | Quantity 1 |
| | Thickness: 20 MM Cell, Top & Bottom (Plate Quality – IS 2062) Bottom Stapler of 25 MM * 8 Nos (Plate Quality – IS 2062) | |
| | Specification: Air Tight Gland Housing, Structure Mounting Lugs, Stuller, Blades, Worm Gear box & With 3 HP Motor (Crompton Greaves Motor), 18” Main Hole with Shutter. | |
| Mild Steel Surface Condenser | Capacity 16.9 M ² Surface Area | Quantity 1 |
| | Thickness: 6 MM Body Thickness (Plate Quality – IS 2062) | |
| | Size: 16” Inch Diameter, 10 Feet Length | |
| | Specification: 60 Nos of 25 MM ID Pipe | |
| Mild Steel Receiver Vessel for Distilled Oil | Capacity: 1000+1000 Liter Capacity Thickness: 4mm Thickness for Vessel (Plate Quality– IS 2062) | Quantity 1 |
| Mild Steel Receiver Vessel for Fuel & Water | Capacity: 600 Liter Capacity Thickness: 4mm Thickness for Vessel (Plate Quality– IS 2062) | Quantity 1 |

| | | |
|----------------------------------|--|------------|
| Bottom Residual Collection Tank | Capacity: 600 Liter Capacity Thickness 6 mm Thickness for Vessel (Plate Quality– IS 2062) 4 MM for Jacket (Plate Quality– IS 2062) Size: According to Final Design Layout (*Pending) Specification: Steam Pressure Safety Valve | Quantity 1 |
| Automatic LDO Burner | Capacity: Up to 1 Lac Kcal / Hr Caloric Vales Depends on Fuel to Be Used Specification: Auto Cutoff / Ignite System Safety Instruments Inline Fuel Filtration System | Quantity 2 |
| Automatic Vacuum System | Capacity: >759.5 MMHg @ Blind Vacuum, 120 M3/hr Specification: Two Stage Oil Seal Vacuum Pump with 2 HP motor Mechanical Vacuum Booster 2 HP motor Inbuilt Condenser | Quantity 1 |
| Vacuum Trap | Capacity: 200 MM diameter, 1500 MM Height 10 Liter Oil Trap Ceramic raschig ring | Quantity 1 |
| Insulation | Insulation of Distillation Vessel: Top: High temperature Cera-wool (128 Density) with Aluminum Coating Furnace Construction: 4 MM Mild Steel Furnace with Internal 50 MM Castable Insulation of Clay Treatment: 4 MM Mild Steel Furnace with Internal 50 MM Castable | Quantity 1 |
| Pumps | 2 Hp Centrifugal Pump for Used Oil Filling in to Distillation Vessel. <ul style="list-style-type: none"> • 1 HP Centrifugal Pump for Removing Waste Water & Fuel. • 2 HP Centrifugal Pump for Removing Distilled Oil. • 2 HP Open Well Centrifugal Pump for Water Cooling Circulation • 2 HP Filter Press Transfer pump | Quantity 4 |
| FRP Cooling Tower | Capacity: 20 TR Capacity | Quantity 1 |
| M.S Chimney | Capacity: 20 Feet Length 8 Inch Diameter 4 MM Thickness High-Tension Nut Bolt 3 Feet * 3 Feet Foundation Plate of 8 MM | Quantity 1 |
| Clay Treatment Vessel (Open Top) | Capacity 2000 Liter Capacity Thickness: 6mm Thickness For Vessel (Plate Quality– IS 2062) Specification: Direct Heating System Using Burner up to 110 max temperature Stuller, Blades, Worm Gear box & With 2 HP Motor | Quantity 1 |
| Filter Press | Capacity: 150 KG Holding Capacity Size: 18 Inch * 18 Inch * 18 Nos Plate. Specification: | Quantity 1 |

| | | |
|-------------------------------------|---|----------------|
| | MOC: Cast Iron With Tray & Valves | |
| Smell Remover System with scrubber: | Capacity: As per EMCA, Air Quality standards requirement. | Quantity 1 |
| ADDITIONAL REQUIREMENTS | | |
| Power Consumption | 20 kVA Recommended (Avoiding Overload) | Less intensive |
| Water Consumption | Not More Than 50 Liters per Batch (Makeup) | Less intensive |
| Others | Land required - 60*80 Ft. • Roof – 10*15 Ft only for Machine Area • Water Tank (Civil Constructed) 10000 Liter. • ETP Tank (Civil Constructed) (Dimension will be decided after pre-inspection of Installation site). • 15 KW Diesel Generators if Required. • Fire Extinguisher System. | |

2.9 Proposed plant maintenance schedule for the environmental efficiency of the used oil recycling plant

| Equipment Part | Task/description | Timeframe |
|------------------|--|----------------------------|
| Vacuum system | <ul style="list-style-type: none"> - Checking/changing of seals, bearings, rings and oils - Overhaul of the system, booster and force pump | Weekly |
| Scrubber | <ul style="list-style-type: none"> - Checking of PH - Changing of scrubber media | Daily |
| Pipe Lines | <ul style="list-style-type: none"> - Checking of blockage, leakage and paintings | Weekly and daily upon need |
| Interceptors | <ul style="list-style-type: none"> - Cleaning | Weekly |
| Reactors/furnace | <ul style="list-style-type: none"> - Cleaning and checking of refraction | Weekly |
| Pumps | <ul style="list-style-type: none"> - Checking/changing of seals, bearings - Inspection of leakage | Daily |
| Storage tanks | <ul style="list-style-type: none"> - Cleaning inside and painting outside | Monthly |
| Motors | <ul style="list-style-type: none"> - Routine inspection | Weekly |
| Blowers | <ul style="list-style-type: none"> - Routine inspection | Weekly |
| Condensers | <ul style="list-style-type: none"> - Routine inspection of tubes inside the condenser - Checking of blockage, leakage | |

3 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

3.1 Introduction

Legislation, laws, policies and regulations specific to environmental management can directly or indirectly affect the development of proposed project. A brief discussion on the various legal frameworks involved for this project is presented in subsequent sections. The proponent will strive to ensure that all required environmental procedures described in this section will be complied with, in order to demonstrate their commitment and responsibility to protecting the environment. Environmental regulations and standards in Kenya are determined and enforced through various levels of statutes the majority of which are sector specific. The Environment Management Coordination Amendment Act 2015 is the governing law for the Protection of the Environment in the Kenya, and is considered the base for various environmental regulations and guidelines.

3.2 Institutional framework

3.2.1 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 of Legal Notice no. 121 on Environmental Management and Coordination (Waste Management) Regulations, 2006 which stipulates the disposal of Hazardous waste such as used oil/sludge. The Authority also administers Environmental Impact Assessments (EIA) 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 EIAs failure to which enforcement action can be taken in accordance with the provisions stipulated in the Environmental Management and Coordination Act of 1999 and its subsidiary legislations.

3.2.2 Water Resources Authority (WRA)

The Water Resource Authority (WRA) 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.

3.2.3 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, guided by the strategic framework provided from the medium-term Plan 2008- 2012 and the wider health sector. The Department of Environmental Health and Sanitation aims to reduce disease burden arising from environmental pollution from general environmental health pollutants.

3.2.4 Directorate of Occupational Safety and Health Services

The department is mandated to implement all rules pertaining to the protection of workers from occupational hazards and ensure safe working environment. The Directorate implements the Occupational Safety and Health Act, 2007 and various rules made there under

3.2.5 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

3.2.6 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.

3.3 Legal Framework

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

3.3.1 The Constitution of Kenya, 2010

The Constitution of Kenya 2010 is the supreme law of the land. Any other law that is inconsistent with the Constitution is null and void to the extent of its inconsistency. Further any action by an individual or a State organ that contravenes the Constitution is null and void. Chapter V of the new constitution states the need for conservation and protection of the environment.

Thus, operations at the facility must be within legal limits as stipulated in the operational licenses acquired and none of the facilities operations infringe on the right to a clean environment for all.

3.3.2 The Environment Management Act 2015

The principal Act covering environmental protection is the Environmental Management Act No 2015 for the Protection and Development of the Environment. This law established the framework for environmental protection in Kenya and has been divided into 13 Parts

Part II of Environmental Management Act No. (8 of 2015) confers the right of every person to a clean environment and to its judicial enforcement. The Act therefore makes it mandatory to work in a clean environment and protect people living close to the project. Part V Section 44 of this Act deals with protection of hilltops, hillsides, mountain areas and forests. Section 51 and 54 of this Act deals with the conservation of biological resources and protection of areas of environmental significance;

Section 91 of the Act (EMCA Cap 387) requires the Authority to categorize hazardous wastes on the recommendation of Standards Enforcement and Review Committee (SERC) and to issue guidelines and regulations for the management of each category of hazardous wastes. The categorization has been done under the EMC (Waste Management) Regulations, 2006, more so, the Authority, (NEMA) has authored guidelines to provide for safe management of used oil and oil sludge in Kenya. Section 93 of the Act, all together, prohibits, discharge of any hazardous substance, chemical, oil or mixture containing oil into any waters or any other segments of the environment contrary to the provisions of this Act or any regulations thereunder.

Under section 58 (1) of Kenya Government's Environment Management Coordination Act (EMCA) 2015 and National Environmental Management Authority (NEMA) Regulations for Environmental Impact Assessment and Audit of June, 2003, waste oil handling and recycling falls under the prescribed list of projects for which environmental impact assessment is mandatory. The proposed project therefore falls in the category of those that require clearance from NEMA before a project considered with risk is undertaken. The following regulation have also been gazetted to operationalize the provisions of the Act

3.3.2.1 The Environmental (Impact Assessment and Audit) Regulations (Revised, 2016)

The *Environmental Impact Assessment and Audit Regulations, 2003* provide guidelines for conducting an EIA study as well as environmental auditing and monitoring. The EIA/EA Regulations are meant to ensure the implementation of Sec. 58 of EMCA. It makes it illegal for anyone to undertake developments without an EIA license and stipulates the ways in which environmental experts should conduct the Environment Impact Assessment and Audits reports in conformity to the requirement stated. It is concise in its report content requirements, processes of public participation, licensing procedures, inspections and any possible offences and penalties under the Act. The Regulations state in Regulation 3 that "*the Regulations should apply to all policies, plans, programmes, projects and activities specified in Part III and V of the Regulations*" basically lists the guidelines of undertaking, submission and approval of the EIA/SEA Report.

3.3.2.2 The Waste Management Regulations-2006

The EMCA Waste Management Regulations, 2006 is the governing law for waste management in Kenya. This regulation is described in Legal Notice No. 121 of the Kenya Gazette Supplement No. 69 of September 2006. The objective of this Regulation is to protect human health and the environment. The regulations consist of eight parts and classify various types of waste and recommended appropriate disposal methods for each waste type. This also contains requirements for handling, storing, transporting and treatment of all waste categories as provided therein. The regulations also specified a series of responsibilities for the waste generator. According to the Legal Notice No. 121 of the Environmental Management and Coordination (Waste Management) Regulations of 2006, used oil classified as hazardous wastes. In addition, the Legal Notice requires that hazardous waste be disposed off in a specific manner as approved by the National Environment Management Authority (NEMA). The development of Technical guidelines on the management of used oil and oil sludge in Kenya has been necessitated by the need to safeguard human health and environment from adverse impacts related to used oil handling and disposal. In addition the proponent shall bear the responsibility of managing other forms of waste that may be generated within the premises in the manner prescribed in the waste management regulations of 2006

3.3.2.3 Technical guidelines on the management of used oil and oil sludge in Kenya

NEMA has developed draft Technical guidelines on the management of used oil and oil sludge in Kenya with the objectives of

- Ensuring effective and efficient collection and transportation systems for used oil and oil sludge;

- Promoting eco-friendly technologies for recycling of used oil;
- Creating awareness on hazards associated with handling used oil;
- Providing guidance on infrastructure for management of used oil

The guidelines cover key elements of used oil and sludge value chain including generation, collection, transportation, storage, recycling, use and disposal. Specifically, the guidelines spell out the classification of used oil and sludge, sources and generators etc. important to this EIA process, the guidelines outline pertinent considerations and mandatory requirements for transportation, recycling, handling and storage of used oil and sludge

3.3.2.4 The Water Quality Regulations-2006

The EMCA Water Quality Regulation of 2006 is concerned with the protection of water quality and applies to drinking water, industrial water, effluent discharge, water used for agricultural, recreational, fisheries, wildlife and other purposes. This Act is divided into 6 Parts as follows:

- Quality standards for sources of domestic water;
- Monitoring for sources of domestic water;
- Standards for effluent discharge into the environment;
- Monitoring guide for discharge into the environment;
- Standards for effluent discharge into public sewers and,
- Monitoring for discharge of treated effluent into the environment.

