



SEASCAN ENERGY LIMITED

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)

FOR THE PROPOSED CONSTRUCTION OF A BULK LPG STORAGE TERMINAL AND
PIPELINE AT CHANGAMWE MOMBASA



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DOCUMENTS INFORMATION

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PROJECT TITLE	ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR THE PROPOSED CONSTRUCTION OF A BULK LPG STORAGE TERMINAL AT CHANGAMWE MOMBASA.
PROJECT LOCATION	CHANGAMWE MOMBASA, MOMBASA COUNTY.
GPS COORDINATES	LATITUDE – 4° 1' 14.94" LONGITUDE – 39° 35' 10.77" E
DOCUMENT TITLE	ENVIRONMENTAL SOCIAL IMPACT ASSESSMENT STUDY

DISCLAIMER

This Environmental Impact Assessment Study Report has been carried out to the best of our knowledge and within the terms of contract with the client. The report is confidential to SEASCAN Energy Limited and any use of the materials hereof should be strictly in accordance with the contractual agreement between Ecoscience and Engineering and the proponent. It is however subject to conditions spelt out in the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019.

CERTIFICATION

This Environmental Impact Assessment (EIA) Project Report has been prepared in accordance with the Environmental Management and Co-ordination Act, 1999 (Revised 2018) and Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2018 for submission to the National Environmental Management Authority (NEMA)

FIRM OF EXPERTS

ECOSCIENCE AND ENGINEERING

NEMA REG: 11492

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LIST OF ABBREVIATION

ANSI	-	American National Standards Institute
API	-	American Petroleum Institute
AS	-	Australian Standards
ASME	-	American Society Of Mechanical Engineers
ASTM	-	American Society for Testing and Materials
BLEVE	-	Boiling Liquid Expanding Vapor Explosion
BS	-	British Standard
BSI	-	British Standards Institution
CBD	-	Convention on Biological Diversity
CBO	-	Community Based Organisations
CSR	-	Corporate Social Responsibility
DIV	-	Dutch Intervention Values
EA	-	Environmental Audit
EEMUA	-	Engineering Equipment and Materials Users
ESIA	-	Environmental & Social Impact Assessment
EMCA	-	Environmental Management and Coordination Act
EMP	-	Environment Management Plan
EPRA	-	Energy & Petroleum Regulatory Authority
ESIA	-	Environmental and Social Impact Assessment
ESMP	-	Environmental and Social Management Plan
IEC	-	International Electrotechnical Commission
IFC	-	International Finance Corporation
ISA	-	International Society of Automation.

ISO	-	International Organization For Standardization
KAA	-	Kenya Airports Authority
LPG	-	Liquefied Petroleum Gas
MIA	-	Moi International Airport, Mombasa
NEMA	-	National Environment Management Authority
NFPA	-	National Fire Protection Association
NGO	-	Non–Governmental Organization
OP	-	Operational Policy
OSMAG	-	Oil Spill Mutual Aid Group Society
PCM	-	Public Consultation Meeting
PPE	-	Personal Protective Clothing
SE4All	-	Sustainable Energy for All
SGR	-	Standard Gauge Railway
TPH	-	Total Petroleum Hydrocarbon
WB	-	World Bank
URTI	-	Upper Respiratory Tract Infections
KOT	-	Kipevu Oil Terminal
ROW	-	Right of Way
KPRL	-	Kenya Petroleum Refinery Limited

ACKNOWLEDGEMENT

We extend our special thanks to the management of SEASCAN Energy Limited for contracting Ecoscience and Engineering Limited to prepare this ESIA Study Report for the Proposed Construction of a Bulk LPG Storage Terminal at Changamwe, Mombasa.

We would like to thank also various stakeholders consulted during public stakeholder consultation for their invaluable contribution, support and cooperation. Their input contributed enormously towards successful completion of this Report.

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EXECUTIVE SUMMARY

Ecoscience and Engineering Ltd was contracted by SEASCAN Energy Limited, a privately owned company that is upcoming LPG Infrastructure Developer to undertake Environmental and Social Impact Assessment (ESIA) for the construction of a 42,000 MT LPG storage and filling plant, and a port-to-land pipeline connection of approximately 15Km in length in Changamwe. The proposed project location is Changamwe, a suburb of Mombasa in Kenya, just west of the Moi International Airport. Latitude: 4° 1'14.94"S Longitude: 39°35'10.77"E. The Jetty is located approximately 2.5 km offshore in the Port Reitz area in the port of Mombasa. Latitude: 4° 3'30.28"S Longitude: 39°36'2.39"E.

The terminal will encompass the following:

- Four (4) batteries of mounded tanks, with each battery holding capacity being 7,000MT;
- Truck loading gantries of 20 trucks capacity at a time;
- 300mm diameter LPG pipeline from KOT to the site through KPRL way leave approximately 15Kms;
- Rail siding for LPG Wagons Loading;
- Firefighting system;
- Administration block;
- Driveway and truck parking facilities;
- Green areas.

The proposed development activities will mainly involve civil, mechanical and electrical works the associated with the installation of the LPG tank and filling point and thereafter operations of the facilities. The main activities to be carried out in the development of the proposed project include earth works, installation of the LPG storage tanks, pump, pipe works and construction of the office blocks.

Therefore, the Proponent seeks to construct a bulk LPG storage terminal on Plot No. 3430 Mombasa County. The augmenting of the on-land storage will ensure product is readily available to customers.

The Proposed Construction of a Bulk LPG Mound is listed in the EMCA Amended Second Schedule as a High Risk Projects under Hydrocarbon projects including depots and refinery facilities for hydrocarbons. The proposed project has the potential of causing impacts to the

environment. The proposed project is also expected to comply with the energy act and its subsidiary legislation. It is against this backdrop that SEASCAN Energy Limited commissioned Ecoscience and Engineering Consultancy Company to carry out an Environmental Impact Assessment (EIA) Study for the project.

Project justification

Universal access to modern energy services by 2030 is one of the three goals of the Sustainable Energy for All (SE4All) initiative launched by the United Nations in 2011. After Kenya joined SE4All in 2012, a stocktaking revealed that Kenyans relied predominantly on traditional sources of cooking energy. About 84 percent of the population cooked with solid fuels (wood, charcoal, or agricultural residue), and 5 percent used kerosene. Cooking with these fuels affects the health of millions of Kenyans while causing environmental and social damage. An estimated 15,000 Kenyans die each year from air pollution, and at least 40 percent of childhood deaths are caused by respiratory illness (According to the 2016 Global Burden of Disease study, the figure was 16,600).

Meanwhile, wood resources are being depleted faster than they can be replenished. (Between 1990 and 2005, Kenya lost 5 percent of its forest cover.) Wood fuel production, household cook stoves, and heating technologies are generally inefficient and wasteful. To deal with the problem, Kenya's government set a long-term goal of having 42 percent of households adopt clean cooking fuels. The goal was embedded in Kenya's Vision 2030 Second Medium-Term Plan (2013–17) in alignment with the SE4All country action agenda. Liquefied petroleum gas (LPG) was to contribute 35 percent, biofuels 5 percent, and electricity 2 percent. A strategy was developed to reduce the cost of LPG and thereby expand its use among lower-income Kenyans.

The proponent's effective project would not only augment their current LPG storage capacity, but also the overall capacity in Kenya by an additional 42,000MT, making it among the largest installation in East and Central Africa. Given the urgent energy requirements of the country, and the growing use of LPG in the market, this would be a nationally important and landmark achievement. The proponent's will also avail the facility as a common user facility as established under the 2019 energy act, this will offer equal trading levels for all LPG marketers thereby stabilizing the market price without any trader having undue advantage.

This exercise was designed to meet the requirements of EMCA 1999 (Amended 2015) and the EPRA Regulations of 2019 For the most part, the exercise involved studying the proposed design

of the Proposed Construction of a Bulk LPG Storage Terminal, Pipeline, Bulk LPG Mound tanks, the operational mechanisms of each component, the input and outputs of the facility and determining the impacts that may manifest during design and construction. In addition, baseline information was obtained through desk studies, physical investigation of the project areas, public and key informant consultations. The study adopted an integrated approach whereby a multi-disciplinary team was engaged in the data collection and analysis.

Generally, the key activities that fed into the EIA Study entailed, but are not limited to the following:

- A sit visit to collect baseline information of the project area;
- A comparative analysis of the project with existing land uses in the neighborhood;
- A review of relevant policy and legislation;
- Discussions with the project proponent to obtain information on various project aspects;
- Identification of health and safety concerns that may be occasioned by the project;
- Seeking views and input through discussions and interviews with the public and key informants;
- Assessment of the site to detail the various existing and likely impacts; and
- Proposal of mitigation measures to avert or minimize negative impacts.

Both positive and negative impacts of the proposed project have been identified and appropriate measures to abate any adverse effects that may emanate from the project activities.

Review of the policy, legal and administrative framework

The Environmental Management and Co-ordination (Amendment) Act, 2015 with all its subsidiary legislation and other sectoral laws were reviewed to establish their bearing on the proposed project. Legislation reviewed included:

- The Constitution of Kenya (2010)
- Environmental Impact Assessment and Audit (amendment) 2019
- Environmental Management and Co-ordination (Water Quality) Regulations 2006
- Environmental Management and Co-ordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009

- Environmental Management and Co-ordination (Waste Management) Regulations 2006
Environmental Management and Co-ordination (Fossil Fuel Emission Control) Regulations 2006
- Environmental management and co-ordination (conservation of biological diversity and resources, access to Genetic resources and benefit sharing) Regulations, 2006
- Environmental Management and Coordination (Air Quality) Regulations, 2014
- The Public Health Act (Cap 242)
- Occupational Safety and Health Act (OSHA), 2007
- The Factories and Other Places of Work (Noise Prevention and Control) Rules, 2005
- Water Act 2012
- Water Resource Management Rules 2007
- The Energy Act 2019
- The Energy (Energy Management) Regulations 2012
- Liquefied Petroleum Gas (LPG) Regulations, 2009
- Land Registration Act, 2012 (Act No. 3 of 2012)
- Physical Planning Act Cap 286
- Land Act, 2012 (Act No. 6 of 2012)
- National Construction Authority Act. (Cap.449A)
- National Construction Authority Regulations, 2014The Standards Act, Chapter 496
- The Weights and Measures Act, Chapter 513
- The Traffic Act, Cap 403
- Public Roads and Roads of Access Act Cap. 399
- The KMA Act
- The BMU Regulations, 2007
- Employment Act No 11 of 2007

The assessment also reviewed IFC Performance Standards on Environmental and Social Sustainability that the Proponent will comply with through the life of the proposed project:

- Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts;

- Performance Standard 2: Labour and Working Conditions;
- Performance Standard 3: Resource Efficiency and Pollution Prevention;
- Performance Standard 4: Community Health, Safety, and Security;
- Performance Standard 5: Land Acquisition and Involuntary Resettlement;
- Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- Performance Standard 7: Indigenous Peoples; and
- Performance Standard 8: Cultural Heritage

The proposed project is expected to start immediately the Study report is approved by the relevant authorities.

Project Objectives

The proposed project aims to increase the supply capacity of LPG to industrial, commercial and residential customers throughout Kenya and East Africa thereby promoting reliance on LPG as opposed to wood fuel and charcoal in order to enhance the biodiversity and environmental conservation. The Proposed Project will stabilize the current fluctuating LPG prices by securing the supply, reduce the deficit and meet the increasing demand of LPG. The proponent's will also avail the facility as a common user facility as established under the 2019 energy act, this will offer equal trading levels for all LPG marketers thereby stabilizing the market price without any trader having undue advantage.

The main objective of the project is to:

- Supply LPG stock for sale by increasing the availability and accessibility of LPG in Kenya. This is in line with Government of Kenya policy on promoting the use of more clean fuels.
- Contribute to an increased consumption of LPG by providing a consistent, affordable and quality supply of LPG in the Kenyan Market.
- Transform the current LPG distribution network in Kenya by utilizing the new and rehabilitated rail networks as the principal means of LPG transport. The project will use a dedicated fleet of LPG ISO – rail containers and to move bulk volumes by rail in the country, complementing the available trucks.

Potential Impacts of the Project

The proposed project is expected to have minimal impacts on the environment. Evaluation of the potential impacts shows that their significance will range between very low to medium low in the absence of the mitigation measures.

The impacts will reduce further with the implementation of the proposed mitigation measures. The potential impacts anticipated include:

a) Socio-economic impacts

The proposed project is expected to create job opportunities for both skilled and unskilled Labor during construction and operation phases. It is anticipated that the proposed project will provide opportunities for local employment and provision of goods and services to construction workers. The proposed project is also expected to contribute in government revenue through payment of taxes.

On the other hand, negative impacts may include behavioral change among the construction crew and the residents as they socialize resulting in upsurge in prostitution, family break ups and sexually transmitted diseases including HIV/AIDS. Temporary work may be taken by "outsiders" rather than local residents, creating tensions thereby affecting project implementation.

b) Impacts on air quality

The proposed project is anticipated to generate negative air quality impacts. Increase in dust generated during construction and exhaust gases from construction vehicles and machines/equipment may be a health hazard and could lead to chest problems, coughs, flu and have serious effects on asthmatic and sinus sufferers. It may also result in increased medical care for the residents.

c) Pollution from waste

Solid and liquid wastes are going to be generated during construction and operation phases of the facility. During construction the waste that is going to be generated include used oils and other chemicals, left over construction materials, wrapping materials which may include non-biodegradable plastics and broken glass. During construction, the Contractors camp will generate domestic waste foods, plastics, papers, broken glass, grey water from the bathrooms and black water from the toilets. Other wastes are wood and metals from repairs and other commercial

activities. During operation used oils and other chemicals will be generated. The decommissioning activities are likely to generate residue materials at the project site.

d) Impacts on ambient noise quality

During the construction phase the proposed project will utilize machineries such as hydraulic excavator, mobile service crane, dump trucks and tipper Lorries including drilling and blasting of bedrock when excavating foundations are likely to generate noise. The contractor at site will be expected to provide proper protective equipment and well planned programs for equipment usage.

e) Health and safety impacts

A number of activities undertaken during development of the proposed project have potential risks to health and safety of the workers. During the construction phase, the potential H&S risks the workers are likely to be exposed to include: Injuries resulting from falling from heights; Injuries resulting from operation of machinery, equipment, tools and construction vehicle, Exposure to diseases, including, typhoid etc. and road accidents.

The potential occupational health and safety impacts during operation phase include injuries to workers from, routine monitoring and maintenance and deaths and injuries from major disasters e.g. explosions and fire outbreaks. During the operation phase, the workers may come in contact with liquid LPG and suffer from severe cold burns whereas during decommissioning, the potential H&S risks include injuries occasioned by dismantling of the facility. The proposed project could be of great public concern especially in the event of a major disaster such as explosions and fire outbreaks. Liquefied Petroleum Gas is a highly flammable product and can be detrimental to the public safety if measures are not put in place.

9.0 Analysis of alternatives

During the course of formulating the proposed project, several project alternatives were considered and evaluated to ensure that the best option of project development was adopted. The alternatives considered include: Storage Type alternatives, LPG Storage Technology alternatives, Alternative to Construction of storage terminal bulk LPG tank Design, Alternative to the proposed location of the construction and its encompasses and the “No Action” Alternative.

On the basis of the above considerations, the Consultant concludes that the proposed project satisfies the overall economic, technical, environmental considerations. SEASCAN Energy

Limited effective project would enhance LPG distribution in the country, but also the overall capacity in Kenya by construction of 42,000MT, six (6) mounds (with each four (4) tanks) of 7,000MT each, making it among the largest installation in East and Central Africa. Given the urgent energy requirements of the country, and the growing use of LPG in the market, this would be a nationally important and landmark achievement.

10.0 Public Consultation

Public stakeholder consultation was undertaken in order to obtain the views and concerns of the stakeholders regarding the proposed project.

The ESIA employed three main methods of consultations to get the data presented in this report. These are:

- Meetings and discussions with Key Stakeholders;
- Questionnaire administration and interviews; and
- Convening of Public Consultation Meetings within the project area.

The EIA team consulted the following key stakeholders or received no objection letters regarding components of the proposed project:

- NEMA Mombasa County;
- Kenya Navy;
- Kenya Ports Authority;
- Kenya Airports Authority (Moi International Airport, Mombasa);
- Oil Spill Mutual Aid Group Society (OSMAG)
- Energy & Petroleum Regulatory Authority (formerly ERC);
- Kenya Forest Service;
- Mombasa County Government;
- Chagamwe Sub County Administration.

Generally, the project is accepted by all those who were consulted and those who attended the Public Consultation Meetings since there is potential for job opportunities and the lowering of the price of gas. However, they called upon the proponent to ensure that employment opportunities are given first to youths from the community. They also urged the proponent to involve the community in Corporate Social Responsibilities such as building hospitals/clinics, sponsoring

needy bright students from the area etc. Another aspect was to ensure safety measures are top notch and have in place a disaster response plan. The pertinent issues raised by the stakeholders have been addressed in the environmental management plan.

Project Cost Estimate

The project cost will be **USD. 70Million.**

Conclusion and Recommendations

Conclusion

The project, including the construction and operation of the Proposed Project is anticipated to provide efficient and seamless transfer of LPG from the receiving jetty to the storage terminal in addition to the provision of sufficient stock of LPG to augment SEASCAN Energy Limited current LPG storage capacity thereby increasing the supply capacity of LPG to industrial, commercial and residential customers throughout Kenya and East Africa. This will also reduce the deficit and meet the increasing demand of LPG and therefore promote LPG as environment friendly fuel source.

The potential adverse impacts associated with the proposed project are possible to mitigate successfully. The impacts before implementation of mitigation measures are assessed as very low to medium low and the ratings are expected to improve further with the implementation of the proposed mitigation measures. In particular, the LPG facility will be designed, constructed and operated according to the latest industry norms and standards. Programs and plans developed and implemented through the EMP will be monitored and audited to ensure compliance with current regulations and cleaner production practices.

Recommendation

The Consultant recommends that the proposed development should be allowed to proceed taking into account the implementation of the proposed Mitigation Measures and Environment Management Plan (EMP). An environmental audit is recommended upon the completion of construction works to corroborate the implementation of the proposed mitigation measures. Any unforeseen project impacts shall be identified and addressed through annual environmental audits.

CHAPTER ONE

1. INTRODUCTION AND BACKGROUND INFORMATION

1.1 Introduction

Ecoscience Engineering Company Ltd was contracted by Seascan Energy Limited to undertake an Environmental and Social Impact Assessment (ESIA) for the construction of a 42,000 MT total storage capacity, six (6) mounds with each mound having 4 tanks of 7,000MT capacity LPG storage and filling plant, and a port-to-land pipeline connection of approximately 15Km in length. The Proponent, SEASCAN Energy Limited, is a privately owned company that is upcoming LPG Infrastructure Developer.

The terminal will encompass

- Six (6) mounds, with each mound having 4 tanks of 7,000MT capacity each;
- Truck loading gantries of 20 trucks capacity at a time;
- 300mm diameter LPG pipeline from KOT to the site through KPRL way leave approximately 15Kms;
- Rail siding for LPG Wagons Loading;
- Firefighting system;
- Administration block;
- Driveway and truck parking facilities;
- Green areas.

The proposed development activities will mainly involve civil, mechanical and electrical works associated with the installation of the LPG tank and filling point and thereafter operations of the facilities. The main activities to be carried out in the development of the proposed project include earth works, installation of the LPG storage tanks, pump, pipe works and construction of the office blocks.

Therefore, the Proponent seeks to construct a bulk LPG storage terminal on Plot No 3430 Mombasa County. The augmenting of the on-land storage will ensure product is readily available to customers.

The Proposed Construction of a Bulk LPG Mound is listed in the EMCA Amended Second Schedule under High Risk Projects under Hydrocarbon projects including depots and refinery facilities for hydrocarbons. The proposed project has the potential of causing impacts to the environment. The proposed project is also expected to comply with the energy act and its subsidiary legislation. It is against this backdrop that SEASCAN Energy Limited commissioned Ecoscience and Engineering Consultancy Company to carry out an Environmental Impact Assessment (EIA) Study for the project.

The Proponent engaged Ecoscience and Engineering Limited Consultancy Company who conducted a process of environmental and social assessment, and has produced a report establishing and maintaining an ESMS appropriate to the Proposed LPG Infrastructure Construction project which has addressed all grievances raised by stakeholder during stakeholders consultation process including emergency preparedness and response system that shall be put in place together with the community and neighbouring facilities. The emergency preparedness and response activities will be periodically reviewed and revised, as necessary, to reflect changing conditions.

1.2 Objectives of the Environmental and Social Impact Assessment (ESIA)

The main objective of this ESIA is to ensure that the construction and operation of the proposed project is undertaken in an environmentally friendly manner compatible with economic and operational parameters. The following are the ESIA objectives:

- To fulfil the legal requirements as outlined in Environmental Management and Coordination Act, EMCA 1999 (Amended 2015) and the Integrated Environmental (Impact Assessment and Audit) IEIA/EA Regulations 2018;
- To obtain background biophysical information of the site and legal and regulatory issues associated with the Project;
- To assess and predict the potential environmental and social impacts during site preparation, construction and operational phases of the Project;
- To make suggestions of possible alterations to the proposed design, based on the assessment findings;

- To propose mitigation measures for the potential significant adverse environmental impacts and safety risks;
- Disclosure and initiate public participation;
- To lower project cost in the long term; and
- To prepare an Environmental and Social Management Plan (ESMP).

1.3 Project Justification

In developing nations of Sub-Saharan Africa like Kenya, providing households with modern energy services is a critical step towards development. A large majority of households in the region rely on traditional biomass fuels mostly wood for cooking, which represent a significant proportion of energy used in the domestic setting. The disadvantages of these fuels are many: they are inefficient energy carriers and their heat is difficult to control; they produce dangerous emissions; and their current rate of extraction is not sustainable to the environment. Transition to clean fuels such as liquefied petroleum gas (LPG) would resolve many of these issues as they do not produce dangerous particulate emissions, and are commercially viable, offering a number of socio- economic advantages over traditional options.

Universal access to modern energy services by 2030 is one of the three goals of the Sustainable Energy for All (SE4All) initiative launched by the United Nations in 2011. After Kenya joined SE4All in 2012, a stocktaking revealed that Kenyans relied predominantly on traditional sources of cooking energy. About 84 percent of the population cooked with solid fuels (wood, charcoal, or agricultural residue), and 5 percent used kerosene. Cooking with these fuels affects the health of millions of Kenyans while causing environmental and social damage. An estimated 15,000 Kenyans die each year from air pollution, and at least 40 percent of childhood deaths are caused by respiratory illness (According to the 2016 Global Burden of Disease study, the figure was 16,600).

Meanwhile, wood resources are being depleted faster than they can be replenished. (Between 1990 and 2005, Kenya lost 5 percent of its forest cover.) Wood fuel production, household cook stoves, and heating technologies are generally inefficient and wasteful. To deal with the problem, Kenya's government set a long-term goal of having 42 percent of households adopt clean cooking fuels. The goal was embedded in Kenya's Vision 2030 Second Medium-Term Plan (2013–17) in alignment with the SE4All country action agenda. Liquefied petroleum gas (LPG) was to

contribute 35 percent, biofuels 5 percent, and electricity 2 percent. A strategy was developed to reduce the cost of LPG and thereby expand its use among lower-income Kenyans.

In keeping with the Kenya Vision 2030 and the Sustainable Development Goals, the Proponent is committed to ensuring access to affordable, reliable, sustainable, and clean LPG for all by 2030.

The proposed project will seek to fulfil the following objectives:

- To achieve faster offloading of gas from the import ships to the storage facility and thus reduce the cost of leasing an offloading ship at the sea thus ensuring that LPG is readily available at more competitive prices;
- To increase the market distribution supply of LPG along with commercial grade propane;
- To promote reliance on LPG as opposed to wood fuel and charcoal and thereby enhance biodiversity and environmental conservation;
- To increase the number of employment opportunities for the community within the area; and
- To increase revenue for SEASCAN Energy Limited and the Nation through exports and increased sales.