Effluent discharge and water for industrial use are dealt with under part III which sets out the standards for discharge into the environment, standards for discharge monitoring, and application for effluent discharge license. The regulation provides guides for water use and conservation as well as effluent standards for discharge.

3.3.2.5 EMCA (Air Quality) Regulations, 2014

The objective of these Regulations is to provide for prevention, control and abatement of air pollution to ensure clean and healthy ambient air. The overall objective is to protect human health and to allow for safety. The regulations under section 31 require an owner or occupier of a controlled facility shall- (a) inform the workers of the hazards in specific work environments; (b) train the workers on the potential hazards of any hazardous substance to which they are exposed and the safety precautions to be taken to prevent any harm to their health; (e) Take exposure reduction measures recommended under Part IX of the Fifth Schedule of the regulations.

The regulations prohibit, any person from causing the emission of air pollutants (such as liquid and gaseous substances) and suspended particulate matter listed under Second Schedule (Priority air pollutants) to exceed the ambient air quality levels as stipulated under the Second Schedule (Ambient air quality tolerance limits) and Seventh Schedule (Emission limits for controlled and non-controlled facilities).

3.3.2.6 Noise Regulations (Legal Notice No. 61 of 2009)

These Regulations were gazetted to manage noise levels to levels that do not cause a disturbance to the public. The regulations set out the considerations for determining noise levels including time of day, proximity to the receptors, recurrence, intensity and possibility of exerting control to the noise. Further, permissible levels for different land uses and day-night times are prescribed by the regulations as tabulated in table 3.1.

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

Table 3.1: Prescribed maximum noise levels

With regard to the facility, the noise levels within the facility should be permissible as stated in Legal Notice 61. All noisy equipment must be muffled appropriately and must be serviced as per manufacturer's schedule to minimize noise and excessive vibrations

3.3.3 The Occupational Safety and Health Act, 2007 (No. 15 of 2007)

The Act applies to all workplaces where any person is at work, whether temporarily or permanently. The objective of this Act is to secure the safety, health and welfare of persons at work; and protect persons other than persons at work against risks to safety and health arising. Under Section 16 of this Act, it is mentioned that *no person shall engage in any improper activity or behaviour at the workplace, which might create or constitute a hazard to that person or any other person.* This Act repealed the Factories and Other Places of Work Act and provides general duties of occupiers of work places. The Act provides for safe use of plant, machinery and equipment and states that all plant, machinery and equipment whether fixed or mobile for use either at the workplace or as a workplace, shall only be used for work, which they are designed for and be operated by a competent person.

Though not explicitly provided, the act and the rules made there under have various sections on hazardous materials that apply to used oil. It also states that any person supplying, distributing, conveying or holding in chemicals or other toxic substances shall ensure that they are packaged, conveyed, handled and distributed in a safe manner so as not to cause any ill effect to any person or the immediate environment.

3.3.4 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.

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

Regulation 12 – 15 requires a Hazard Communication program implemented at their workplace. The Proponent is required to maintain an inventory of all Material Safety Data Sheets (MSDS) for the chemicals stored in their workplace. As a minimum the MSDS shall comply with the format indicated in the Third Schedule of the Regulations and will be disclosed fully to the employees handling the chemical by the Proponent. All unused, obsolete or expired chemicals must be disposed off 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.

3.3.6 The Physical Planning Act – 1999 (Chapter 286) revised 2012

The *Physical Planning Act Chapter 286* is the main Act that governs land planning. The respective County Authority (e.g County Government of Kwale) must approve development and issue a certificate of compliance. Section 29 of this Act gives the powers to County Authorities to reserve and maintain all land planned for open spaces, parks, urban forests and green belts. In this regard, the final disposal site must be approved by the County Government. The same section therefore allows for the prohibition or control of the use and development of land and buildings in the interests of proper and orderly forms of development in the area. Section 36 of the Act allows local authorities to order for the project to comply with NEMA regulations i.e. EIA reports if the authority deems that the project has injurious impacts on the environment

3.3.7 The Water Act 2016

The *Water Act, 2016* provides guidelines on use and management of the of the water resources and prohibits the water pollution. As per Part II, section 3 of this act states “*every water resource is hereby vested in the state, subject to any rights of user granted by or under the Act or any other law*”. The act also species that a permit is required from The Water Resource Authority in case of supply to over twenty (20) users.

3.3.8 Public Health Act Cap 232 (Rev. 2012)

The *Public Health Act Cap 232* makes provisions for securing and maintaining health. It consists of directives that affect human health. Under Part IX section 115 of this Act, it is stated that no person or institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Any noxious matter or wastewater flowing or discharged into a watercourse is deemed as a nuisance. The Public Health Act Cap 247, gives provisions for use of poisonous substances. It also requires persons concerned with importation, sale, disposal storage, transportation or use of poisonous substances to be registered and licensed and provides measures for detecting and investigating cases in which poisoning has occurred.

Section 115 of the Act states “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.” Section 118 1(e) of the Act states “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.”

3.3.9 The County Government Act 2012

Under this Act, Kwale County assumes a number of roles in its area of jurisdiction, which includes the Bishop Makarios road area. Devolution to county governments has impacted all kinds of developments in an area. The administrative changes have impacted operational plans and costs.

Section 160 (a) of The County Government Act, Chapter 265 empowers every County Government to establish and maintain sanitary services for the removal and destruction of, or otherwise dealing with, all kinds of refuse and effluent and, where any such service is established, to compel the use of such service by persons to whom the service is available.

Section 201(1) – (4) expands the jurisdiction of local authority to make by-laws in respect of all such matters as are necessary or desirable for the maintenance of the health, safety and well-being of the inhabitants of its area or any part thereof and for the good rule and government of such area or any part thereof and for the prevention and suppression of nuisances. The by-laws so made may control, regulate, prevent, prohibit or compel certain activities to be undertaken and prescribe offences in case of contraventions.

3.3.10 The Energy Act 2019

Energy Act of 2019 consolidates the laws relating to energy, to provide for National and County Government functions in relation to energy, to provide for the establishment, powers and functions of the energy sector entities; promotion of renewable energy; exploration, recovery and commercial utilization of geothermal energy; regulation of midstream and downstream petroleum and coal activities; regulation, production, supply and use of electricity and other energy forms; and for connected purposes. Aimed at modernising the legal framework for Kenya’s energy sector, the Acts introduce a raft of amendments to Kenya’s ageing energy legislative framework with the view of keeping abreast with the evolving global energy landscape. Additionally, as Kenya is the final stages of making its first crude oil sales under the Early Oil Pilot Scheme (“EOPS”), it is expected that the Acts will reinvigorate investors to participate in Kenya’s nascent oil industry due to increased certainty with respect to Kenya’s legislative regime.

Under the Energy Act, three key institutions are established that will be tasked with managing and regulating Kenya’s energy resources, being, the Energy and Petroleum Regulatory Authority (“EPRA”) formerly ERC, the Rural Electrification and Renewable Energy Corporation (“REREC”) and the Nuclear Power and Energy Agency (“NPEA”). The REREC, on the other hand, will be mandated with providing oversight with respect to Kenya’s Rural Electrification Programme as currently spearheaded by Kenya Electricity Transmission Company Limited (“KETRACO”) under the guidance of the Rural Electrification Authority (“REA”). Similarly, REREC will be at the helm of Kenya’s renewable energy agenda, and will therefore be mandated, inter alia, with ensuring that

Kenya's energy mix comprises of a significant portion of renewable energy sources, in line with the Paris accord. It is worthwhile to note that significant progress is being made on this front with approximately 65% of Kenya's energy mix coming from renewable sources.

Similarly, the NPEA will be tasked with assisting with the successful attainment of Kenya's nuclear power ambitions. It is expected that NPEA will pioneer the introduction and implementation of sound policies under the nuclear power programme, currently spearheaded by the Kenya Nuclear Energy Board. It is expected that the NPEA will ensure the attainment of installed nuclear power capacity amounting to 4GW by 2030.

As provided under the Energy Act 2019, the EPRA will be mandated with the regulation of Kenya's electricity value chain with a specific focus on generation, transmission, distribution and supply segments of the electricity value chain. Additionally, the EPRA will similarly be tasked with regulating the importation, refinement, exportation, transportation, storage and sale of petroleum and attendant petroleum products, with the exception of crude oil.

3.3.11 Petroleum Act 2019

Conversely, the Petroleum Act 2019 established the legislative framework guiding the exploration and production of petroleum resources in Kenya. The updated piece of legislation will govern the contracting, exploring, development and production of petroleum resources in Kenya, including crude oil and natural gas.

The 2019 Petroleum Act provide a framework for contracting, exploring, developing and producing petroleum. The new law would also be used to formulate national petroleum policy and conduct petroleum operations. It will be a reference point in the establishment of petroleum institutions. Under the new law, the national government, county governments and local communities shall receive a fair share of benefit from revenues emanating from petroleum operations.

3.3.12 Guidelines for Used Oil Recycling Facilities

A recycling facility shall undertake reprocessing, reclaiming and regeneration (re-refining) of used oils by use of an appropriate selection of physical and chemical methods of treatment. All the recycling facilities shall specify the nature of recycling activity to be undertaken e.g. Reprocessing, Reclamation, Regeneration (Re-refining) and the final products to be produced.

3.3.12.1 Standard Infrastructure

Recycling facilities shall require standard infrastructure such as;

- Tanks (as per KS standards);
- Oil water interceptors;
- Bund walls;
- Paved surfaces with an impervious material especially at the offloading and loading bays;
- Proper drains etc;
- Pollution control equipments;

- Signages;
- Fire assembly and exit points;
- Minimum required area for each facility;
- Perimeter walls;
- Refractionating column and
- Site office.

3.3.12.2 Requirements of the site

The guidelines require every person intending to establish a recycling facility shall obtain an Environmental Impact Assessment (EIA) license before commencement. Additionally, all recycling facilities are required to obtain a waste recycling license on commencement of operations and adhere to the license conditions including undertaking of annual Environmental Audits and submitting the report to the Authority. Further;

- All oil tanks shall meet the standards set out under KS 1967:2006 for storage and distribution of petroleum products in above ground bulk installations;
- All oil tanks shall be bunded appropriately with bund wall of a size stipulated under the KS 1967:2006;
- All recycled oil emanating from the processes shall be handled and stored in accordance with the requirements set out in KS 1967:2006;
- All recycling facilities shall be provided with adequate and functional oil interceptors and other pollution control measures;
- All recycling facilities shall receive used oil from licensed transporters only;
- All recycling facilities shall maintain a record of dully filled tracking documents;
- All recycling facilities shall ensure any waste arising from their recycling operations is disposed as per Environmental Management and Coordination (Waste Management) Regulations of 2006;
- All recycling facilities shall control emissions and ensure the levels meet the required set standards under the Environmental Management and Coordination (Air Quality) Regulations of 2014;
- All recycling facilities shall provide valid physical addresses, contact details, telephone numbers, email contacts and GPS coordinates of their locations;
- All recycling facilities should have in place an Emergency Response Plan (spill control equipment, a fire control plan, an evacuation plan) in case of incidents, spillages, fires, explosions etc;
- The loading and offloading area is to be bunded. The bund area must equal or exceed the volume of the largest compartment of any vehicle to be discharged,
- The owner or operator of a recycling facility shall ensure that the recycling area is fenced off and no other activity should take place within the fenced area other than recycling of used oil
- Establish a complaint management system (twenty-four (24) hour complaint contact telephone number) and ensure verbal response is provided to the complainant within two (2) hours.