The Kenyan Government has increased the incentives for LPG use in the region, however, the consumption has generally been low due to multiple factors such as insufficient supply sources, smaller tankers utilized for importation, inadequate storage facilities in the region, limitation of operation of facilities to daylight hours as well as severe traffic issues experienced at the main import port of Mombasa.

The proponent's effective project would not enhance distribution of LPG, but also the overall capacity in Kenya by an additional four (4) units, making it the largest installation in East and Central Africa. Given the urgent energy requirements of the country, and the growing use of LPG in the market, this would be a nationally important and landmark achievement. The proponent will also avail the facility as a common user facility as established under the 2019 energy act. This will offer equal trading levels for all LPG marketers thereby stabilizing the market price without any trader having undue advantage.

Finally, not only will the project yield substantial revenues for SEASCAN Energy Limited due to its increased capacity allowing higher projected throughputs, but also the additional investment

shall mean further development in the area allowing additional community employment. The LPG market will also receive a boost and curtail shortages.

1.4 Scope and Terms of Reference for the ESIA

This assessment evaluates the environmental and socio-economic impacts of the following aspects of the Project:

- Site preparation and earthworks;
- Construction;
- Commissioning and operation; and
- Decommissioning

The process involved having discussions with the Proponent on the key issues and collection of primary and secondary data on the same. The primary data was collected using both qualitative and quantitative methods of data collection through field visits/site walks, public and stakeholders consultation. Secondary data was collected through literature review which included the review of policies, Acts and regulations; County Development Plans; project area maps; previous project area reports among others.

This exercise was designed to meet the requirements of EMCA 1999 (Amended 2015) and the IEIA Regulations of 2018. For the most part, the exercise involved studying the proposed design of the Proposed Construction of the Additional LPG Import Pipeline & Phase 1C Bulk LPG Mound, the operational mechanisms of each component, the input and outputs of the facility and determining the impacts that may manifest during design and construction. In addition, baseline information was obtained through desk studies, physical investigation of the project areas, public and key informant consultations. The study adopted an integrated approach whereby a multi-disciplinary team was engaged in the data collection and analysis.

Generally, the key activities that fed in to the EIA Study entailed, but are not limited to the following:

- A sit visit to collect baseline information of the project area;
- A comparative analysis of the project with existing land uses in the neighborhood;
- A review of relevant policy and legislation;
- Discussions with the project proponent to obtain information on various project aspects;

- Identification of health and safety concerns that may be occasioned by the project;
- Seeking views and input through discussions and interviews with the public and key informants;
- Assessment of the site to detail the various existing and likely impacts; and
- Proposal of mitigation measures to avert or minimize negative impacts.

Both positive and negative impacts of the proposed project have been identified and appropriate measures to abate any adverse effects that may emanate from the project activities.

1.5. ESIA Activities

1.5.1. Literature Review

Literature review pertaining to the project development and operation activities have been done. This included documentary review on the nature of the proposed activities, project documents, relevant policies and legislative framework as well as the environmental setting and socio-economic data of the area and discussions with the Proponents contact person. This has included the review of the appropriate national legislation and other relevant studies and reports on the construction of Bulk LPG Storage facilities.

1.5.2. Site Visits for Data Collection

Project area site visit and execution of other activities took place between 24th to 28th August, 2020. The activities during the field visits included the following:

- Project Start up meeting and site reconnaissance survey;
- Project area data collection;
- Interviews with key stakeholders and local community and administration of questionnaires;
- Holding discussions with key stakeholders and administration of key informant interviews;
- Evaluation of the geographical location of the project including the physical area that may be affected by the project's activities and physical limits for the ESIA area;
- Obtain project baseline data covering socio-economic and bio-physical aspects including air, soil and noise; and
- Convening of Public Consultation Meeting (PCM).

1.5.3. ESIA Study report Preparation

A comprehensive ESIA Study report containing the findings has been compiled by the Consultant in accordance with NEMA guidelines for consideration and approval. In preparing the report, the Consultant paid attention to the following issues as specified in the second schedule of the Environmental (Impact Assessment and Audit) Regulations, 2003 Amended 2019:

- Ecological considerations including: Biological diversity, sustainable use, and ecosystem maintenance;
- Social consideration including: Economic impacts, social cohesion or disruption, effect on human health, communication, and effects on culture and objectives of culture value;
- Landscaping including: views opened up or closed, visual impacts (features, removal of vegetation, etc), compatibility with surrounding area, and amenity opened up or closed e.g. recreation possibilities;
- Land use including: effects of proposal on current land uses and land use potentials in the Project area, possibility of multiple use, and effects of the proposal on surrounding land uses and land use potentials; and
- Water including: water sources (quantity and quality) and drainage patterns/drainage systems.

1.5.4. Field Data Collection Schedule

Baseline data was collected on the proposed project site and the immediate neighbourhood. The data collected was on aspects such as: topography; local flora and fauna; soils and geology; existing and past activities including human settlements; local surface and ground water resources; ambient air quality and noise levels (qualitative); waste management practices; and natural resources and cultural heritage aspects of the project area.

1.5.5. Impact Assessment Methodology

To identify potential and assess impacts associated with or resulting from Project activities, the ESIA team used professional judgment, fieldwork, and desk-top analysis to identify potential impacts and their interactions. The significance of potential impacts that may result from the proposed Project was determined to assist in preparing recommendations for evaluation of the

proposed Project. The methodology that was used to identify and assess potential impacts of the proposed project is described below:

1.5.6. Steps of impact assessment

Impact Assessment took place as follows:

- Characterize the baseline – the existing conditions before the Project is undertaken and any effects are generated;
- Identification of sources of impacts and the impacts themselves that are generated by any aspect of the Project;
- Recommend mitigation and enhancement measures to address the impact; and
- Rate impacts after mitigation to produce a “residual” impact rating.

1.5.7. Rating Impacts

Potential ESIA impacts are rated to:

- Provide a basis for prioritization of impacts to be dealt with;
- Provide a method of assessing the effectiveness of proposed mitigation measures; and
- Provide a scale which shows the level of impact both before and after a proposed mitigation measure has been applied.

1.5.8. Impact rating Criteria

An impact rating is the product of two elements: (1) the severity of the potential impact and (2) the likelihood of the “event” occurring.

1.5.9. Severity Criteria

The severity or enhancement of each impact was rated using the criteria identified in Table 1 and Table 2.

Table 1: Impacts Rating Criteria

Severity	Negative Social/Health Impacts					Negative Environmental Impacts
	Duration	Geographic Extent	Ability to Adapt	Socio-cultural effect	Health Effects	
<input type="checkbox"/> Low	<input type="checkbox"/> Short-term <input type="checkbox"/> <1 year Low frequency	Individual household	<input type="checkbox"/> Those affected will be able to adapt to the changes with relative ease, and maintain pre-impact livelihoods, culture, quality of life and health.	Inconvenience but with no consequence on long-term Livelihoods, culture, quality of life, resources, infrastructure and services.	<input type="checkbox"/> Event resulting in annoyance, minor injury or illness that does not require hospitalization.	<input type="checkbox"/> Affect environmental conditions, species, and habitats over a short period, is localized and reversible.
<input type="checkbox"/> Moderate	<ul style="list-style-type: none"> • Medium-term 1-6 years • Medium or intermittent frequency 	<input type="checkbox"/> Small number of households	<input type="checkbox"/> Those affected will be able to adapt to change, with some difficulty, and maintain pre-impact livelihoods, culture, quality of life and health, but only with a degree of support	Primary and secondary impacts on livelihoods, culture, quality of life, resources, infrastructure and services	<input type="checkbox"/> Event resulting in moderate injuries or illness, which may require hospitalization	<input type="checkbox"/> Affects environmental conditions, species and habitats in the short to medium term. Ecosystems integrity will not be adversely affected in the long term, but the effect is likely to be significant in the short or medium term to some species or receptors. The area/region may be able to recover through natural

Table 2: Severity Criteria

Severity	Negative Social/Health Impacts					Negative Environmental Impacts
	Duration	Geographic Extent	Ability to Adapt	Socio-cultural effect	Health Effects	
<input type="checkbox"/> High	<input type="checkbox"/> Long term/Irreversible <input type="checkbox"/> > 6 years <input type="checkbox"/> Constant frequency	<input type="checkbox"/> Large part of full settlement	<input type="checkbox"/> Those affected will not be able to adapt to changes and continue to maintain pre-impact livelihood	<input type="checkbox"/> Widespread and diverse <input type="checkbox"/> Primary and secondary impacts likely to be impossible to reverse or compensate for.	<input type="checkbox"/> Catastrophic event <input type="checkbox"/> Resulting in loss of life, severe injuries or chronic illness requiring hospitalization.	<input type="checkbox"/> Affects environmental conditions, species and habitats for the long term (i.e., over the life of the Project) may substantially alter the local and regional ecosystem and natural resources, and may affect sustainability. <input type="checkbox"/> Regeneration to its former state would not occur without intervention. <input type="checkbox"/> Affects environmental conditions or media over the long term, has local and regional affects.

1.5.10. Likelihood Criteria

Likelihood of the event occurring is comprised of the following categories:

- Low likelihood – Rare (e.g., few or no occurrences in related projects);
- Medium likelihood – Uncommon (e.g., documented occurrences in related projects); and
- High likelihood – Common (e.g., occurs within the LPG projects).

1.5.11. Determining Rating

The overall rating of the impacts will be determined by using the following matrix (Table 3). It should be noted that these matrices act as a guide and there may be situations where their rigid application is inappropriate and where stakeholder perceptions and feedback have a significant role to play. For specific impacts where this is the case, the rating is clearly explained in the evaluation of the impact.

Table 3: Overall Rating of Impacts

Severity/Enhancement	Likelihood		
	Low	Medium	High
High level of Enhancement	Moderate	Major	Major
Medium level of Enhancement	Minor	Moderate	Major
Low level of Enhancement	Insignificant	Minor	Moderate
Low severity	Insignificant	Minor	Moderate
Medium severity	Minor	Moderate	Major
High severity	Moderate	Major	Major

Criteria for assessing the significance of impacts stem from the following key elements:

- Status of compliance with relevant Kenyan legislation, policies and plans and any relevant Kenyan or industry policies, standards or guidelines;
- The magnitude (including nature, scale and duration) of the change to the natural or socio-economic environment (e.g. An increase in noise, an increase in employment opportunities), expressed, wherever practicable, in quantitative terms. The magnitude of all impacts is viewed from the perspective of those affected by taking into account the likely perceived importance as understood through stakeholder engagement;
- The nature of the impact receptor (physical, biological, or human). Where the receptor is physical (e.g. the air shed) its quality, sensitivity to change and importance are

considered. For a human receptor, the sensitivity of the household, community or wider societal group is considered along with their ability to adapt to and manage the effects of the impact; and

- The likely that the identified impact will occur.
- An impact of minor significance (a 'Minor impact') is one where an effect will be experienced, but the impact magnitude is sufficiently small (with or without mitigation) and well within accepted standards, and/or the receptor is of low sensitivity/value.

An impact of moderate significance (a 'Moderate impact') is one within accepted limits and standards. Moderate impacts may cover a broad range, from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit. Clearly to design an activity so that its effects only just avoid breaking a law and/or cause a major impact is not best practice. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that 'Moderate' impacts have to be reduced to 'Minor' impacts, but that moderate impacts are being managed effectively and efficiently.

An impact of major significance (a 'Major impact') is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. An aim of ESIA is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long-term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (i.e. ALARP has been applied). It is then the function of regulators and stakeholders to weigh such negative factors against the positive ones such as employment, in coming to a decision on the Project.

1.5.12. Mitigation Measures

In developing mitigation measures, the first focus is on measures that will prevent or minimize impacts through the design and management of the Project rather than on reinstatement and compensation measures. A 'hierarchy' of mitigation measures for planned activities and unplanned events is outlined below:

Avoid at Source; Reduce at Source: avoiding or reducing at source through the design of the Project (e.g. avoiding by siting or re-routing activity away from sensitive areas or reducing by restricting the working area or changing the time of the activity);

Abate on Site: add something to the design to abate the impact (e.g. pollution control equipment);

Abate at Receptor: if an impact cannot be abated on-site then control measures can be implemented off-site (e.g. traffic measures);

Repair or Remedy: some impacts involve unavoidable damage to a resource (e.g. material storage areas) and these impacts require repair, restoration and reinstatement measures. Compensate in Kind; Compensate through Other Means where other mitigation approaches are not possible or fully effective, then compensation for loss, damage and disturbance might be appropriate (e.g. financial compensation for degrading agricultural land and affecting crop yields). It is emphasized that compensation to individuals with residual impacts to livelihood or quality of life will generally be non- financial and will have a focus on restoring livelihoods.

Control: this aims to prevent an incident happening or reduce the risk of it happening to as low as reasonably practicable (ALARP) through reducing the likelihood of the event (e.g. preventative maintenance regimes, traffic calming and speed limits, community road safety awareness training);

Reducing the consequence (e.g. Bunds to contain hazardous substance spills); and a combination of both of these;

Recovery/Remediation: this includes contingency plans and response, e.g. Emergency Response Plans and Procedures.

1.9 Method used for Gathering Opinions on the Proposed Project

Stakeholder consultations were carried out in order to: inform project stakeholders of the proposed project; to explain the likely impacts (positive/negative) of implementing the project; and to obtain views, concerns, comments and suggestions from interested and affected parties regarding the proposed project.

Four categories of stakeholders were identified. These included:

1. Internal Project Stakeholders: These project 'insiders' mainly from SEASCAN Energy worked closely with the Consultant to ensure successful execution of the ESIA. They provided the Consultant with the project brief, information on the project area and on other stakeholders.

2. **The Local Community:** These were the key stakeholders important in the mapping of impacts and their magnitude/significance. Information from these stakeholders was gathered through questionnaires administered to a sample of the neighboring population and through public barazas held in each of the three locations (Portriezi, Chaani, Kwahola-Magongo) neighboring the project site on the 27th, 28th and 29th October 2020 respectively.
3. **Other Stakeholders:** These are the business community / service providers within the project area. They are likely to be affected by the project both directly or indirectly. They provide services that are consumed by the project area community. They include road users, Business community around. They were consulted through questionnaire administration.
4. **Key Informants:** These were the key stakeholders who the Consultant selected on the basis of their knowledge of the goings-on in project host community, as well as their knowledge of the proposed LPG works. They included both Central Government officials (The Assistant County Commissioner, Changanwe Sub County, Mombasa County Government, KPA, Kenya Maritime Authority, Kenya Railways, EPRA, PIEA, NEMA County Director, Chief and community elders).

1.5.13. Socio-economic Survey

The Consultant undertook socio-economic survey in order to establish the current social and economic status of the project area community. This was to assist the Consultant in identifying how the project is likely to change the socio-economic dynamics of the project area so as to proposed cost effective mitigation measures. The exercise was conducted with the aid of a public stakeholder checklist designed to capture several pertinent issues, which included:

- Personal information of the respondents including age and level of education;
- Sources of income;
- Sources of energy for lighting and cooking;
- Quality of housing;
- Issues and concerns related to the project; and
- Suggestions for improving the environmental operations of the proposed Project.

CHATER TWO

2. PROJECT DESCRIPTION

This section will assemble and evaluate data on the project details including information of the site location and the project details.

2.1 Site Location

The proposed project is located at Changamwe, a suburb of Mombasa in Kenya, at the KRC siding lines at plot Number 3430 Mombasa at coordinates 4°00'48.4"S 39°37'20.6"E (-4.013443, 39.622384). The site is neighbouring the Railways terminal to the North, Mega Garments to the East, KPRL to the Souths and Kenya Pipeline to the West. The Jetty is located approximately 7.5 km offshore in the Port Reitz area in the port of Mombasa. Latitude: 4° 3'30.28"S Longitude: 39°36'2.39"E.

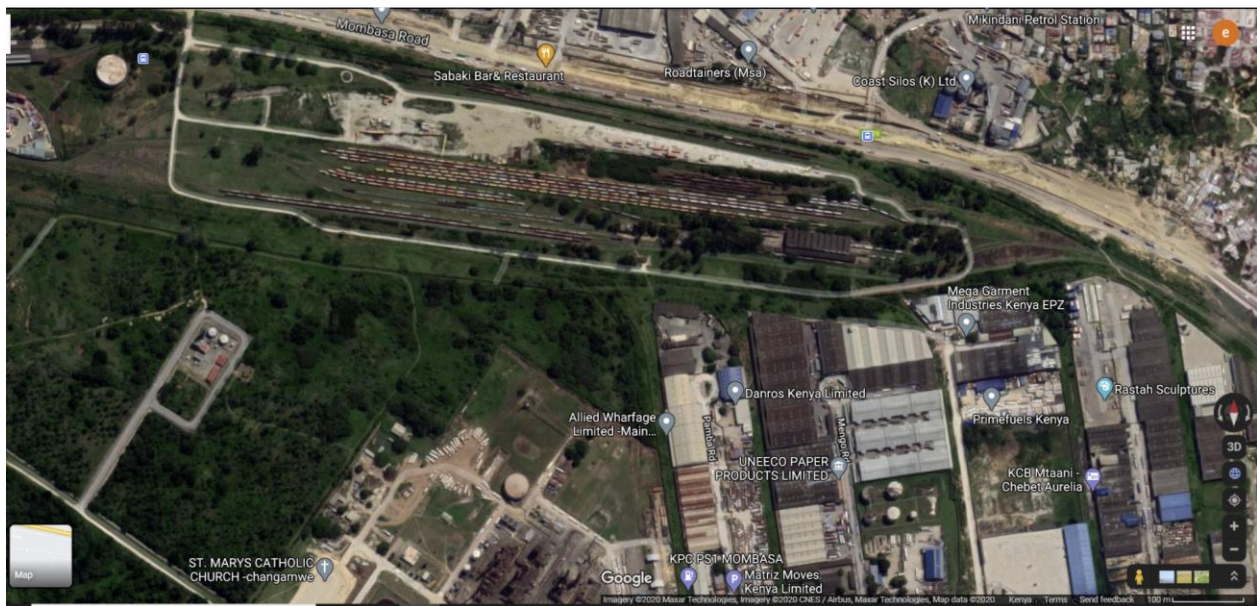
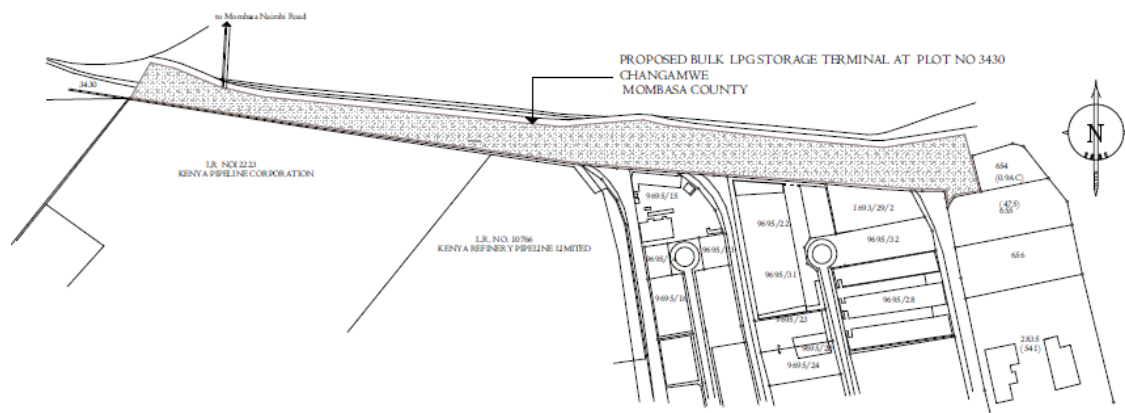


Figure 1: Site location Map



LOCATION PLAN

Figure 2: Location Plan



Figure 3: *Proposed Site location*

2.2 Process Description from product receipt, storage and loading

2.2.1 Additional Import Pipeline

The proposed construction of an additional LPG import pipeline will be within the existing layout design infrastructure of the existing pipeline. The new pipeline will provide redundancy for the existing pipeline from the jetty to the new storage facility and will be split into three sections:

- Underwater section from the jetty to shore shelter;
- Underground section from the shore shelter to the booster pump station; and
- Underground and above ground section from the booster pump station to the new storage facility.

2.2.2 Pipeline Burial

The pipeline shall be buried normally at a depth of a minimum of 1.0 meter below natural ground level except river/ rail/ road/ canal/waterways crossing. Additional soil cover other than specified above shall be provided at locations indicated by statutory/ local authorities or in areas likely to have an increased risk of impact damage or third party interference as per agreements between COMPANY and authorities.

Select back fill shall also be provided as applicable for areas prone to seismic activity. Pipeline route shall be examined to establish any drainage requirement in hilly terrain. In case required, the drainage shall be designed to prevent trench flooding during construction and protect.

2.2.3 Scrapper Stations

Scraper traps shall be provided at the Dispatch & receipt on piggable lines. The scraper traps shall be capable of handling all type of cleaning/scrapping pigs. The launching and receiving barrels shall be designed in accordance with the requirements of ASME B 31.4, as applicable and its end closure shall be designed and fabricated according to ASME Section VIII, Div.1. Adequate arrangements for launching, retraction, handling and lifting of cleaning and instrumented pigs shall be provided at the scraper stations. Traps shall be accessible by walkway/road for movement of equipment, pigs, etc. These stations shall be provided with an access road from the nearest metalled road. Corrosion resistant coating shall be provided on the pipeline up to a minimum length of 500 mm after it comes aboveground at terminals and scraper stations. Centreline elevation of scraper trap shall be at a suitable height from grade level. Suitable arrangements shall be provided for handling & lifting of pigs.

2.2.4 Weldings

The main pipeline welding shall be carried out in accordance with API 1104, the specification for welding and welding charts. All mainline welds shall be 100 % radiographed.

2.2.5 Insulating Joints

Insulating joints shall be provided to electrically isolate the buried pipeline from above ground pipeline. Insulating joints shall be monolithic type and shall allow smooth passage of pigs. They shall be installed in the above-ground portion of the pipeline, immediately after the buried/aboveground transition at the scraper stations.

2.2.6 Crossings

The pipeline at road crossing should comply with the requirement of API RP 1102. Pipeline at Metalled /District Roads, State/National Highways, Railways, Lined Canal shall be provided with Casing pipe. Un-metalled road, Nallah, unlined canal, channels & other water bodies shall be uncased (open-cut) crossings. Size of casing pipe shall be minimum two sizes greater than carrier pipe. The casing pipe shall be installed by trenchless method like ramming/ boring/ jacking/HDD. Before insertion Hydro testing shall be done for carrier pipe for minimum 2 hours prior to joint coating of welded joints.

Casing pipe shall be coated using epoxy, 500 micron thick on the external surface and 200 micron thick on the internal surface of the casing pipe. The carrier pipe shall be electrically insulated from the casing by making use of insulating spacers of the proper size and in sufficient numbers. Spacing between two spacers shall not be more than 1.0 meter. Casing pipe shall be protected by a set of sacrificial anodes.

2.2.7 Hydrostatic Testing

After installation, the entire pipeline system shall be hydro tested with inhibited water. The minimum hydrostatic pressure shall be 1.25 times design pressure as per B 31.4 for liquid hydrocarbon pipeline. Mainline valves shall be installed after successful completion of hydro testing. The maximum hydrostatic test pressure at any location of the pipeline shall not exceed the pressure required to produce hoop stress equal to 95% of SMYS of the pipe material based on minimum wall thickness in the test section. The test duration shall be a minimum of 24 hours.

2.2.8 Health, Safety and Environment

Contractor shall strictly comply with all the statutory requirements related to Health, Safety & Environment for design and installation of the complete pipeline system.

2.3 Materials Properties

2.3.1 Steel properties line pipe

Pipeline steel grade will be ASTM A333 Gr. 6 with wall thickness of sch. 80 (17.48). The considered corrosion allowance is 3mm.