4 BASELINE INFORMATION OF THE STUDY AREA

4.1 Introduction

This section presents a status report on the situation of the project site within the context of Kwale County as a whole. It discusses the environmental, socioeconomic, and bio-physical characteristics of the area and acts as a basis for continued monitoring and assessment of the impact of that facility to the surrounding community with special focus on the environment and social aspects.

4.2 Topography, geological features and soils of the proposed site

Kwale County has four major Topographical features; the coastal plain, the foot plateau, coastal uplands and Nyika plateau. Geologically the area consists of shales and sandstones overlain by sands and corals. Only the shales represent a source of salinity. So both surface and ground water of the area are of good quality. Most parts of Msambweni division have a high rainfall pattern but because of the fairly flat terrain, inland drainage is less dense and ground water flow is slower. The area is partially underlain by 'MajiyaChumvi formation' and thus many sources of ground water are saline in nature. Some hydrothermal features are evident in the area.

Soils in the county vary with topography and geology of the area. In the coastal plains, the soils have formed on lagoonal deposits and coral reef limestone. Their composition ranges from sand, clay, loam alluvial deposits and complexes of those composites. The soils are poorly drained, very deep, excessive saline, olive to greenish grey, loam to clay and often contain sulphuric material.

4.3 Meteorological information

The coastal climate in Kenya is mainly influenced by large-scale pressure systems of the Western Indian Ocean and monsoon winds. The monsoon winds blow from the northeast (October-March) and southeast (April-September). Transition periods of change of direction of the flow of the winds occur in the months of March-April and September- October. East African coastal currents also flow year round and are formed by the northward deflection of the southern Equatorial current and which accelerated during the southeast monsoon, but slowed during the northeast monsoon.

Kwale County is hot and dry from January to April while June to August is the coolest period of the year. Rainfall is bi-modal with the long rains usually starting from March/April and continues until July, while the short rains occur in November and December. Annual precipitation varies from 900-1500 mm per annum along the coast to 500-600 mm per annum in the hinterland. Generally temperatures are fairly constant over the year with a mean monthly maximum of around 30°C and a monthly minimum of around 20°C. The average annual temperatures range from 26.3°C to 26.6°C in the coastal lowlands while a range from 25°C to 26.6°C is experienced in the Shimba hills and from 24.6°C to 27.5°C in the hinterland. Relative humidity is consistently high throughout the year peaking to 90% during the wet months between April and July (GOK, 1997).

4.4 Land use

Land use patterns are greatly influenced by the existing topographical features and communities settled in a particular place. The coastal uplands which include Shimba hills, Tsimba, Mrima and Dzombo have abundant rainfall thus it is an area of medium to high agricultural potential. Also most of the terrestrial forests land is in the

coastal uplands (Shimba hills) where the Shimba hills National Reserve is found and it's also reserved for wildlife. The Nyika plateau is underlain by basement rock system and the main activity is livestock rearing. Fewer activities are experienced in the coastal plains and foot plateau due to existence of Jurassic rocks and sand hills thus the establishment of hotels and cottages for tourists. Development in Mazeras division is greatly influenced by the industrial activities. There is also dominant residential land use with subsistence farming within the wider vicinity of the area

4.5 Environmental quality- refuse & sewerages issues

Most parts of Kwale County have no proper defined ways of solid and sewage waste management. The settlements along the beaches are served with refuse collection and disposal site at Mwabungo while for most of the inland population, these services are not provided. Usually people have pit near their homestead where they burn their solid waste. On the other hand, there is no proper sanitary waste disposal in Kwale County. Reports show that among the waste disposal systems found in 43 centers, 81% had pit latrines only, 14% had pit latrines and septic tanks, 2% (one town) had septic tanks and only LungaLunga has a sewage treatment plant.

4.6 Demographic characteristics

Kwale County is populated mainly by the Digo and Duruma tribes belonging to the Mijikenda Ethnic group. Other tribes found in the county include the Kamba, Arabs and Indians though to a very small proportion. The 2009 census recorded Kwale County as having a total population of 649,931 comprising of a male population of 315,997 and a female population of 333,934. Population growth is expected to increase due to the current shift of industrial activity away from Mombasa into the outskirts and the increased rate of migration of other communities and foreigners.

4.7 Environmental resources

4.7.1 Fauna and flora

The site has no fauna or Flora. This section provides information on livestock and wildlife resources. In the wider Kwale County, Livestock Population in the county is amongst the lowest in the country which constitutes 1% of the total rangeland livestock population and this is attributed to drought and diseases in most parts of the county. Most of the wildlife population is found in the western part of the county which coincides with the Tsavo boundary. The Shimba hills national reserve is best known for its sable antelope population and also protects a variety of antelope species, buffalo and elephant population (East 1997). The forest of Mwache is a remnant of higher rainfall period and have an exceptional high biodiversity. Vegetation in the area has been affected by shifting cultivation that characterized agricultural practice in the past. The result has been a complex landscape with plant communities whose mapping is difficult. Crop trees in the area include coconuts, mangoes and cashew nuts. Other vegetation in the area is of diverse importance including medicinal, edible oil, fruits, vegetable as well as for spiritual needs.

4.8 The socio-economic environment of the assessment site

4.8.1 Cultural heritage

Kayas from part of the cultural heritage and they are mainly found in the heart of dense forests in Kwale and Kilifi districts. They are believed to shelter the fortified villages of the Mijikenda. There are a total number of 29 kayas

and sacred groves found in Kwale County (Robert & Luke, 1993). Other national heritage sites in Kwale County are located along the coast with many of them located on private lands. They consist of mosque ruins, palaces, houses, walls with gates and tombs, which are located at Tiwi, Kirima, Kongo, Diani and monuments Acts, some have archeological research potential, architectural value or tourism potential. National museums are the entities that maintain various aspects of Kenyan history (NES, 1985)

4.8.2 Human and Economy development

The economy of Mazaras is driven largely by the commercial activities that take place in neighboring Mombasa County. Although there are companies involved in the manufacturing sector there is a recent upsurge in the establishment of truck marshaling yards for most of the major transport companies, container depots and Container Freight Stations (CFSs). The existence of the Kenya Ports Authority and the attractions that Mombasa offers to tourists contributes significantly to the overall business activity in Mariakani. The project area is under the economic influence of Mazaras town and commercial/industrial facilities lining the Mombasa-Nairobi Highway

4.9 Infrastructure and social amenities

4.9.1 Roads

Kwale County has a road network of about 1130km of which only 16% are of bitumen standard. The project site has a good accessible murrum road off the Mombasa-Nairobi highway. The site is at close proximity to the Standard Gauge Railway

4.9.2 Water and electricity supply

The county has inadequate and unreliable surface and underground water resources. The availability and usage of water in the county varies from one place to another due to the different environmental conditions. The coastal stretch has a better water supply than the other parts of the county. The area has reliable ground water sources which are concentrated within 10km stretch inland from the Indian Ocean. The ground water quality varies according to the nature of the bedrock.

4.10 Housing

There mainly exist three house types in the rural areas of the county. The traditional Mijikenda (Duruma) house, the Swahili house which is mostly found in the coastal strip and the 'up country' type houses in Shimba hills settlement schemes. The area depicts urban-style private houses, temporary and semi-permanent housing depending on income levels and lifestyles of the occupants. While most residents own the housing units in their homesteads, workers in the nearby industrial facilities are mostly accommodated in rental housing units in Mazaras town

5 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

5.1 Introduction

The Government is committed to encouraging sustained developments along with the maintenance of ecological and environmental balances. All development activities have impacts on the environment. This section dwells on negative impacts with respective mitigation measures and positive impacts associated with the project. Impacts that may result from the installation of the facility, delivery of raw material, handling, storage, processing and dispatching activities.

Used oil at the facility have potential to present human health impact particularly during the processing activity where harmful fumes are expected. Other stages of the process present relatively mild impacts to humans but with significant risks to the environment. In line with the EIA Regulations, the following methodology was used in assessing impacts related to the proposed used oil recycling. All impacts are assessed according to the following criteria:

- i. The **nature**, a description of what causes the effect, what will be affected and how it will be affected.
- ii. The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of activity), regional, national or international. A score of between 1 and 5 is assigned as appropriate (with a score of 1 being low and a score of 5 being high).
- iii. The **duration**, wherein it is indicated whether:
 - The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
 - The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
 - Medium-term (5–15 years) – assigned a score of 3;
 - Long term (> 15 years) - assigned a score of 4; or;
 - Permanent - assigned a score of 5.
- iv. The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
 - 0 is small and will have no effect on the environment;
 - 1 is minor and will not result in an impact on processes;
 - 2 is low and will cause a slight impact on processes;
 - 3 is moderate and will result in processes continuing but in a modified way;
 - 4 is high (processes are altered to the extent that they temporarily cease); and
 - 5 is very high and results in complete destruction of patterns and permanent cessation of processes.
- v. The **probability** of occurrence, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
 - Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
 - Assigned a score of 2 is improbable (some possibility, but low likelihood);

- Assigned a score of 3 is probable (distinct possibility);
 - Assigned a score of 4 is highly probable (most likely); and
 - Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- vi. The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- vii. The **status**, which is described as either positive, negative or neutral.
- The degree to which the impact can be reversed.
 - The degree to which the impact may cause irreplaceable loss of resources.
 - The degree to which the impact can be mitigated.

The significance is determined by combining the criteria in the following formula:

$$S = (E + D + M) P$$

Where

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The significance weightings for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to carry out the project in the area),
- 30-60 points: Medium (i.e. where the impact could influence the decision to carry out the project in the area unless it is effectively mitigated),
- 60 points: High (i.e. where the impact must have an influence on the decision process to carry out the project in the area).

Impact shall arise during the installation, operational and decommissioning phases of the project cycle. As such, analyses have been made for all these phases and mitigative measures proposed in the proceeding sections of this report.

5.2 Positive Impacts

5.2.1 Socio-economic benefits of the project

Through this investment, the overall revenue of the country will increase through payment of income tax, Pay-As-You-Earn, (PAYE), VAT and business licensing. The venture will also achieve the following:

5.2.2 Provision of employment opportunities

Used oil recycling facility will engage employees on a permanent and contract basis to work on the various sections of the facility. The employed persons are therefore able to earn an income to secure their livelihoods.

5.2.3 Revenue generation to the proponent.

The facility will accrue income to the investor from the charges levied on services to clients. This enables the investor to meet respective financial obligations and make profits.

5.2.4 Provision of used oil recycling services

The facility will meet the ever-increasing demand for used oil recycling services occasioned by the expanding automotive industry. This is justified from an economic and environmental perspective since the recycling activity would manage the oil that would otherwise pose risks to the environment

5.2.5 Support to other business establishments

The facility adds a customer base for other small and larger scale businesses and enterprises in the area. The facility will also support other business ventures such as transport, auto repair industry, environmental services etc.

5.2.6 Long-term positive impact on environment due to used oil recycling

Used oil recycling is seen as having a positive impact on the environmental (air and soil) and social aspects (premises employees, nearby residents and general public). This is mainly due to the risk of used oil pollution of soil and ground water being reduced to low risk or eliminated altogether. Therefore, the long-term impact of used oil treatment is viewed in a positive light (or as a positive action / impact).

5.3 Management of used oil

5.3.1 The Precautionary Principle

If there is a doubt about the impacts of used in waste such oily or oil contaminated materials, the procedure for management of used oil should be followed.

5.3.2 Duty of Care

The concept of duty of care request all parties involved in used oil generation, handling and management chain to have regard for the proper observance of good waste management practice throughout the chain.

5.3.3 Collection, storage transport and handling

Collection, storage transport and handling of used oil shall be in accordance with the provisions of the EMCA waste Management Regulation of 2006 and the technical guidelines on the management of used oil and oil sludge in Kenya. Workers handle used oil and sludge should be provided with training and informed about proper practice and risks. Every process in the used oil management chain should be such that no environmental media is polluted by the commodity and life forms are not subjected to the harmful effects of the used oil.

5.4 Impacts during site preparation and installation phase

5.4.1 Impact of extraction of construction materials

During site preparations and installation works, the proposed site will be brought up to up to standard to facilitate proper and safe installation. Site preparations will entail minor leveling works, paving works, preparatory works for laying utility lines and site enclosure for security purposes among other works. All these activities will demand raw materials and inputs that will be sourced from the environment

Raw materials for the construction of the development proposal will originate from quarries, woodlots and industries which will have an impact on the environment through destruction of the physical environment where mining is involved or wood materials are required, disposal of pollutants into the environment from industries manufacturing raw materials and threat to water resources in the case of sand harvesting

Mitigations measures

- The contractor will obtain raw materials for the construction materials from compliant and licensed sources
- The contractor will procure quantities that are sufficient for the intended works only and recycle as far as practical to curtail wastage.
- The contractor will commit to extensive use of recycled raw materials as will be appropriate and in a manner that does not compromise the safety of the used oil recycling plant.

5.4.2 Occupational health and safety hazards

Occupational hazards abound from the use of tools and machinery at the construction site. They may include exposure to moving parts, sharp edges, falls etc. Movement of materials into the construction site by workers and during construction per se may cause accidents with potential to cause injury. This will affect the health of the worker(s) and their potential to work thereby impacting negatively economically.

Mitigations measures

- The contractor will provide workers with appropriate Personnel Protective Equipment (PPE) and ensure their use
- Workers will be trained on safety equipment use and first aid facilities availed on site
- Contractor to comply with the requirements of the Occupational Safety and Health Act (OSHA) by registering the site as a work place
- Appropriate precautionary signage will be strategically displayed at the construction site
- All visitors to the site will be provided with PPE and accompanied by site staff.

5.4.3 Air pollution from construction dust

In the site preparation and installation phase dust will be expected from excavation of soil, paving and movement of vehicles. If generated in large quantities dust may present a respiratory hazard and also cause visual intrusion hence presenting accident risks as well as causing general nuisance to the neighbors. Air emissions would also be expected from exhausts of vehicles delivering construction material.

Mitigations measures

- The contractor will secure the site using appropriate dust screens and replace worn out screens.
- Building materials that are likely to produce dust such as ballast shall be sprinkled with water before use.
- Dusty surfaces at the construction site will be sprinkled with water.
- Schedule dusty activities for less windy conditions
- Employ sound project planning to accomplish generating activities quickly
- Employees will be provided with dust masks.
- Maintain slow speeds for traffic accessing the project site

5.4.4 Solid waste generation

During the site preparation and installation phase site works, acquisition of packaged material and general cleaning will generate considerable wastes in the form of metal cuttings, rejected materials, gunny bags, empty paint containers among others. These will be disposed in prescribed manner through contracted NEMA licensed waste handlers.

Mitigations measures

- Procure the services of a NEMA licensed waste handler to manage solid wastes from the construction site
- Deploy adequate waste collection bins throughout the construction site
- All recyclable materials should be collected and reused on site or delivered to recyclers
- Procure only sufficient quantities of materials to avoid generation of waste from surplus
- Strictly observe the ban on secondary packaging and single use plastics

5.4.5 Noise impact

Noise is expected from movement of vehicles and construction equipment. It would also arise from construction activities at the site such loading and offloading of material, carpentry and masonry activities. Noise may lead to hearing impairments which will reduce the workmanship of the employees and also affect their finances due to treatment and medication. The impact of noise is expected to be partially mitigated naturally due to the industrial nature of the wider neighbourhood in addition to the presence of a busy road adjacent to the facility and the openness of the immediate neighborhood. As much as the noise may be in keeping with that of the zone with relatively high background noise, special attention needs to be accorded to the nearby residential settlements.

Mitigations measures

- Delivery of raw materials to site to be done only during the day of weekdays
- Noisy equipment and machinery will be located directionally away from the residential neighbours
- Workers on site should be provided with PPE to attenuate high noise levels associated with the deployed equipment and noisy activities
- Use of serviceable vehicles and machinery is also expected to reduce noise levels
- Ensuring that noisy construction equipment are fitted with silencers where possible

- The site will be fully enclosed to contain noises that may emanate from the works
- Deploy a hoarding barrier to contain the noise generated from the project site

5.4.6 Impact on flora and fauna

No Flora and fauna will be impacted especially during site preparation and clearance. There is no vegetation at the site currently. However soil disturbance I foreseen to perturb soil dwelling organism and burrowing animals

Mitigations measures

- Limit excavations an earthworks to the spatial extent of the project site only
- Minimize earthworks to as minimal as necessary
- Undertake screen planting around the project site and establish ornamental bushes to counter the impact of concrete emboundment.

5.4.7 Effluent generation

The construction workforce is expected to generate effluent that will need to be managed appropriately.

Mitigations measures

- Provide for portable toilet facilities to service the workforce from a NEMA licensed effluent disposal contractor.

5.4.8 Traffic management

Heavy commercial vehicles as well as supply vans will add to traffic increase at the site. Additionally, slow moving commercial vehicles have potential to significantly affect traffic along the highway as well as along the access road. Sound traffic management id therefore a prerequisite to effectively direct traffic into and out of the project site.

Mitigations measures

- Heavy commercial vehicles delivering raw materials shall observe designated speed limits for the area.
- Proper signage and warnings shall be placed on the access road to forewarn other motorists on the use of the road by delivery vehicles and earthmovers
- Delivery of raw materials for the construction shall only be undertaken during weekdays and during off peak hours
- All materials will be offloaded on the site and not on road reserves to the inconvenience of the neighbours
- Speed limits of 20KPH will be observed once a heavy commercial vehicle joins the access road
- The project contractor in conjunction with safety officer shall draw a detailed traffic management plan.
- Commercial vehicles delivering oversized load shall be accompanied by escort vehicles
- Route analysis for oversized deliveries shall be conducted to avert traffic incidents.

5.4.9 Water use and management

Construction projects utilize significant quantities of water for mixing and casting concrete. Water will also be required for human use including drinking and sanitary needs. It is however foreseen that the water consumption during the site preparation and installation phase shall be minimal and current supplies are considered adequate

to meet the demand. Notwithstanding, the following measures shall be put in place to check water consumption and conservation as per the Water Act (2016) and Water Quality Regulations (2006)

Mitigations measures

- The contractor will ensure water conservation in all construction activities
- Water will be recycled and reused as far as is practical within the project site
- Monitor water consumed at the site and adjust accordingly
- Repurpose used water for dust suppression and not fresh water

5.5 Impacts during the operation phase of the used oil recycling plant

5.5.1 Operational risks

The fittings / installations at the plant will include pumps, pipe work and above ground storage tanks. The risks associated with them include:

- Pump leaks may occur here through air separators, valves or couplings
- The hoses conveying the used oil and finished product may leak through nozzles, joints and weak points
- Tanks may have leaks at the point of joints
- Possible ignition of vapours of finished product and spilled material

Mitigation measures

- Regular tests to ensure integrity of the installations (especially the tanks) through contracted engineering firms and certificates to that effect issued
- The used oil recycling plant and installations will strictly follow provisions of API 650 and Kenya Standards KS 1969:2006 & KS 2506:2014 respectively
- Inventory management / stock reconciliation should be done daily to ensure no leakages and to monitor available stocks
- Put in place emergency procedures to deal with specific risks that may arise from the proposed facility

5.5.2 Fire and explosion Hazards

Hydrocarbons are volatile and their vapors in specific concentrations are flammable. If precautions are not taken to prevent their ignition, fire and subsequent safety risks may arise. Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces.

Vapors generated from waste oil re-refining process may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Vapors may travel long distances to an ignition source and flash back.

Mitigation measures

- Develop and implement a fire action and evacuation plan tailored for the facility
- A secondary emergency exit and a fire assembly point will be designated within the premises
- Flammable substances will be appropriately stored, labelled and restricted to authorized persons only
- Provide fire-fighting equipment and fire alarms at strategic locations within the buildings. These will be regularly inspected and maintained by a reputable fire security company.
- Fire drills will be conducted at least biannually to ensure that workers are conversant with the action to take in the event of fire or explosions.
- Fire awareness materials and warning signage will be placed in strategic locations within the used oil recycling plant to educate the workers on fire awareness.
- Prepare an emergency response plan to be prominently displayed at the facility through a reputable Occupational Health and Safety consultancy firm.
- Allow sufficient safety distance between installations and areas prone to fire risks
- Carry out an Occupational Health and Safety Audit and fire safety audit in line with the OSHA, No. 15 of 2007

Emergency exit siting

The evacuation plan shall designate at least one secondary exit that is remote from the main entry/exit door. The siting of the exits shall be such that the possibility blockage of both doors by fire or other emergency condition is minimized. Siting of the emergency exit shall generally follow the following criteria:

- Should be located away from rooms with hazardous materials
- Should lead to open spaces and avoids narrow passages
- Should be mapped and exit signs indicating the nearest route to the exit installed
- Should be equipped with wheelchair access ramps.

5.5.3 Effluent generation

Most of the effluent that will potentially be generated from the facility shall emanate from the recycling process. Specifically, the dewatering process is foreseen to generate huge amounts of effluent as it will entail stripping of water from the used oil. The dewatering process shall be undertaken through settling tanks and bulk dewatering tanks operating in series. The stripped water shall be contaminated with oil and shall require sound management and disposal. The effluent generated in this manner shall be flocculated and channeled to an effluent treatment plant. Effluent at the facility will emanate from cleaning operations (wash water) from operational areas and administrative areas. This wastewater may contain chemicals which may enter the food chain to humans or harm the environment. Wash-water so produced shall be channeled into an oil-water separator. The sludge generated shall be handled on site and the resultant water channeled to the effluent treatment plant. Since the proponent shall acquire an operational license from NEMA to handle used oil and sludge, it is expected of the proponent to undertake in house handling and management effluent.

Effluent will also be generated from sanitary facilities within the premises. The effluent will be managed through a septic tank soak pit system since the subject area does not have a reticulated sewer system

Mitigation measures

- Install efficient drainage systems to convey oil laden water and storm water
- Apply for an Effluent Discharge License from NEMA
- Install an effluent treatment plant (ETP) to effectively manage the waste water prior to disposal
- Conduct monthly monitoring of the effluent discharged from the ETP against Standards set out in schedule III of Water Quality Regulations, 2006
- Station a dedicated operator at the ETP to carry out regular monitoring and oversee operations for optimal operation of the ETP
- Conduct regular inspections for pipe blockages or damages and fix appropriately

5.5.4 Solid wastes

The facility will generate different types of solid wastes s i.e. from the office comprising of mainly paper from administrative activities, glass and plastics for office supplies; and from the used oil operations of the facility in the form of rags, used seals and packaging materials.