2.3.2 Bends, flanges and fittings properties

The radius of bends to be used in jumper fabrication will be 3D. All bends shall be provided with straight tangents on each end. Tangent length shall be 500mm or pipe diameter in length whichever is greater unless otherwise stated.

2.3.3 External anti-corrosion coating

External corrosion protection will be achieved using a 3-layer polyethylene (3LPE) coating, which will be used for all pipelines having a coating thickness of 3mm.

2.3.4 Concrete weight coating

The pipelines will require weight coating along the shallower sections of the route to satisfy stability and/or impact protection requirements. On-bottom Stability Report shall be referred for final concrete weight coating thicknesses.

2.3.5 Cathodic protection onshore design

To protect the onshore pipelines from the landfall point (LFP) to onshore terminal facilities (OT) against corrosion a Cathodic Protection System based on sacrificial Magnesium anodes has been designed. Existing CP system will be used for the proposed pipeline as per the CP adequacy report.

2.3.6 Cathodic protection offshore design

For the offshore sections of the pipeline, protection is to be afforded by a sacrificial anode system in accordance with the requirements of DNV-OS-F101 and DNV-RP-F103.

2.3.7 Mounded Storage Tanks

This scope of the project will involve the construction of LPG bullets having a total capacity of 42,000 MT, 6 mounds with each mound having 4 tanks as indicated on the site layouts.

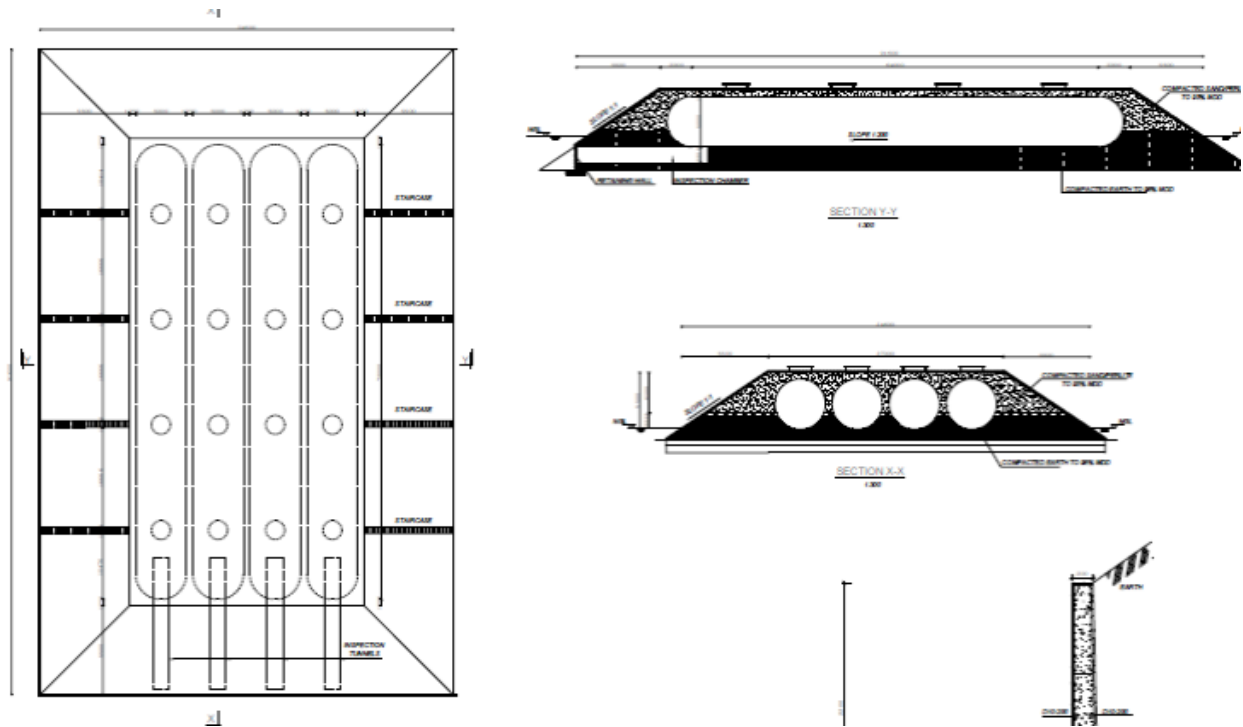


Figure 4: Layout for LPG Mounded Vessel

The project will apply civil, structural, mechanical, process, electrical and Instrumentation principles in the design and the construction. The full scope will involve the following;

- Civil works including stabilization, R.C. foundations, R.C retaining wall, Inspection tunnel, and sand compaction.
- Construction of MT mounded tanks which will involve rolling and welding.
- LPG equipment and piping network complete with compressor units, pumps, piping, valves, and other mechanical accessories
- Compressed air network and/or hydraulic network.
- Firewater network with pump, piping, valves, and equipment.
- Electrical network complete with L.V. switchboard, MCC, cables, and accessories.

2.4 Project detail

The Proponent is planning to develop a bulk mounted tanks LPG Marine terminal facility storing up a 42,000-metric tons and a filling plant in Mombasa county. The Proponent also proposes to construct a 15km pipeline from the port to the terminal.

The terminal will encompass:

- Four (4) batteries of six (6) mounded tanks, with each holding capacity being 7,000 MT

- Truck loading gantries of 20 trucks capacity at a time
- 300mm diameter LPG pipeline from KOT to the site through KPRL Way Leave approximately 15Kms
- Rail siding for LPG Wagons Loading
- Firefighting system
- Administration Block
- Driveway and truck parking facilities
- Green areas

The proposed development activities will mainly involve civil, mechanical and electrical works associated with the installation of the LPG tank and filling point and thereafter operations of the facilities. The main activities to be carried out in the development of the proposed project include excavations or earth works, installation of the LPG storage tanks, pump, pipe works and construction of office blocks.

In accordance with Legal Notice No. 101 (EIA/EA Regulations, 2003) and Environmental Management and Coordination Act (EMCA, Cap 387), the Proponent is required by law to prepare an Environment Impact Assessment (EIA) study report for approval by National Environment Management Authority (NEMA) prior to commencement of the project development. The proposed project is also expected to comply with the energy act and its subsidiary legislation.

The main objective for the development is to;

- ❖ Supply LPG stock for sale by increasing the availability and accessibility of LPG in Kenya. This is in line with Government of Kenya policy on promoting the use of more clean fuels.
- ❖ To contribute to an increased consumption of LPG by providing a consistent, affordable and quality supply of LPG into the Kenya market.
- ❖ To transform the current LPG distribution network in Kenya by utilizing the new and rehabilitated rail networks as the principal means of LPG transport. The Project will use a dedicated fleet of LPG ISO-rail containers and to move bulk volumes by rail in the country, complementing the available trucks.

2.5 Project Technology

The primary technologies used for the design, construction and operation of the LPG facility include various international codes of practice, Standards, Government Acts and Local Authority Regulations. In Kenya there are a limited number of regulations covering the technology to be used in the design, construction and operation of LPG station. Subsequently the country relies

on international codes of practice, standards and guidelines for the design, construction and operation of such facilities.

2.6 Design Standards & Philosophies

2.6.1 Operating and Safeguarding Philosophies

The new piping and equipment will be designed for the maximum process conditions achievable during normal operation. Pressure safety valves will, however, be required on pressure vessels as per South African PER (R8). Thermal Safety Valves (TSV's) will be installed where pipe sections can be blocked in during normal operation. Operating personnel are required to inspect the LPG transfer line daily. The Additional LPG Import Pipeline shall be leak tested and all valves cycled in preparation for a vessel.

2.6.2 Fire and Explosion Protection Philosophies

Additional remotely activated emergency isolation valves will be installed to reduce the potential leak volume and thereby reduce the amount of LPG that can be released during such a scenario. Gas monitors should be used to determine any gas leaks along the Additional LPG Import Pipeline and must be used whenever a confined space is entered.

2.6.3 Isolation and Maintenance Philosophies

A double isolation philosophy will be used on all equipment that may require periodic maintenance so that it will not be necessary to empty a long section of transfer line to perform maintenance. Pipeline isolation valves may be credited when the section of pipe that needs to be emptied is relatively short. Excess flow valves will be installed wherever a single failure of a relatively weak point on the pressure boundary can lead to a large gas release e.g. at pressure instruments. Proper inspection, testing and maintenance procedures will be developed to ensure adequate availability of the import transfer line.

2.6.4 Emergency Isolation

The following emergency situations shall be considered for the Additional LPG Import Pipeline facility:

Table 4: Emergency Plan

No	Emergency Situation	Potential Response
1.	Fire	1) Inform Carrier to Stop LPG transfer 2) Initiate Emergency Isolation 3) Close close-by manual isolation valves, if possible 4) Protect nearby equipment 5) Remove liquid product, if possible
2.	Leakage from hoses or loading arm	1) Inform Carrier to Stop LPG Transfer 2) Initiate Emergency Isolation
3.	Emergency on the jetty	3) Close close-by manual isolation valves, if possible
4.	Leakage from pipe flanged connections	4) Monitor gas cloud and explosive limits 5) Remove liquid product, if possible
5.	Onshore tank overfilling	1) Initiate Emergency Isolation 2) Inform Carrier to Stop LPG Transfer 3) Manage the environment around the spill 4) Perform clean-up
6.	Rough seas, wind speed above 15m/s	1) Inform Carrier to Stop LPG Transfer 2) Initiate Emergency Isolation 3) Disconnect Marine Loading Arm

2.6.5 Pigging

The pigging facility shall be required on the transfer line in order to perform routine maintenance on the line. The existing pig launcher on the jetty will be interchangeable in the future between the existing pipeline and the new LPG Import Pipeline since pigging is not a regular requirement. A pig receiver will be installed at the pump station to receive the pig from the jetty. A pig launcher will also be installed at the pump station to facilitate pigging of the line from the pump station to the new storage facility. A pig receiver will be installed as close as possible to the new storage facility to receive the pig from the pump station.

2.6.6 Leak Detection

Leak detection will be performed on the transfer pipeline in order to have confidence in the integrity of the Additional LPG Import Pipeline and to have early detection of possible leaks in order to minimize any resulting spills and consequential environmental pollution. Leak detection will be performed by increasing the pressure (pumping up) of the entire transfer line to a pressure higher than the vapor pressure, isolating the line in sections and monitoring the pressures and temperatures of each of the sections to determine if the line is leaking.

2.7 Codes and Standards

The principal design codes are listed below:

Table 5: Codes and Standards

Design Area	Code	Title
Onshore Pipeline Design	ASME B31.4	Pipeline Transportation Systems for Liquid Hydrocarbons and other Liquids
Piping Systems	ASME B31.3	Process Piping
Offshore Pipeline Design	DNV OS-F101	Submarine Pipeline Systems
Offshore Cathodic Protection	DNV RP-B401	Cathodic Protection Design
Pipeline Stability	DNV RP E305	On Bottom Stability Design of Submarine Pipelines
Pipeline Spanning	DNV RP-F105	Free Spanning Pipelines
Conformity Assessment	SANS 347 – 2012	Categorization and Conformity Assessment Criteria for all Pressure Equipment
Bullet fabrication	ASME SEC VIII DIV 2 and Amendments PD 5500	Standard for bullet fabrication

2.7.1 Mounded Storage Tanks

The following Kenyan Standards and International Standards for the LPG Industry would be fully implemented in the proposed 42,000 MT storage facility project. Again, it should be noted that the Kenyan standards will take preference should there be conflicting issues within the various standards.