Solid waste of more hazardous nature shall be generated from the settling tanks during the pre-treatment/dewatering operations. This shall in the form of grit and metallic chips that found within the used oil medium. Solid waste in the form of dried out sludge shall also emanate from the facility. Additionally, other oil contaminated wastes such as paper, rags etc. need to be handled as per the provision for other hazardous wastes. These waste streams shall be consolidated and handed over to hazardous solid waste handlers for proper management such as incineration or landfilling as appropriate.

Domestic type wastes that may be generated within the site shall be managed through NEMA licensed solid waste handlers for disposal at designated dumpsites. Adequate measures should however be put in place to ensure that oil contaminated wastes are not mixed with regular wastes

Mitigation measures

- Deploy adequate waste segregation bins throughout the facility to facilitate separation of hazardous from non-hazardous wastes for proper handling
- Engage a NEMA licensed solid waste handler to manage non-hazardous wastes from the facility and proper records kept for collection and disposal.
- Engage a NEMA licensed hazardous waste handler to manage wastes from the facility
- The proponent will provide for solid waste management through a hierarchy of options that includes reduction at source, separation of wastes to make it easier to undertake recycling.
- Comply with the provisions of Legal Notice No. 121 of 2006
- Strictly observe the ban on single use and secondary plastic packaging

5.5.5 Spill management

Used oil has the potential of accidental spills especially if not well handled and have the potential to contaminate water and soil. Spills of other associated substances such as reagents, and acids used in the recycling process are also prone to spills accidental spills may occasionally occur during offloading of fuel into storage tank. Oil/lubricant leakages from delivery tankers and dispenser pumps can contaminate soil and water resources.

Mitigation measures

- The entire facility will be imperviously paved using cabro blocks to mitigate possible soil and water pollution in case of severe spillages
- Provide spill response kits within the facility such as sorbents sand to aid in speedy cleanup
- Any oily materials shall be segregated, sheltered away and disposed by the contracted hazardous waste handler
- Strictly account for all the delivered used oil by transporters and suppliers by careful scrutiny of tracking documentation
- Ensure that adequate spill containment is provided at all times in case of severe leakage of oils and finished product. The containment shall be of at least 20% the capacity of the holding vessel
- Ensure that the tanks are regularly inspected and maintained to detect and prevent any leaks
- Regularly desludge and maintain the oil interceptor in good working order
- Sound engineering strategies to be put in place to avoid spills. Observe the tank and piping standards as specified by KEBS and API
- Ensure runoff from the facility complies with the standards set out in schedule III of Legal Notice No. 120, Water Quality Regulations of 2006 through analysis of discharge from interceptor

5.5.6 Noise generation

Noise at the facility is foreseen to potentially emanate from two main sources i.e.

- Noise from used oil recycling operations
- Noise from traffic

Noise from recycling operations will be from the installations, auxiliary appliances and from the staff. This category of noise is foreseen to be minimal and in keeping with that of the baseline conditions. Notwithstanding, measures are required to keep it at minimum. Noise from traffic is expected from vehicles accessing the facility to deliver material or collect the finished product. However, the noise from vehicles accessing the facility is in keeping with that of the background levels. A sound traffic management plan shall be put in place to check the noise from vehicles in addition to the following measures

Mitigation measures

- The background noise along Mombasa-Nairobi highway and adjacent commercial/industrial establishments is in keeping with that to be generated by vehicles accessing the used oil recycling plant.
- Endeavor to conduct operations with minimal noise as is practical
- Install only compact machinery that are muffled to minimize noise as much as possible

- Discourage unnecessary hooting and engine revs as much as possible
- Encourage transporters to use transport in good state of maintenance
- Provide suitable PPE to workers working in noisy areas of the facility
- Carry out baseline and regular noise mapping exercise through NEMA licensed contractors to ensure compliance with schedule I of Legal Notice No. 61 of 2009

5.5.7 Use of water resource

The facility will use water resources to service its operations hence it has a negative impact on quantities that are available for water. The facility will source its water from a water line serving the area, supplementary supplies can be obtained from water bowsers and by drilling a borehole on site.

The water so obtained will be used to run day-to-day activities at the recycling plant including sanitation and general cleaning. In the process, water will be used in the fractionating tower as a coolant and to aid condensation of the fraction of finished product. Water shall be recirculated as much as possible without compromising the process. Waste water shall be channeled to the ETP for treatment and reused where practical. Water shall also be used for human consumptive purposes such as drinking and cooking.

Mitigation measures

- Create awareness among workers on the importance of conservation of water resources
- All water for use shall be metered to determine consumption levels
- Rain water harvesting is recommended as a measure to provide for water for general cleaning
- Apply and obtain a water abstraction permit from WRA and adhere to the abstraction limits if a borehole shall be drilled on site
- Recycle the treated water from the ETP for non-human consumptive purposes such as fire-fighting, general cleaning, landscaping etc.
- Install low capacity cisterns in sanitary conveniences to keep flush volumes at minimal

5.5.8 Use of Energy resource

The facility will use energy resources from the environment such as electricity and fuel. Electrical energy will be used for various purposes including lighting, running of machines, and operation of electronic equipment and other daily operations.

The primary energy source will be on-grid electricity

Proposed mitigation measures

- Proponent should consider installation of solar external lighting systems to complement electricity supply from the national grid.
- Procurement of energy saving appliances that have a low energy rating.
- Provide energy saving tips for each of the sections of the facility so that occupants are aware of their obligations to conserve energy
- Explore energy efficient production technologies in the recycling process

- Monitor energy use during operations and maintain records
- Maintain the standby generator in good working condition to guarantee its efficiency

5.5.9 Occupational Health and safety

The operations of the used oil recycling plant can cause serious health and safety risks to workers on site. Occupational exposures are normally related to the dermal contact with fuels and inhalation of vapors during handling of such products, accidental falls, musculoskeletal injuries and general exhaustion.

Mitigation measures

- Develop and implement a policy on health and safety at the workplace as well as an effective Emergency Response Plan (ERP) and enlighten the staff on safety measures and procedures.
- The workers should be provided with appropriate gear (PPE) and trained on occupational health and safety in line with the Occupational Safety and Health Act No. 15 of 2007.
- Appropriate warning signage to be put up strategically
- Restrict access to operational areas to authorized personnel only
- Provide documentation of all incidences and accidents occurring on the site including near misses.
- Conduct annual health and safety audits in line with Occupational Safety and Health Act No. 15 of 2007
- Provide well stocked First Aid kits and train staff members in first aid administration.
- Implement a hazard communication program implemented at their workplace.
- The Proponent is required to maintain an inventory of all Material Safety Data Sheets (MSDS) for the chemicals stored in their workplace and fully disclose fully disclosed to the employees handling the chemical
- All unused, obsolete or expired chemicals must be disposed off 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 and oil safely in the workplace through regular toolbox talks
- A workable fire action plan will be developed and implemented, fire break distances will also be observed for high risk sections of the recycling plant
- Endeavor to fully comply with the provision of the Occupational Safety and Health Act No. 15 of 2007

5.5.10 Safety of visitors, neighbors and general public

The proponent has an obligation to put in place measures that will protect the visitors to the site, neighbors, and the general public.

Mitigation measures

- The facility will be secured and manned on a 24hours basis by a contracted security firm.
- Access to the facility is restricted to authorized personnel only.
- All visitors to the facility must be provided with protective clothing at all times.

- It will be the responsibility of the proponent to ensure that first-aid services are provided to employees at all times.

5.5.11 Traffic concerns

The site is located off the Mombasa-Nairobi highway. It is foreseen that the day-to-day activities of the facility may increase the vehicular count along the access road but will not enormously impact on the normal traffic. Traffic accessing and leaving the facility to make deliveries and collection will exert an impact on the traffic flow as the slow down and turn or wait for clearance. The existing facility has adequate parking space provided, however possibility of full utilization during peak operations are a reality.

Since the used oil will be obtained from diverse sources, it is foreseen that offsite impacts due to traffic could potentially be significant. This is due to risks posed by transporting oil to the facility by players, including small scale players, who might inadvertently spill or expose other people to the used oil.

Traffic is expected to exert impacts on the nearby neighborhood through noise and dust nuisance, potential for accidents and disturbance

Proposed mitigation measures

- The proponent will ensure that the road reserve near the facility is kept clear of traffic.
- Ensure that all vehicles visiting the used oil recycling plant are accommodated within premises and don't block the road
- Adequate parking space has been provided within the facility
- Implement a compliance policy among supplier to only receive used oil packaged and transported in the prescribed manner
- Enlighten the delivery and dispatch trucks to observe slow speed when traversing the access road

5.5.12 Vapour emissions and air quality

In terms of air quality, hydrocarbon vapors will normally be released during the actual recycling process, especially with application of heat. The vapors emitted are of importance since they present risks to the personnel on site as well as those away from the site. The emissions may originate from volatile materials generated or used within the plant. Depending on process and product, these may include

- Gases of sulphur-Sulphur dioxide (SO₂)
- Nitrogen Oxides (NO_x)
- Volatile Organic compounds (VOCs)
- Carbon Monoxide (CO)

These gasses are commonly released when fuels and oils undergo combustion or heated. The emissions depend on combustion conditions such as temperature, quantity of oxygen (air), burner types etc. they have different health effects on human beings with varying tolerance limits.

Volatile Organic Compounds emission consists of a large group of substances generally described as hydrocarbons. Their molecular structure is characterized by the combination of carbon and hydrogen atoms. Additionally, these substances can also contain oxygen, nitrogen, sulphur and phosphorus. These are referred to as TOCs (Total Organic Compounds). The emission of hydrocarbons finds its origin in the use of organic constituents and organic fuels in the production process. Especially by the heating or combustion emissions, these substances take the form of vapour or of reaction products. The most important source of emission of hydrocarbons is the incomplete combustion of fuel.

Proposed mitigation measures

- All venting systems and procedures have to be designed according to required standards
- Include Vapor Recovery Systems and carbon filters on vents
- Installation of gas detector to detect any leaks that may arise from the recycling process
- Regular air quality monitoring by a NEMA accredited laboratory will be undertaken to ascertain compliance with Legal Notice No. 34, Air Quality Regulations, 2014
- Workers in hazardous areas will be provided with adequate PPE and their usage strictly enforced
- Carry out periodic health survey among the workers and liaise with local health facilities to conduct passive surveillance among nearby residents for ailments related to these emissions

5.6 Decommissioning phase

Proponent will undertake safety and environmental audit to identify and mitigate any impacts that may arise from any left-over material and substances that could be harmful to people and/or the environment. Negative impacts associated with this phase are discussed below

5.6.1 Economic decline

The national economic gain got from the investment activities will be lost in the event of decommissioning of the facility. The proponent will also suffer huge losses and the workers on the premise will be jobless. The business fraternity will be affected as they will have no place for doing their business. This will also impact on their economic status.

5.6.2 Solid wastes

Decommissioning activities will be accompanied by generation of solid wastes especially due to the end of project life or change of user. Solid wastes expected at this phase include among others; Plastics, wood, glass, metal, papers, iron sheet, electricity gadgets, concrete blocks, among others.

5.6.3 Insecurity

Insecurity may result from the site being abandoned following the decommissioning. The unoccupied area is likely to be overgrown with shrubs that may be used as hideouts for criminals

5.6.4 Safety risks

Decommissioning of projects would normally be accompanied by safety risks from any leftover electrical cables, uncovered manholes and structures that may collapse and injure passers-by if left on site for a long time. There may also be environmental hazards from exposed left over substances which may cause soil and water contamination or generate noxious odor which can result to diseases.