- API Std 520 – Sizing, Selection and Installation of Pressure-relieving Devices in Refineries – Part 1, Sizing and Selection

- API Std 520 – Sizing, Selection and Installation of Pressure-relieving Devices in Refineries – Part 2, Installation
- API Std 521 – Guide for Pressure-relieving and Depressurizing Systems
- API Std 610 – Centrifugal Pumps for Petroleum, Petrochemical and Natural Gas Industry
- API Std 661 - Petroleum, Petrochemical, and Natural Gas Industries Air-Cooled Heat Exchangers
- ASME B16.5 - 2013 - Pipe Flanges and Flanged Fittings
- ASME design code SEC VIII DIV 2 and Amendments PD 5500

2.7.2 Mechanical & Process Work

- API Std 520 – Sizing, Selection and Installation of Pressure-relieving Devices in Refineries – Part 1, Sizing and Selection
- API Std 520 – Sizing, Selection and Installation of Pressure-relieving Devices in Refineries – Part 2, Installation
- API Std 521 – Guide for Pressure-relieving and Depressurizing Systems
- API Std 610 – Centrifugal Pumps for Petroleum, Petrochemical and Natural Gas Industry
- API Std 661 - Petroleum, Petrochemical, and Natural Gas Industries Air-Cooled Heat Exchangers
- ASME B16.5 - 2013 - Pipe Flanges and Flanged Fittings
- KS 1938 Part 3: Liquefied petroleum gas installations involving storage vessels of individual water capacity exceeding 9000L.
- EEMUA 2000: Guide for the design, construction and use of mounded horizontal cylindrical vessels for pressurized storage of LPG at ambient temperature
- API 2510: Design and Construction of LPG Installations
- API 2510A: Fire Protection Considerations for the Design and Operation of Liquefied Petroleum Gas (LPG) Storage Facilities.
- NFPA 58: Liquefied Petroleum Gas (LPG) Code.
- ASME B 16.9: Factory made wrought steel butt welding fittings.

2.7.3 Electrical & Instrumentation Works

- BS 5467 Specification for XLPE Insulated Cables
- BS 5486 Low Voltage Switchgear and Control Gear Assemblies
- BS 5501 Electrical Apparatus for Potentially Explosive Atmospheres
- IP Part 1 Electrical Safety Code

- BS 5308 Instrument Cables
- BS 6739 Code of Practice for Instrumentation in process Control Code of Practice for Earthing

2.7.4 Civil & Structural Works

- BS 8110 Structural use of concrete
- BS 8004 Code of practice for foundations
- BS 5328 Specification for concrete
- BS 6032 Code of practice for earthworks

2.7.5 Ground Improvement & Standards

Murram / sand shall be used for the ground improvement work as follows:

- Murram shall be laid in layers, each layer in loose state shall not be more than 200mm in thickness. Water as per OMC requirement shall be sprinkled on the layer and after allowing for soaking, compaction shall be done using a vibratory roller (10 MT static weight) of 20 MT – 30 MT weight in dynamic state. The layer shall be compacted to obtain a degree of minimum 95% with respect of the max. dry density. Each layer shall be tested for compaction at rate of 1 test per every 500 sq.m area. Each test shall consist of 6 samples.
- The bullet bed material shall be sand laid in layers, each layer in loose state shall not be more than 300 mm in thickness so as to give compacted thickness of 200- 150 mm. Water to the tune of 3 to 5 lit/ sq.m shall be sprinkled on the sand layer and after allowing for soaking. Compaction shall be done using a vibratory roller (10 MT static weight) of 20 MT – 30 MT weight in dynamic state. The required sand filling shall be completed in layers as above to reach the desired level up to the bottom of the bullets.
- The sand bed shall be laid to the falls & to the levels and full depth as shown on the drawings and the bed for the bullets shall be excavated out of the fully compacted bed using a template formed to the exact shape and size of the bullets.
- If welding trenches are to be used they shall be backfilled with sand compacted in accordance with the above clauses. The trenches shall be adequately propped and braced to ensure that there is no loss of compaction of the adjacent sand bed.

2.7.6 Sand Surround/Filling between Bullets

- The sand surround to each bullet shall be material in compliance with the sand specification and laid around the bullet during the mounded filling operation to a 300 minimum thickness and shall be compacted to a 90% maximum dry density.

- ii. The filling material between the bullet surround shall be sand in compliance with the sand specification laid in maximum 200 mm layers.
- iii. Compaction shall be sufficient to avoid significant settlement of the sand filling/mound surface but shall be such as not to impose undue stresses on the bullets.
- iv. The sand filling shall be placed equally, in maximum 300 mm layers (uncompacted depth), on each side of the bullets so as to avoid any lateral displacement/rotation of the bullets during compaction.
- v. Sand filling shall be brought up to the levels and slopes as shown in the drawings to below the drainage layer.

2.7.7 Material Specification

- i. The sand for the bullet bed, bullet surround and filling between bullets shall consist of material complying with the following specification:-
 - a) Good quality clean, non-aggressive sand with a maximum organic material content of 3% by weight.
 - b) A max. silt content of 10% by weight (particles smaller than 0.063mm)
 - c) A maximum particle size of 5 mm.
 - d) A grain size distribution uniformity coefficient (D60/D10) of between 2 & 8.
- ii. The Tile / paver to the top of the mound shall consist of clean, well graded stone free from all organic material, sulphates, or any other detritus material, and with a particle size of 5mm to 50 mm. Depth varies from 80mm minimum to 100mm maximum.
- iii. The side slopes to the mound shall be protected by good quality stone pitching constructed out of stones of size 225 average and grouted together to form an impermeable finish, all as denoted on the drawings with 1:4 cement mortar for joints. Raised pointing is to be carried out with 1:2 cement mortar.

2.8 Construction Phase

2.8.1 Soil Excavation Activities

Soil excavation will take place to facilitate the construction of various components of the proposed Project and other components. A significant amount of soil will be excavated to provide a secure base for placing the 6 LPG Bullets which are 72m long and 8m in diameter. The contractor is going to carry out the soil excavation process with utmost care to ensure that the excavated soil is not improperly heaped or carried away by any surface flows to any nearby surface water courses like the streams on the eastern side causing siltation.

Environmental protection during the construction phase will address management of hazardous materials, dust, erosion and sedimentation control. The site will be maintained in accordance with relevant erosion and sedimentation control standards for construction sites.

2.8.2 Construction Materials

The exact quantities of materials required for the construction of the proposed project as enumerated in other sections of this chapter are not known at this stage of the project. As much as possible, the proponent intends to use locally available materials for the construction of the various structures and equipment. Only where such materials shall not be available locally will they be brought in from outside the project area. The Contractor will be in charge for the transport of raw materials to site during construction process.

2.8.3 Commissioning

After the full construction of the additional storage facility, all commissioning procedures shall be followed upon which the facility shall be rendered operational. Commissioning work will include purging air from tank and pipelines with an aim of ensuring that the Facility has been constructed in accordance with the design and that it is ready for operation.

2.9 Operation Phase

The facility shall be receiving LPG via marine. The gas shall then be pumped offshore to the constructed and existing mounded storage tanks using an already existing pipeline and the additional import pipeline. Once in the facility the gas shall be added an odourant to enable it be detected in case of leakage as LPG is odourless. This shall be done using an odourant system existing in the facility.

At the facility the operations shall include loading LPG to the trucks and Rail wagons. The gas shall be loaded to the trucks and wagons by use of pumps of appropriate capacity and LPG vapour shall be handled by use of compressors. In case of any eventuality and a truck or a wagon need to be offloaded of the product, the compressor shall offload the gas back to the storage tanks.

2.10 Project Decommissioning Phase

The proponent owns the land where the Mounded LPG Vessels will be installed. However should the lease lapse, the proponent shall be expected to decommission & demolish the facility and restore the host environment close to its original state prior to use of the site as a Fuel Storage and Distribution Terminal.

The decommissioning exercise shall involve the following:

- The Mounded LPG Bullets and other LPG holding facilities must be degassed before decommissioning and removal;
- First, any remaining Liquid LPG must be removed from the system and storage tanks
- After removal, any remaining LPG that cannot be removed must be flared.
- Once the flare will no longer burn, the system must be purged of residual vapours.
- Purging is typically done using Nitrogen or Air.
- Once the tanks have been completely purged, the tanks are excavated (since they will be mounded).
- The contractor should verify that all data plates are legible & intact, otherwise the tanks may have to be re-certified, before being resold or reused for pressurized service.

After excavation, tanks, vaporizers, compressors and other equipment will be dismantled and prepared for transport;

- All piping will be cut and capped;
- Hazardous material like ethylene-glycol and mercury switches, if any, will be collected for appropriate disposal;
- Proper cranes will be used to lift the bullets from their piers onto trucks for transport;
- All concrete works will be demolished;
- Other structures within the plant will also be demolished;
- Careful removal of all the electrical fittings and associated cables will be done; and
- There will be proper handling of the demolished materials and have an authorized and guided transportation and disposal away from human settlement and water bodies in accordance with the County government and NEMA Regulations and guidelines.

The host environment shall thereafter be rehabilitated and restored to its former state through:

- Approved and appropriate landscaping methodology;
- Removal of any soils that may have been impacted by oils for offsite (away from the project area) remediation;
- Bringing in of clean soil to replace impacted soil that has been excavated and removed; and
- Planting of indigenous vegetation and nurturing them to ensure they grow to the status where they can grow to maturity unattended.

2.11 Cost of Proposed Project

The project is estimated to cost the proponent USD 70 Million to implement.

CHAPTER THREE

3 BASELINE CONDITIONS OF THE PROJECT SITE

This section will assemble and evaluate data on the relevant environmental and social characteristics of the project areas. It will include information on any changes anticipated before the project commences, including physical, biological and socio-cultural environments. The baseline environmental condition of the proposed project is described in terms of the existing physical, biological, and social environment.

3.1. Physical Environment

3.1.1. Topography

Mombasa County is located on coastal lowland with extensive low-lying areas rising from an altitude of 8 m in the east to about 100 m in the west. The Island and Kisauni area are basically flat alluvial plains while the Changanwe region consists of Jurassic plains. Near the sea, the land is composed of Pleistocene Coral Reef, which is commercially exploited as a source of limestone for the cement industry, and also as a source of building stone. The town of Mombasa is centered on Mombasa Island, but extends to the mainland. The island is separated from the mainland by two creeks, Port Reitz in the south and Tudor Creek in the north.

The Coastal area is located in the range of 8 to 200m above the sea level on the coastal lowland. The site area topography is generally uneven. The land area for the proposed project by SEASCAN Energy Limited is actually located at the Kenya Railways Changanwe Marshalling yard.

3.2. Soil and Geology

The regional geological setting of the Coast is dominated by the rifting and break-up of the Paleozoic Gondwana continent and the development of the Indian Ocean (Embleton & Valencio 1977). The project area is characterized by an overburden of loose silty sand then soft silty clay with some sand underlain by stiff clay with some sand and the Shale at the bottom.

Table 6: Weathering Grade

TERM	GRADE	DESCRIPTION
Fresh	I	No sign of material weathering
Slightly Weathered	II	Shows sign of discoloration on major discontinuity
Moderately Weathered	III	Less than half material is decomposed
Highly Weathered	IV	More than half material is decomposed
Completely Weathered	V	All rock material is decomposed
Residual	VI	All rock material is converted to soil

The seashore has extensive sandy beaches, which make the town an attractive tourist destination. The soil types are broadly associated with the geological formations along the physiographic zones in the district. Along the coastal lowlands, four soil types predominate.

1. On the raised reefs along the shore well-drained, shallow (< 10 cm) to moderately deep, loamy to sandy soils predominate.
2. On unconsolidated deposits in the quaternary sands zone (Kilindini sands) are well drained moderately deep to deep, sandy clay loam to sandy clay, underlying 20 to 40 cm loamy medium sand.
3. On the Kilindini sands are also found areas with very deep soils of varying drainage conditions and colour, variable consistency, texture and salinity.
4. Also, found on the Kilindini sands are well-drained very deep, dark red to strong brown, firm, sandy clay loam to sandy clay, underlying 30 to 60 cm medium sand to loamy sand soils.

On the coastal uplands, composed of the raised areas in Changamwe and western parts of Kisauni, 2 soil types are dominant;

1. Soils developed on unconsolidated sandy deposits in the Magarini formation, composed of sandy to loamy soils. These are well-drained, very deep, sandy clay loam to sandy clay, with a topsoil of fine sand to sandy loam.
2. Soils developed on shales composed of heavy textured soils constitute the relatively high agricultural potential area in the district. The soils are dominated by well drained to imperfectly drained, shallow to deep, firm to very firm clay, and imperfectly drained deep, very firm clay, with a humic topsoil and a sodic deeper subsoil.