5.7 Decommissioning strategy

During the decommissioning stage, it will be imperative for the proponent to conduct a decommissioning environmental audit to effectively mitigate the negative impacts associated with the decommissioning impacts. The following shall be undertaken during decommissioning

5.7.1 Dismantling and demolitions

The plant shall be methodically emptied and dismantled upon end of project life. Machinery, equipment and components shall be hauled away after which structures shall be demolishes. Electrical cabling and utilities shall be discontinued and associated underground routings filled back

5.7.2 Site decontamination

Site decontamination shall be achieved through clean up of the area, removal and disposal of any residual oils and sludge, and stabilizing the area. Soil media that is freshly contaminated with oil during the decommissioning phase shall be excavated away and disposed or incinerated

5.7.3 Site restoration

Site restoration shall entail returning site conditions to as near baseline as practical. This can be achieved by revegetating the site and using bio-remediative measures such use of plants that absorb and breakdown the pollutants (Phytoremediation)

6 OCCUPATIONAL SAFETY AND HEALTH

6.1 Introduction

Occupational Safety and Health (OSH) is of paramount importance in such a high risk exercise. The occupational environment directly affects employees, neighbourhood, visitors, contractors, sub-contractors and the general public. Further, upon project commencement, a number of safety measures have to be in place to ensure the safety of users, neighbours and the general public.

The proponent is therefore responsible for the following:-

- Implementation of appropriate national and internal recognised OSH standards, codes and guidelines;
- Inclusion of meaningful participation of employees in implementation and maintenance of procedures and processes;
- Implementation of a programme to change employee culture and attitudes regarding health and safety;
- Planning, implementing and monitoring programs and systems required to ensure OHS at the workplace;
- Provide and maintain workplaces, plant, equipment, tools and machinery and organise work so as to eliminate or control hazardous ambient work factors;
- Provide appropriate occupational health and safety training for all employees;
- Provide adequate personal protective gear/ clothing to all employees at no cost to employees;
- Record and report occupational injuries and illness;
- Ensure contract specifications include demands for service providers, contractors, and sub-contractors to have or establish systems enabling them to meet the OHS requirements of the employer.

6.2 Occupational Health and Safety Management System

An Occupational Health and Safety Management System (OHSMS) must be established, managed and operated for the proposed project. The system must contain the following features:

- i. Occupational health and safety policy;
- ii. Organizational framework of the OHSMS;
 - Staffing of OHSMS
 - Competence requirements;
 - Operating procedures;
 - Training programs;
 - System documentation;
 - Communication
- iii. OHSMS objective (documentation)
- iv. Hazard prevention
 - Prevention and control measures (active and negative);
 - Management of changes;

- Emergency preparedness and response;
- Procurement (tools, equipment, plant, services, contractors).
- v. Performance monitoring and measurements
 - Hazard prevention measures;
 - Ambient working environment;
 - Work related injuries, ill health, disease and injuries;
- vi. Evaluation
 - Feedback;
 - Corrective measures;
 - Action plan.

6.3 Physical factors in the work place

Five physical factors in the proposed project site are of importance. These are:-

- Signage;
- First-aid;
- Personal protective equipment; and

6.3.1 Signage

- Hazardous and risky areas, installations materials, safety measures, emergency exits shall be properly marked;
- Signage shall be according to national and international standards, well known to, and easily understood by workers, visitors and general public.

6.4 First-Aid

- Employer to ensure qualified first aid is provided to employees at all times;
- Eye-wash stations and/or emergency showers shall be provided close to the site where the recommended first-aid response is immediate flushing with water;
- First Aid stations to be equipped with gloves, gowns and masks for protection against direct contact with blood and other body fluids;
- Written emergency procedure to be in place.

6.5 Personal protective equipment

- Proponent to identify and provide appropriate Personal Protective Equipment (PPE) that will offer adequate protection to the worker, co-workers, and occasional visitors without incurring unnecessary inconveniences;
- Proponent to actively enforce use of PPE and ensure PPE is cleaned when dirty, properly maintained and replaced when damaged or worn out;
- Proper use of PPE to be part of recurrent training programmes for employees.

7 PROJECT ALTERNATIVES

The ESIA study report has been prepared for submission to NEMA informed by facts, findings and recommendations/proposals of which are based on the proposed used oil recycling. This helps in evaluating and examining the foreseeable effects of the project on the environment and therefore assisting in addressing how the proposed used oil recycling has to ensure that all environmental and social measures are complied with during operational phase.

The yes (proposed) alternative consists of the proponent's/applicant's final proposal with the inclusion of the legal guidelines, regulations and procedures as stipulated in the EMCA, 2015 Amendment Act which aims at reducing environmental impacts to the maximum extent practicable. Appropriate Environmental and Social Management Plans have been prepared as per the proposed project.

7.1 The yes alternative

The yes (proposed) alternative consists of the proponent's/applicant's final proposal with the inclusion of the legal guidelines, regulations and procedures as stipulated in the EMCA, 2015 Amendment Act which aims at reducing environmental impacts to the maximum extent practicable. Appropriate Environmental and Social Management Plans have been prepared

This section outlines the alternatives necessary for the Ali Empex to ensure, as far as is practicable, the prevention of contamination by used oil from any workplace; to ensure that used oil is recycled appropriately.

Recycling of used oil must be at a site;

- Designated by the local authorities and licenced by NEMA;
- Privately owned facility licenced by NEMA.
- i. Disposal at designated site by the Kwale County and licenced by NEMA

This option is not feasible because within Mombasa County there are no designated sites by the County authority licenced by NEMA for recycling used oil.

- ii. Disposal at privately facility licenced by NEMA

This option is the most suitable because of the following

- The site will be found suitable after appraisal by NEMA
- Transportation to other licensed sites outside Mombasa may be costly and add into project implementation cost.
- All measures to enhance safety and health of community and employees will have been enhanced

8 CHAPTER: CONSULTATIONS AND PUBLIC PARTICIPATION

8.1 Introduction

According to legal notice number 167 on Environment Management and Coordination Waste management Regulations 2006 used oil is classified as a hazardous waste. It therefore follows that any activity that engages in waste oil should be notified to NEMA and also public participation be properly conducted.

The public perception of risks related to waste oil recycling appears to reflect general societal anxieties and fears, which may (or) not have a reasonable basis. Despite these fears, the Communication regarding proposed activity has generally been positive between the neighbours and the proponent. This is in line with the requirements of Legal Notice No. 101, Kenya Gazette Supplement No. 56 of June 13th 2003, the Environmental (Impact assessment and Audit) Regulations, 2015. Consultations and public participation was encompassing, interactive and intensive, so as to ensure that as many stakeholders as possible and the public were reached. Special attention was paid to general public, especially those drawn from and within the immediate neighborhood. Views, comments, concerns and opinions of stakeholders concerning the project were sought. The experts discussed possible and practical ways to address the issues and concerns raised with the stakeholders.

8.2 Detailed Public Consultation

Consultation meetings were held with project neighbours and local stakeholders in order to gauge their perception regarding the proposed project

One consultative meetings were held including a courtesy call to Chiefs office. Detailed outcomes of each meeting are discussed in the next clauses.

8.2.1 Courtesy Call on the area Chief

This involved briefing the Chief on the purpose of the planned EIA exercise on the proposed used oil recycling plant in Mazeras and covered:

- i) The need for conducting an ESIA as per NEMA requirements contained in the 2015 Environment Management and Co-ordination Act.
- ii) Brief by the Chief on the administrative issues boundaries of within Kasemeni Location,
- iii) Environmental challenges facing the Kasemeni/ Mazeras Community especially on the spouting of industries along the SGR line.
- iv) The expectation of the community and ways in which the proponent can further work in harmony with community once the project kicks off



Plate 3: Courtesy call to Chief done by EIA Expert

8.2.2 1st stakeholders meeting (Baraza)

This meeting was held on 27th July 2019 at Chiefs office, Kasemeni Location. During the meetings, the EIA Experts briefed the participants on the proposed project and the objectives of the meeting and some anticipated impacts. Following this presentation, participants were given opportunity to, express their concerns as well as fears and propose recommendations that need to be incorporated into the design and operation of the used oil recycling plant. Key concerns that emerged as points of objection from the meeting were as follows

- (i) Environmental impacts of used oil to the local community
- (ii) Fire safety
- (iii) Emission management if any



Plate 4: Community during public meeting called at Chief office, Kasemeni location



Plate 5: Chief addressing the members of Kasemeni location community during public participation exercise

Attendance list and Minutes of the public participations is attached in this report.

9 ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN (EMMP)

An Environmental Management and Monitoring Plan (EMMP) outline is developed to ensure sustainability of the proposed establishment and operation of the used oil recycling plant. The plan provides a general outlay of the activities, associated impacts, mitigation action plans and appropriate monitoring indicators. Implementation timeframes and responsibilities are also defined. The primary responsibility for the integration of the mitigation measures for the proposed used oil recycling plant lies with the project proponent.

9.1 Environmental Inspection and monitoring

9.1.1 Inspections

Inspections typically are conducted to determine whether the used oil recycling activities are in compliance with applicable regulations, project commitments and specifications, disposal plans and/or permit conditions. For such a high risk project, a formalized environmental inspection program may be mandated by conditions attached to permits or governmental agencies.

9.1.1.1 Source of inspection requirements

Inspections will be conducted to verify that the proposed used oil recycling is in compliance with applicable regulatory requirements and contract/subcontract specifications. Sources of environmental inspection requirements include project permits and other regulatory agency approvals, environmental regulations and guidelines.

All sources of environmental compliance requirements must be reviewed to identify inspection requirements that will be included in the EIA license. Examples of project activities that may require inspection include, but are not limited to:

- Used oil reception, handling, processing, storage and dispatch
- Risk mitigation implementation

9.1.2 Documentation and record keeping

Environmental inspections will be documented and records retained in project files. Examples of documentation are telephone conversation logs, written correspondence, inspection logs and inspection reports. The inspector must develop an appropriate field inspection checklists, forms or other documentation. Checklists and forms generally will contain the following:

- Date and time
- Location
- Activity being inspected
- Inspector's observations and relevant data
- Need, if any, for corrective action
- Name, title and signature of inspector

9.1.3 Sources of monitoring requirements and parameters

Monitoring requirements are typically specified in environmental analysis documents and project permits and approvals. Agency required resource protection plans or mitigation plans could also be a source of monitoring requirements. All sources of environmental compliance requirements must be reviewed to identify any monitoring requirements and incorporated into the EIA license. Examples of parameters that will require monitoring activity include, but are not limited to:

- Air quality or air emissions
- Water quality parameters
- Biological resources
- Health and safety

9.1.4 Management tools

Matrices and databases – Development of a matrix that identifies all agency-specified monitoring requirements will be helpful in planning, executing, documenting and reporting monitoring activities. Identification of monitoring requirements by resource, the nature of each requirement, special technical expertise required, used oil recycling, monitoring location, and type of documentation will provide adequate record of compliance and any agency reporting requirements can be incorporated.

9.1.5 Regulatory reporting requirements

The proponent will undertake routine regulatory reporting to NEMA, Public Health, County Government of Kwale on the progress and monitoring parameters within specified timeframes and so that appropriate documentation and information can be collected to satisfy requirements.

9.2 Significance of an EMMP

EMMP for the proposed used oil recycling is to provide a logical framework within which identified negative environmental impacts can be mitigated and monitored. In addition, the EMMP assigns responsibilities of actions of various actors and provides a timeframe within which mitigation measures and monitoring can be done. The EMMP is a vital output of an Environmental Impact Assessment as it provides a checklist for project monitoring and evaluation for sound environmental planning at entire life of the project.

There will be a need to entrench within the working operations of the proposed activity a sound EMMP that will ensure no significant environmental pollution occurs. To achieve this, the following will need to be done: -

- The proponent to develop and document Environmental Management Policies that will guide used oil recycling activities. The policies should address environmental conservation measures to be put in place, occupational and safety matters of all users;
- Availing of necessary finance for implementation of EMMP; and

- The proponent and contractors to ensure that they carry out their work within Environmental and Occupational, Health and Safety requirements.

9.3 8.4 EMMP Implementation

This EMMP implementation will be overseen by the proponent. However other institutions like NEMA, may undertake their own environmental management actions.

9.3.1 NEMA

NEMA is the oversight institution over the environment in Kenya. Its role will be of monitoring compliance to the environmental indicators as identified in this EMMP. The role of NEMA will be:

- Oversight Monitoring As the lead agency responsible for the protection of environment in Kenya; NEMA will play the leading oversight role of monitoring the activities of the project according to the EMCA (2015) and the EIA/EA Regulations (2016)
- Site Inspection Visits; NEMA will undertake site visit to inspect and verify for themselves the nature and extent of the impacts and if the mitigation measures proposed in this EMMP are being complied with or vice versa.

9.3.2 Licensed used oil transporters

The licensed used oil transporters will endeavour to ensure that all the mitigation measures highlighted in the EMMP are being followed. They will produce an internal compliance inspection report that will be shared with NEMA if required.

9.4 EMMP Action plan for the preparation and installation phase

| Aspect/issue | Mitigation measures | Monitoring aspect | Responsibility | Cost (Kshs) |
|--|---|---|---------------------------------------|---|
| Impact of extraction of construction materials | <ul style="list-style-type: none"> - The contractor will obtain raw materials for the construction materials from compliant and licensed sources - The contractor will procure quantities that are sufficient for the intended works only and recycle as far as practical to curtail wastage. - The contractor will commit to extensive use of recycled raw materials as will be appropriate and in a manner that does not compromise the safety of the used oil recycling plant. | <ul style="list-style-type: none"> - The amount/quantity of recyclable materials used | Contractor Proponent | Part of the construction cost |
| Occupational health and safety hazards | <ul style="list-style-type: none"> - The contractor will provide workers with appropriate Personnel Protective Equipment (PPE) and ensure their use - Workers will be trained on safety equipment use and first aid facilities availed on site - Contractor to comply with the requirements of the Occupational Safety and Health Act (OSHA) by registering the site as a work place - Appropriate precautionary signage will be strategically displayed at the construction site - All visitors to the site will be provided with PPE and accompanied by site staff. | <ul style="list-style-type: none"> - Workers using Protective Equipment - Presence of Well stocked First Aid Box - Separate and clean Washrooms (Gents & Ladies) | Contractor Proponent | 50,000 for PPEs and First Aid equipment |
| Air pollution from construction dust | <ul style="list-style-type: none"> - The contractor will secure the site using appropriate dust screens and replace worn out screens. - Building materials that are likely to produce dust such as ballast shall be sprinkled with water before use. - Dusty surfaces at the construction site will be sprinkled with water. - Schedule dusty activities for less windy conditions - Employ sound project planning to accomplish generating activities quickly - Employees will be provided with dust masks. - Maintain slow speeds for traffic accessing the project site | <ul style="list-style-type: none"> - Amount of dust produced. - Level of landscaping carried out. | Contractor Proponent | Ksh 150,000 |
| Solid waste generation | <ul style="list-style-type: none"> - Procure the services of a NEMA licensed waste handler to manage solid wastes from the construction site - Deploy adequate waste collection bins throughout the construction site - All recyclable materials should be collected and reused on site or delivered to recyclers - Procure only sufficient quantities of materials to avoid generation of waste from surplus - Strictly observe the ban on secondary packaging and single use plastics | Amount of waste on site Presence of well-maintained receptacles and central collection point. | Proponent | 30,000 for purchase of receptacles. |
| Noise impact | <ul style="list-style-type: none"> - Delivery of raw materials to site to be done only during the day of weekdays - Noisy equipment and machinery will be located directionally away from the residential neighbours | <ul style="list-style-type: none"> - Level of noise generated | -Proponent -Workers -Contractor | 20,000 |

| Aspect/issue | Mitigation measures | Monitoring aspect | Responsibility | Cost (Kshs) |
|---------------------------------------|---|--|---|--------------------------------------|
| | <ul style="list-style-type: none"> - Workers on site should be provided with PPE to attenuate high noise levels associated with the deployed equipment and noisy activities - Use of serviceable vehicles and machinery is also expected to reduce noise levels - Ensuring that noisy construction equipment are fitted with silencers where possible - The site will be fully enclosed to contain noises that may emanate from the works - Deploy a hoarding barrier to contain the noise generated from the project site | | | |
| Injuries caused by plant installation | <ul style="list-style-type: none"> - Ensure that machinery, equipment, personal protective equipment, appliances and hand tools used in construction do comply with the prescribed safety and health standards and be appropriately installed maintained and safeguarded. - Ensure that equipment and work tasks are adapted to fit workers and their ability including protection against mental strain. - All machines and other moving parts of equipment must be enclosed or guarded to protect all workers from injury. - Arrangements must be in place to train and supervise inexperienced workers regarding construction machinery - use and other procedures/operations Equipment such as fire extinguishers must be examined by a - Government authorized person. The equipment may only be used if a certificate of examination has been issued. - Reports of such examinations must be presented in prescribed forms, signed by the examiner and attached to the general register. | <ul style="list-style-type: none"> - Installation clearance certificate - Certified installers | <ul style="list-style-type: none"> - Proponent - manufacturer | Cost related to installation |
| Effluent generation | <ul style="list-style-type: none"> - Provide for portable toilet facilities to service the workforce from a NEMA licensed effluent disposal contractor. | <ul style="list-style-type: none"> - Presence of an approved system for handling human waste at the site | Proponent | 100,000 for biodigestor installation |
| Water use and management | <ul style="list-style-type: none"> - The contractor will ensure water conservation in all construction activities - Water will be recycled and reused as far as is practical within the project site - Monitor water consumed at the site and adjust accordingly - Repurpose used water for dust suppression and not fresh water | <ul style="list-style-type: none"> - Water conservation signage mounted at the site - Quantity of water recycled | Proponent & Contractor | 10,000 |

9.5 EMMP Action plan for the operation phase

| Aspect/issue | Mitigation measures | Monitoring aspect | Responsibility | Cost (Kshs) |
|----------------------------|--|--|-------------------------------------|----------------------------------|
| Operational risks | <ul style="list-style-type: none"> - Regular tests to ensure integrity of the installations (especially the tanks) through contracted engineering firms and certificates to that effect issued - The used oil recycling plant and installations will strictly follow provisions of API 650 and Kenya Standards KS 1969:2006 & KS 2506:2014 respectively - Inventory management / stock reconciliation should be done daily to ensure no leakages and to monitor available stocks - Put in place emergency procedures to deal with specific risks that may arise from the proposed facility | <ul style="list-style-type: none"> - Test reports | Proponent | 20,000 per monitoring |
| Fire and explosion Hazards | <ul style="list-style-type: none"> - Develop and implement a fire action and evacuation plan tailored for the facility - A secondary emergency exit and a fire assembly point will be designated within the premises - Flammable substances will be appropriately stored, labelled and restricted to authorized persons only - Provide fire-fighting equipment and fire alarms at strategic locations within the buildings. These will be regularly inspected and maintained by a reputable fire security company. - Fire drills will be conducted at least biannually to ensure that workers are conversant with the action to take in the event of fire or explosions. - Fire awareness materials and warning signage will be placed in strategic locations within the used recycling plant to educate the workers on fire awareness. - Prepare an emergency response plan to be prominently displayed at the facility through a reputable Occupational Health and Safety consultancy firm. | <ul style="list-style-type: none"> - Fire action/ response plan | Proponent DOSH Officials NEMA | 100,000 annually for Fire safety |

| Aspect/issue | Mitigation measures | Monitoring aspect | Responsibility | Cost (Kshs) |
|----------------------------|---|---|---------------------|-----------------------------|
| | <ul style="list-style-type: none"> - Allow sufficient safety distance between installations and areas prone to fire risks - Carry out an Occupational Health and Safety Audit and fire safety audit in line with the OSHA, No. 15 of 2007 | | | |
| Chemicals/ Reagents Safety | <ul style="list-style-type: none"> - Develop a suitable system for the safe collection, recycling and disposal of chemical wastes, obsolete chemical and empty chemical containers to avoid their reuse for other purposes and to eliminate or minimize the risks to safety, health and environment. - Ensure that all reagents used in recycling are appropriately labeled or marked and that material safety data sheets containing essential information regarding their identity, suppliers classification of hazards, safety precautions and emergency procedures are provided and are made available to employees and their representatives/ - Keep a record of all chemicals/reagents used at the premises, cross-referenced to the appropriate chemical safety data sheets - There should be no eating or drinking in areas where chemicals are stored or used. | <ul style="list-style-type: none"> - Observation - MSDS | Proponent | 50,000 for enforcement |
| Effluent generation | <ul style="list-style-type: none"> - Install efficient drainage systems to convey oil laden water and storm water - Apply for an Effluent Discharge License from NEMA - Install an effluent treatment plant (ETP) to effectively manage the waste water prior to disposal - Conduct monthly monitoring of the effluent discharged from the ETP against Standards set out in schedule III of Water Quality Regulations, 2006 - Station a dedicated operator at the ETP to carry out regular monitoring and oversee operations for optimal operation of the ETP | <ul style="list-style-type: none"> - Drainage system installed - ETP system installed - Maintenance schedule | -Proponent -NEMA | 80,000 for an efficient ETP |

| Aspect/issue | Mitigation measures | Monitoring aspect | Responsibility | Cost (Kshs) |
|---------------------------------|--|--|---|---|
| | <ul style="list-style-type: none"> Conduct regular inspections for pipe blockages or damages and fix appropriately | | | |
| Solid wastes | <ul style="list-style-type: none"> Deploy adequate waste segregation bins throughout the facility to facilitate separation of hazardous from non-hazardous wastes for proper handling Engage a NEMA licensed solid waste handler to manage non-hazardous wastes from the facility and proper records kept for collection and disposal. Engage a NEMA licensed hazardous waste handler to manage wastes from the facility The proponent will provide for solid waste management through a hierarchy of options that includes reduction at source, separation of wastes to make it easier to undertake recycling. Comply with the provisions of Legal Notice No. 121 of 2006 Strictly observe the ban on single use and secondary plastic packaging | <ul style="list-style-type: none"> List of NEMA licensed solid waste handlers Records of used oil packaging materials recycled Extended user responsibility programme | <ul style="list-style-type: none"> Proponent NEMA | 10,000 Monthly |
| Oil leaks and spills management | <ul style="list-style-type: none"> The entire facility will be imperviously paved using cabro blocks to mitigate possible soil and water pollution in case of severe spillages Provide spill response kits within the facility such as sorbents sand to aid in speedy cleanup Any oily materials shall be segregated, sheltered away and disposed by the contracted hazardous waste handler Strictly account for all the delivered used oil by transporters and suppliers by careful scrutiny of tracking documentation Ensure that adequate spill containment is provided at all times in case of severe leakage of oils and finished product. The containment shall be of at least 20% the capacity of the holding vessel Ensure that the tanks are regularly inspected and maintained to detect and prevent any leaks | <ul style="list-style-type: none"> Use of properly maintained hoses and fittings Cement screeds in all the chambers using water proof material. Leaks check system installed Use water finding dipstick and/ or a hydrometer to check on density/ specific gravity | <ul style="list-style-type: none"> Proponent NEMA | 60,000 for Oil water interceptor installation |