The area is underlain by Shales of Jurassic age. The Shales are covered by unconsolidated sediments of Pleistocene age, the Magarini Formation. This superficial cover of Magarini Sediments includes alternating layers of silty sand, clayey silt and silty clay that together vary in thickness from a few metres to up to a maximum of 15m.

The site area is composed of Arenosols, which are excessively drained to well drained, very deep, reddish yellow to white, loose sand to loamy sand. These soils develop gullies quickly. The relatively steep slopes at the site area can accelerate development of gullies when there is surface runoff on bare soil.

The area is underlain by Shales of Jurassic age. The Shales are covered by unconsolidated sediments of Pleistocene age, the Magarini Formation. This superficial cover of Magarini Sediments includes alternating layers of silty sand, clayey silt and silty clay that together vary in thickness from a few metres to up to a maximum of 15m.

3.3. Hydrology

Mombasa town, like many other towns in Kenya receives its water supply from distant areas. Its main source of water supply is the Mzima springs some 300 km away in the Chyulu hills (Taita Taveta District). These springs are believed to be part of the Kilimanjaro Mountain system but generally this falls under the Athi River drainage basin, generally referred to as Sabaki in the coastal zone.

Apart from the Mzima springs, Mombasa town and the coastal region in general receives surface water supplies from Baricho, Marere and from the Tiwi boreholes in the south coast area. There is a small stream running starting approximately 400m to the north of the site and passes about 150m east of the site. It drains south-east wards and joins another stream where it changes direction of flow southwards into Port Reitz Creek. The stream runs for about 1.8km before joining the sea. Surface runoff from the site is likely to flow eastwards to join this stream and eventually end up in the sea.

Water will be needed for construction, for drinking and hygiene purposes. The proponent will sink a borehole to abstract water for use during construction and operation of the depot.

3.4. Noise Measurements

Noise measurements were carried out in the project area to establish the baseline status. The scope of work was assessing the noise exposure levels at various sensitive receptor locations along the project corridor.as well as at the proposed site location.

Table 7: Summary of the Noise Measurement Results

Sampling location	L _{eq}	L _{min}	L _{max}	L ₁₀	L ₅₀	L ₉₀	EMC, (Noise and Excessive Vibration Pollution) (Control) Regulations 2009	IFC Guidelines
MP01-KRC along the lines next to combined warehouses	55.1	38.8	88.5	53.3	46.9	45.3	55 dB	70 dB
MP02-KRC middle of the proposed project location	48.2	39.9	75.4	51.4	46.0	43.2		
MP03-KRC opposite the main gate	54.7	38.6	84.3	52.7	45.0	40.6		
MP04-Mega Garment next to combined warehouses	57.8	46.8	97.6	59.3	54.1	51.2		

****Values above the stipulated limit

Table 8: Measurements Points and Description

Sampling location	GPS Coordinates	Rationale for the measurement points	Pollutants of concern
MP01-KRC along the railway lines next to combined warehouses	S 04°02'36.9" E 039°39'34.8"	Establishment of Baseline ambient air quality and noise measurement report at the proposed project sites.	SO ₂ , NO ₂ , VOCs and PM ₁₀ and PM _{2.5}
MP02-KRC middle of the proposed project location	S 04°02'36.9" E 039°39'34.8"		SO ₂ , NO ₂ , VOCs and PM ₁₀ and PM _{2.5}
MP03-KRC opposite the main gate	S 04°00'40.3" E 039°39'34.8"		SO ₂ , NO ₂ , VOCs and PM ₁₀ and PM _{2.5}
MP04-Mega Garment next to combined warehouses	S 00°05'28.0" E 034°46'04.3"		SO ₂ , NO ₂ , VOCs and PM ₁₀ and PM _{2.5}

The results obtained from the measurement exercise in the table above depict that some measured locations had their noise values slightly above (MP04-Mega Garment next to combined warehouses, KRC along the siding lines next to combined warehouses) the stipulated limit whereas some had their values within the limits (**55dB**) EMC (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009. Similarly, the values were within the IFC Guidelines for the diurnal schedule (**70dB**).

As noted during the measurement, the significant noise level obtained at MP04- Mega Garment next to combined warehouses was the vehicular movement and motorcycle cycling around the area as depicted by the percentile and the 1/3 Octave Band frequency data.

The construction activities are likely to result in slight increase in noise levels. However, the increase will be intermittent and of short-duration.

3.5. Ambient Air Quality

Baseline ambient air quality measurements were carried out in the project area to establish the baseline status. The scope of work was assessing the current conditions of air quality at various locations along the project corridor.as well as at the proposed site location.



Figure 5: *Photographic view of air quality measurements taking place*

The air quality is expected to be impacted by construction and demolition activities during decommissioning of the project; however, implementation of the proposed recommended measures will keep the levels within the acceptable limits.

Table 9: Summary of Particulate matter results

Measurement Points	PM ₁₀ µg/m ³	EMC, Air Quality 2014 µg/m ³	WHO Air Quality Guidelines µg/m ³	PM _{2.5} µg/m ³	EMC, Air Quality 2014 µg/m ³ one hour	WHO Air Quality Guidelines µg/m ³
MP01-KRC along the siding lines next to combined warehouses	23.94	150	150	7.83	75	75
MP02-KRC middle of the proposed project location	15.34			4.59		
MP03-KRC opposite the main gate	16.39			5.48		
MP04-Mega Garment next to combined warehouses	77.91			25.22		

The results of the Particulate Matter in the table above indicate that the values obtained at all measured locations were within the stipulated limits EMC, Air Quality 2014.

As observed during the measurement, the particulate matter results may have been influenced by the vehicular and motorcycle movement along the nearby road accessing to the Mega Garment by dispersing particulate into the atmosphere depending on the size of particle and speed of wind.

For the VOCs and Particulate Matter measured, the values were within the Kenyan and International Finance Corporation Air Quality Guidelines. The particulate matter results may have been influenced by the vehicular and motorcycle movement along the nearby road accessing to the Mega Garment by dispersing particulate into the atmosphere depending on the size of particle and speed of wind.

The average background noise levels for the measured locations ranged between (48.2-57.8dB) for diurnal schedules. Some of these values were within whereas some were slightly above the stipulated regulatory limits EMC (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009. Similarly, the values were within the IFC Guidelines for the diurnal schedule (**70dB**).

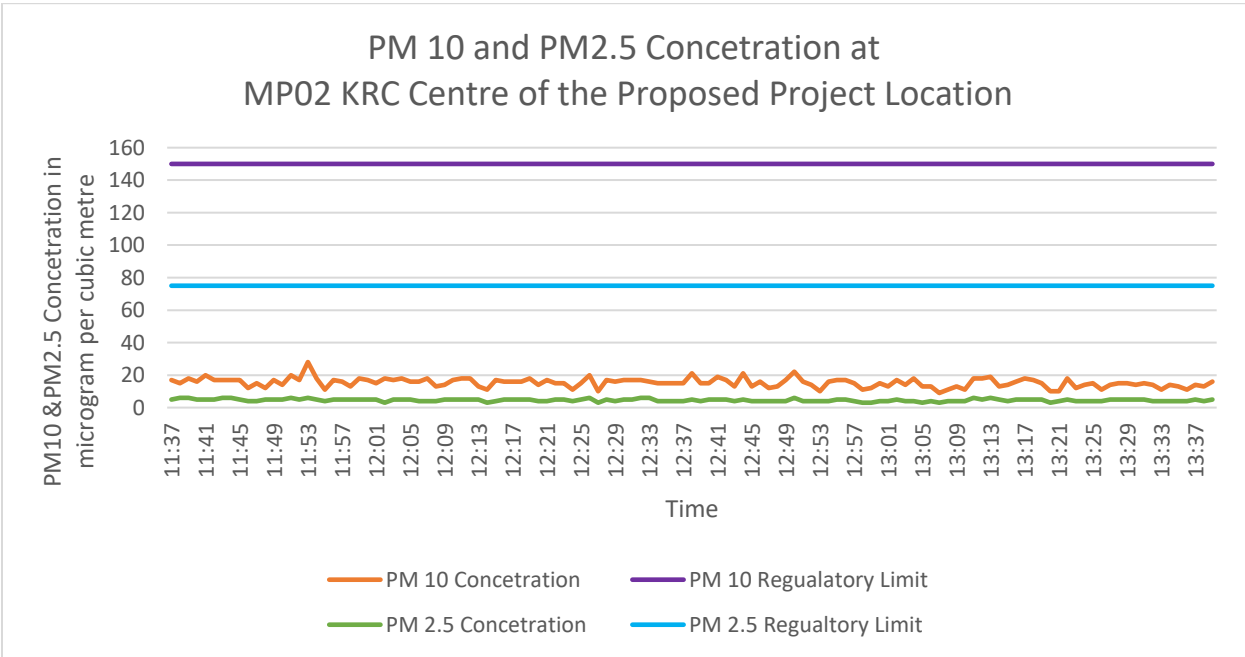
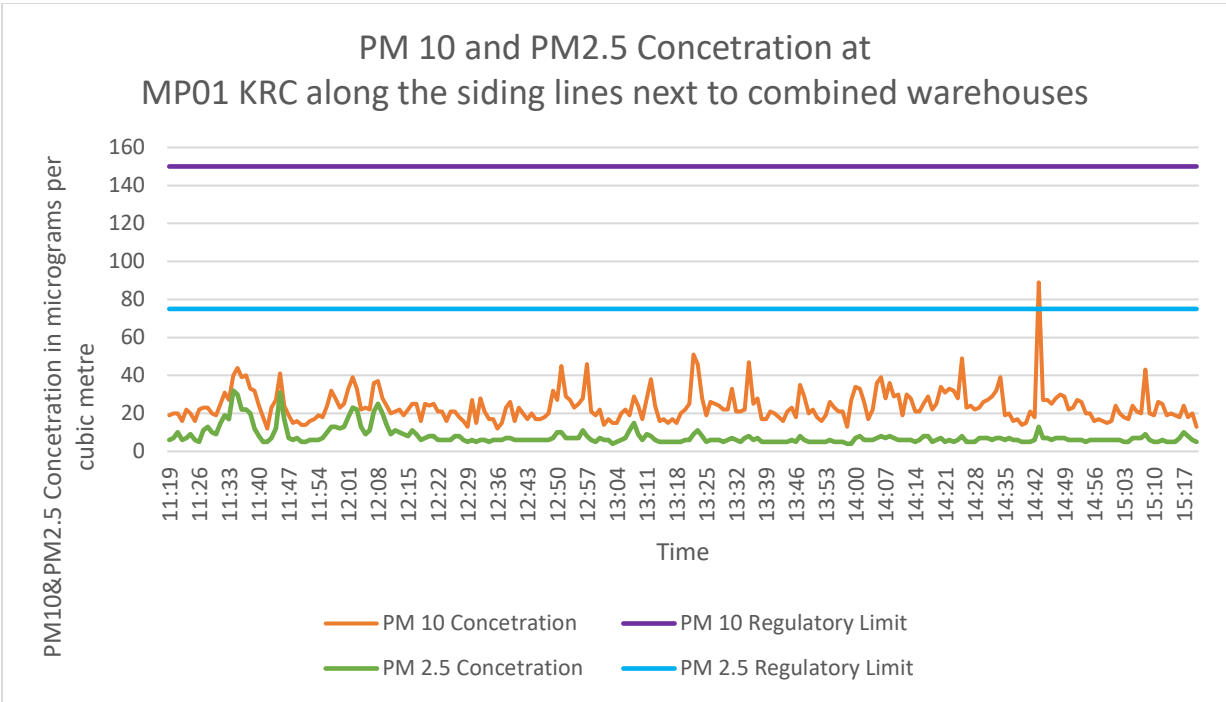
The significant high values of noise may have been influenced by vehicular and motor cycle movement along the nearby road giving access to the Mega Garment as depicted by the percentile and the 1/3 Octave Band frequency data.