| Aspect/issue | Mitigation measures | Monitoring aspect | Responsibility | Cost (Kshs) |
|-----------------------|--|---|--|----------------------------------|
| | <ul style="list-style-type: none"> - Regularly desludge and maintain the oil interceptor in good working order - Sound engineering strategies to be put in place to avoid spills. Observe the tank and piping standards as specified by KEBS and API - Ensure runoff from the facility complies with the standards set out in schedule III of Legal Notice No. 120, Water Quality Regulations of 2006 through analysis of discharge from interceptor | <ul style="list-style-type: none"> - Ensuring no spills during refilling and / or when offloading the fuel | | |
| Noise generation | <ul style="list-style-type: none"> - The background noise along Mombasa-Nairobi highway and adjacent commercial/industrial establishments is in keeping with that to be generated by vehicles accessing the used oil recycling plant - Endeavor to conduct operations with minimal noise as is practical - Install only compact machinery that are muffled to minimize noise as much as possible - Discourage unnecessary hooting and engine revs as much as possible - Encourage transporters to use transport in good state of maintenance - Provide suitable PPE to workers working in noisy areas of the facility - Carry out baseline and regular noise mapping exercise through NEMA licensed contractors to ensure compliance with schedule I of Legal Notice No. 61 of 2009 | <ul style="list-style-type: none"> - Complaints records if any - Noise Survey reports | <ul style="list-style-type: none"> -NEMA -DOSH -Community | 40,000 annually for Noise survey |
| Use of water resource | <ul style="list-style-type: none"> - Create awareness among workers on the importance of conservation of water resources - All water for use shall be metered to determine consumption levels - Rain water harvesting is recommended as a measure to provide for water for general cleaning - Apply and obtain a water abstraction permit from WRA and adhere to the abstraction limits if a borehole shall be drilled on site - Recycle the treated water from the ETP for non-human consumptive purposes such as fire-fighting, general cleaning, landscaping etc. | <ul style="list-style-type: none"> - Water consumption records - Storm water harvesting structures - Water recycling for general cleaning at the plant | <ul style="list-style-type: none"> - Proponent - NEMA - Community | |

| Aspect/issue | Mitigation measures | Monitoring aspect | Responsibility | Cost (Kshs) |
|---|--|---|--|---|
| | <ul style="list-style-type: none"> – Install low capacity cisterns in sanitary conveniences to keep flush volumes at minimal | | | |
| Use of Energy resource | <ul style="list-style-type: none"> – Proponent should consider installation of solar external lighting systems to complement electricity supply from the national grid. – Procurement of energy saving appliances that have a low energy rating. – Provide energy saving tips for each of the sections of the facility so that occupants are aware of their obligations to conserve energy – Explore energy efficient production technologies in the recycling process – Monitor energy use during operations and maintain records – Maintain the standby generator in good working condition to guarantee its efficiency | <ul style="list-style-type: none"> – Electricity bills – Energy audits report – Energy saving measures programmes | <ul style="list-style-type: none"> -Proponent -Energy Auditors -EPRA | 100,000 annually for Energy Conservation measures |
| Occupational Health and safety and fire hazards | <ul style="list-style-type: none"> – Develop and implement a policy on health and safety at the workplace as well as an effective Emergency Response Plan (ERP) and enlighten the staff on safety measures and procedures. – The workers should be provided with appropriate gear (PPE) and trained on occupational health and safety in line with the Occupational Safety and Health Act No. 15 of 2007. – Appropriate warning signage to be put up strategically – Restrict access to operational areas to authorized personnel only – Provide documentation of all incidences and accidents occurring on the site including near misses. – Conduct annual health and safety audits in line with Occupational Safety and Health Act No. 15 of 2007 – Provide well stocked First Aid kits and train staff members in first aid administration. | <ul style="list-style-type: none"> – Explosions Fire Outbreak carried. – Proof of inspection on firefighting equipment. Fire – Signs put up in strategic places. – Availability of firefighting equipment – Statutory Audits carried out | <ul style="list-style-type: none"> – Proponent – NEMA – DOSH – Community | 100,000 annually for statutory audits |

| Aspect/issue | Mitigation measures | Monitoring aspect | Responsibility | Cost (Kshs) |
|--|---|---|---|-------------------------------|
| | <ul style="list-style-type: none"> - Implement a hazard communication program implemented at their workplace. - The Proponent is required to maintain an inventory of all Material Safety Data Sheets (MSDS) for the chemicals stored in their workplace and fully disclose fully disclosed to the employees handling the chemical - All unused, obsolete or expired chemicals must be disposed off 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 and oil safely in the workplace through regular toolbox talks - A workable fire action plan will be developed and implemented, fire break distances will also be observed for high risk sections of the plant - Endeavor to fully comply with the provision of the Occupational Safety and Health Act No. 15 of 2007 | | | |
| Safety of visitors, neighbors and general public | <ul style="list-style-type: none"> - The facility will be secured and manned on a 24hours basis by a contracted security firm. - Access to the facility is restricted to authorized personnel only. - All visitors to the facility must be provided with protective clothing at all times. - It will be the responsibility of the proponent to ensure that first-aid services are provided to employees at all times. | <ul style="list-style-type: none"> - Security firm - Warning Signages - Presence of boundary wall | <ul style="list-style-type: none"> - Proponent - NEMA - DOSH - Kasemeni Community | - 20,000 for signages |
| Traffic concerns | <ul style="list-style-type: none"> - Ensure that all vehicles delivering used oil are accommodated within premises and don't block the road - Adequate parking space has been provided within the facility | <ul style="list-style-type: none"> - Parking spaces provided for at the site - Number of traffic related incidences | - Proponent | 20,000 for signage updated or |

| Aspect/issue | Mitigation measures | Monitoring aspect | Responsibility | Cost (Kshs) |
|----------------------------------|---|--|--|--|
| | <ul style="list-style-type: none"> - Implement a compliance policy among supplier to only receive used oil packaged and transported in the prescribed manner - Enlighten the delivery and dispatch trucks to observe slow speed when traversing the access road | | | replaced upon need |
| Vapour emissions and air quality | <ul style="list-style-type: none"> - All venting systems and procedures have to be designed according to required standards - Include Vapor Recovery Systems and carbon filters on vents - Installation of gas detector to detect any leaks that may arise from the recycling process - Regular air quality monitoring by a NEMA accredited laboratory will be undertaken to ascertain compliance with Legal Notice No. 34, Air Quality Regulations, 2014 - Workers in hazardous areas will be provided with adequate PPE and their usage strictly enforced - Carry out periodic health survey among the workers and liaise with local health facilities to conduct passive surveillance among nearby residents for ailments related to these emissions | <ul style="list-style-type: none"> - Emission reports - Plant maintenance Schedule | <ul style="list-style-type: none"> - Proponent - NEMA - Registered Laboratory - Kasemeni Community | 50,000 quarterly for emission analysis |

9.6 EMMP Action plan for the decommissioning phase

| Environmental Impact | Proposed Mitigation Measures | Monitoring aspect | Responsible party | Cost |
|---------------------------------|---|--|---|---------------------------------------|
| Demolition wastes | <ul style="list-style-type: none"> – Conduct a decommissioning impact assessment survey. – Obtain demolition permit from County Government of Kwale after undertaking a due diligence decommissioning audit – Recover recyclable materials from the demolitions and sell them to recycling companies – Deploy the services of a NEMA licensed contractor to collect and dispose of wastes that cannot be recycled – Provide for adequate disposal of demolition waste – Seek to sell/ donate reusable recyclable materials to minimize waste – The energy supply and waste water management systems should be decommissioned safely such that no gaping manholes or charged electric wires are left exposed. | Amount of demolition waste on site | Proponent | 60,000 for collection of wastes |
| Health and Safety | <ul style="list-style-type: none"> – Proponent will carry out a decommissioning audit before demolition and submit it to DOSHS and NEMA – The contractor to implement the provisions of the Occupational Safety and Health Act, No. 15 of 2007 – The contractor will avail appropriate tools and equipment suitable for the for the decommissioning works – The contractor will station first aid and emergency services at site – Conspicuously display safety signs and warning posters – The contractor will provide Personal Protective Equipment (PPE) to workers at the site and enforce their usage at all times – Ensure all the recommendations made are strictly adhered to Proponent to prepare workers in advance on its planned closure | <ul style="list-style-type: none"> – Decommissioning report – OSHA reports | <ul style="list-style-type: none"> – Proponent – NEMA – DOSH – Kasemeni Community | To be determined upon decommissioning |
| Noise, Dust and public nuisance | <ul style="list-style-type: none"> – The contractor will deploy compact machinery and fit them with mufflers | Noise | <ul style="list-style-type: none"> – Proponent – NEMA | -50,000 for purchase of PPE |

| Environmental Impact | Proposed Mitigation Measures | Monitoring aspect | Responsible party | Cost |
|--|---|--|--|------|
| | <ul style="list-style-type: none"> - Acoustic screens will be deployed around noisy working areas to contain noise - Contractor to deploy fine dust screens at the site during demolitions - Inform all neighbors in writing on the commencement of the decommissioning at least two weeks in advance, - Contain all activities within the decommissioning site | | <ul style="list-style-type: none"> - DOSH - Kasemeni Community | |
| Effluent management infrastructure decommissioning | <ul style="list-style-type: none"> - Contract NEMA licensed effluent handlers to empty the ETP, oil interceptor and septic system - Conduct soil & effluent analysis to inform suitable remediation strategy - Backfill all pits resultant of the decommissioned septic system - Methodically dismantle the ETP checking for potential leak and spill | NEMA waste handlers contracted for the decommissioning | Proponent NEMA | TBD |
| Restoration of project site | <ul style="list-style-type: none"> - Initiate site cleanup and restoration - Revegetate the site with suitable remediative plants and binding grasses - Excavate and dispose freshly contaminated soil | Planted trees or grasses at the site | Proponent NEMA | TBD |

10 CONCLUSION AND RECOMMENDATIONS

10.1 Conclusion

Used oil can cause very serious environment problems when they are not eliminated in an environmentally sound manner. As it is not possible to avoid these wastes which are results of modern life, the best solution is to eliminate them by causing the minimum harm for the nature. Used oil management is as one the most important environmental problem in Kenya of late years as the issue of eliminating solid wastes in a healthy and economical way has gained more importance.

The primary objective of this Environmental Impact Assessment was to fulfil the legal requirements, as outlined in the Environmental Management and Co-ordination Act, Cap 387 and the Environmental Impact Assessment and Audit Regulations, 2015. The study has established that the proposed project will come along with some negative impacts which include health risks and occupational health and safety risks. The negative effects can however be sufficiently mitigated through implementation of the proposed mitigation measures in the EMP.

In addition, the proponent shall adhere to all relevant national and international environmental, health and safety standards, policies and regulations that govern execution and operation of such projects. It is recommended that the project proponent fully implement the EMP and that NEMA considers the project for licensing provided the proponent adheres to the licensing Conditions.

10.2 Recommendations

For compliance and substantive assurance of environmental integrity the proponent should ensure

- iii. Adherence to the formulated EMMP to mitigate the predicted negative environmental impacts during the proposed actions
- iv. Adherence to the technical guidelines on the management of used oil and oil sludge in Kenya.

After consideration of all the environmental impacts that the proposed activity may cause, including public health risks; impact on soil, water, environmental health; waste management issues; short and long term positive impacts, various mitigation measures are proposed. These measures are contained in the Environment management Plan (EMP) and include the following: -

- Practising good waste management
- Proper handling and transport of the used oil and the finished product
- Monitoring air quality
- Water quality monitoring
- Auditing of operations and performance parameters for continuous improvement
- Health and safety considerations

The proposed activity can be a sustainable development if all the mitigation measures advanced herein are adhered to. On the basis of the findings of this report, we recommend that the project be licensed subject to committed implementation of the proposed EMP as well as operationalization of the monitoring program proposed

11 REFERENCES

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12 APPENDICES

1. Copy of Practising license for the EIA Experts
2. Copy of land Title
3. Copy of PIN certificate
4. Plant technical specification
5. Proposed Oil water Interceptor
6. Minutes of Proceedings of Public consultation
7. Questionnaire Survey schedules