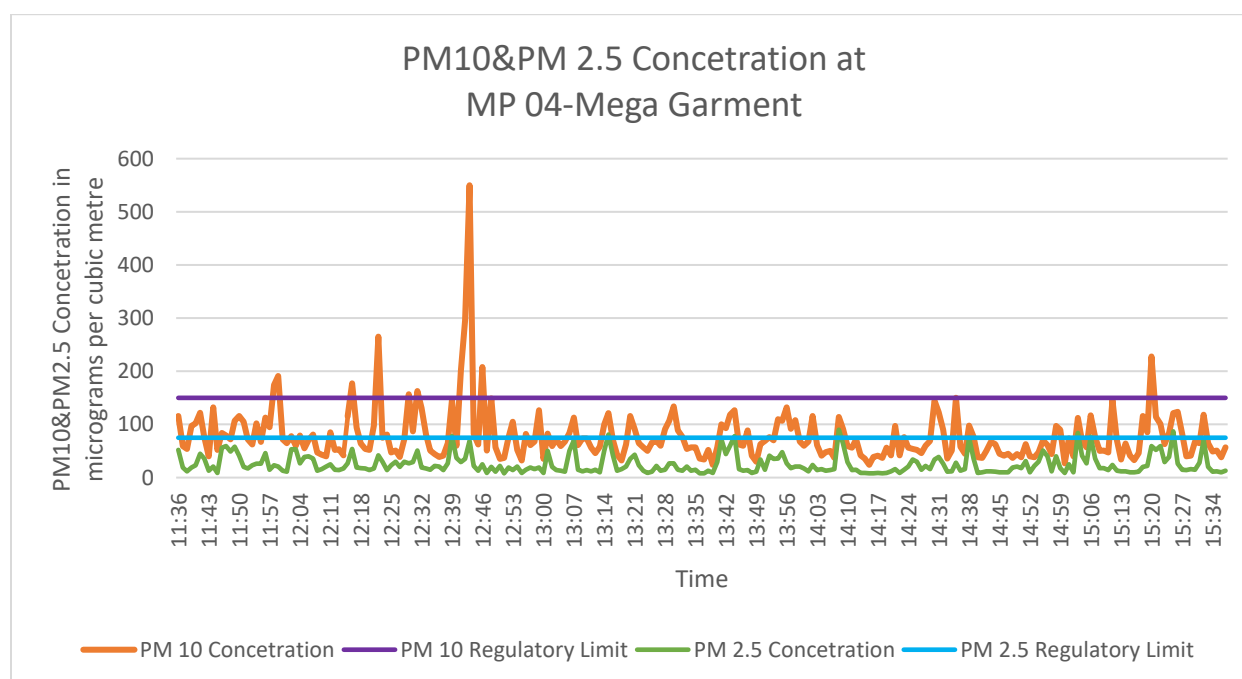
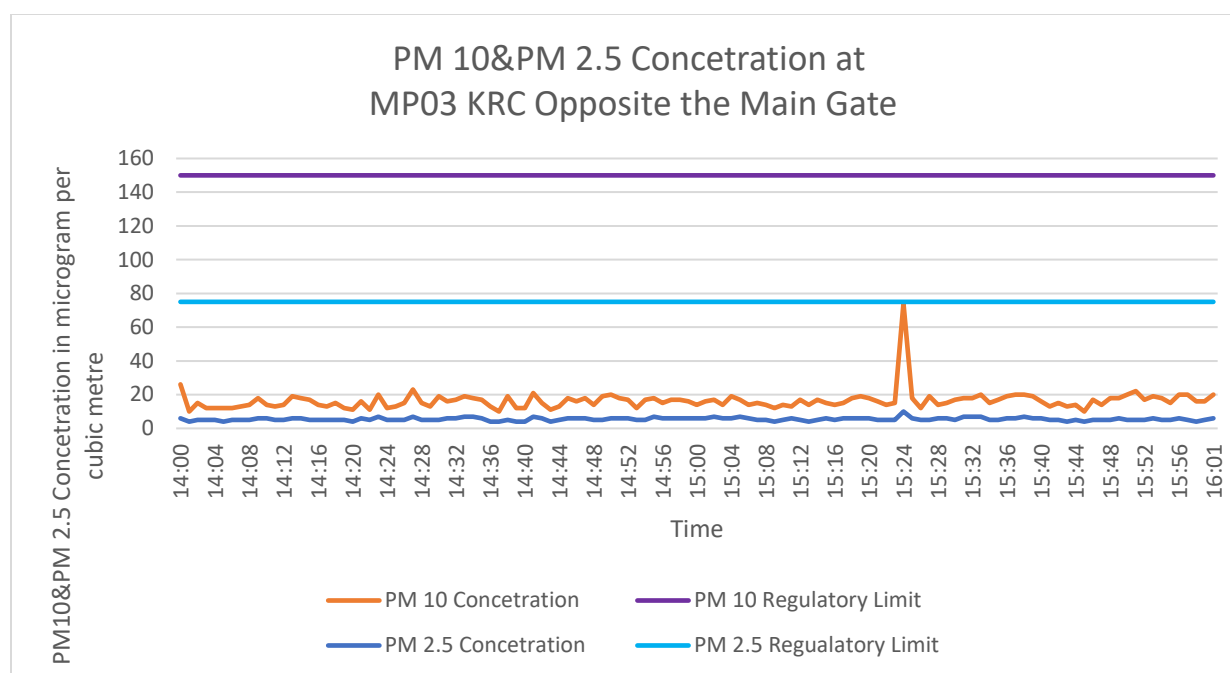
Recommendations

- Workers should be informed of the noise monitoring results, the minimal risk of hearing loss, and the roles of hearing protection and audiometric testing;
- Make earplugs available at the entrance to these noisy working areas;
- Areas to be posted with signs warning about high noise levels and the requirement to wear hearing protection; and
- Shorter exposure periods can also be considered for the workers at these points.

Table 10: Summary of gases Results

Measurement Point	SO ₂ µg/m ³	EMC, Air Quality 2014 µg/m ³	WHO Air Quality Guidelines µg/m ³	NO ₂ µg/m ³	EMC, Air Quality 2014 µg/m ³ One hour	WHO Air Quality Guidelines µg/m ³	TVOCs µg/m ³	EMC, Air Quality 2014 µg/m ³
MP01-KRC along the siding lines next to combined warehouses		125	125	---	411	200	BDL	600
MP02-KRC middle of the proposed project location	----			----			BDL	
MP03-KRC opposite the main gate							BDL	
MP04-Mega Garment next to combined warehouses	----			-----			BDL	





3.6. Biological Environment

2.4.1. Flora & Fauna

The marine and coastal zone is rich in biodiversity, which is the mainstay of the fishing and tourism industry. Mangroves are found along the shores of Makupa, Tudor and Mtwapa Creeks in the County. Further, the inland vegetation cover is mainly shrubs and grass. Most common tree

species include *Azadirachta indica*, *Leucena lucocephala*, *Daum palms* and *Adansonia digitata*. The main grass species include *Cenchrus ciliaris*, *Blephasis stuhlmanii* and *Lactuca captensis*.

Coastal birds concentrate usually on inter-tidal areas especially mud flats, estuaries, reef flats and beaches.

Over 80% of the project site is dominated by agricultural land. However, a remnant bushland/thicket of indigenous vegetation exists to the east of the new project site. This is dominated by shrubs of less than 6 metres such as *Ziziphus mauritiana*, *Senna singueana*, *Lantana camara*, *Flueggea virosa*, *Thespesia danis*, *Dalbergia vacciniifolia*, *Dichrostachys cinerea*, among others. Common herbs include *Commelina spp.*, *Clitoria ternatea*, *Sida spp.* and grasses such as *Panicum maximum*, *Chloris roxburghiana*, *Brachiaria deflexa*, *Digitaria spp.* and *Eleusine indica*.



Figure 6: Vegetation cover on the project location

3.7. Marine resources and protected areas

There are strands of mangrove forest and some coral reefs that fringe the seashore near the additional pipeline project site that support the artisanal fishery. The mangroves are protected under the Forest Act, while the coral reefs are protected as marine resources under the Fisheries Act.

3.8. Climate

Climatic condition variations in the County are attributed to South East Monsoon winds (blowing between April and September) and the North East Monsoons (October to March) and oceanic influence. The mean rainfall in the coast region ranges from 1,397 mm in the south decreasing to 889 mm in the north and occurs in two periods. The rains occur during the inter-monsoonal period, with the long rains starting from March to June, while the short rains occur from October to December.

Coastal climate is classified as tropical. In winter, there is much less rainfall than in summer. This climate is considered to be according to the Köppen-Geiger climate classification. The temperature here averages 26.0°C. Precipitation here averages 1112 mm. Precipitation is the lowest in February, with an average of 17 mm. Most precipitation falls in May, with an average of 258 mm. At an average temperature of 28.2°C, March is the hottest month of the year. In July, the average temperature is 23.7°C. It is the lowest average temperature of the whole year.

3.9. The Socio-Economic Profile

Mombasa has a vibrant economy and is known for its varying hospitality amenities and beautiful beaches that makes it a popular tourist magnet. Mombasa is also a Kenya's second major industrial hub after Nairobi with various industries such as mining, manufacturing, Energy (Oil Refining) set up at the County.

Tourism is definitely one of the most lucrative activities in Mombasa County. This is attributed to the many tourist attraction sites and the warm temperatures experienced all year round. Mombasa port is the leading trading centre that has one of the largest seaport called the Kilindini Harbour that mean "deep" in Swahili and the harbour is used for trading. The good road network eases transportation of goods from the port to designated destination. Moi International Airport is important because visitors use it to travel into the county, a lot of people to travel to the county

due the good infrastructure that have being put in place by the government in a bid to enhance the tourism.

Mombasa County has a lot of tourist attraction that has made people to travel there due to the availability of clean beaches that stretch from north to the south of the county. Such beaches include the Fort Jesus which is the main tourist's attraction site in the county that was built in the 16th century by the Portuguese. It shows various artefacts and the monumental still stand to today. Other economic activities carried out in the area include Chrome mining, Cement manufacturing and fishing which supply sea food to the residents and other towns such as Nairobi. Several food-processing factories are involved in the packaging and export of food products and flowers to other continents.

3.10. Population Demography

Changamwe is one of the six Sub-Counties of Mombasa County. It has four locations namely Changamwe, Kwa Hola, Port Reitz and Chaani. The Plant will be located within Kwa Hola Location but the pipeline will traverse Kwa Hola, Port Reitz and Chaani locations. The Proposed Additional LPG Import Pipeline & Phase 1C Bulk LPG Mound project is located in Miritini Sub-Location, Mombasa County on the southern side of Miritini Centre.

The size and composition of the population are important variables in the development of the local economy. Table 1.0 presents the population distribution in Mombasa and in Changamwe Sub-County with 1.2m people and 132,000 people, respectively. Changamwe Sub-County therefore hosts 11% of the County population (52% male, 48% female). Looking at the specific locations affected by the proposed project, Kwa Hola Location has the highest population density (29,000/Km²), followed by Chaani Location (10,000persons/Km²), as compared to the County population density that is about 5,600persons/Km².

A look at the age distribution shows that the active laborforce (15-64 years) constitute 68% of the population, with 42% of people in this category being youth (15-34 years). The elderly (65+ years) and children (0-14 years) constitute 31% of the total population (KNBS, 2019).

The population demographic data is secondary data obtained from Population and Housing Census - Kenya National Bureau of Statistics (2019). The data used to evaluate the socio-economic status of the project area community is primary data obtained from the socio-economic survey conducted by the ESIA team during this assessment.

The Government of Kenya carried out a National Population and Housing Census in 1999 and 10 years later in 2009. The Kenya National Bureau of Statistics (KNBS) provides the population data as given in Table 10. The 2009 Census covered a smaller area of Miritini Sub-location than the 1999 (almost half) and the population density is 3 times higher. This shows how Miritini has seen high population growth in the past few years. This is largely due to increased business brought about by the industries and the large number trucks that use the area as a stopover.

3.11. Population Size by Gender

Table 11: Population Distribution by gender in Changamwe Sub-county, Mombasa County

Area	Total	% of Total	Male	% Male	Female	% Female	Area (Sq. Km)	% of Total Area	Persons per Sq. Km
Mombasa County	1,208,333	100%	610,257	51%	598,046	49%	219.9	100%	5,495
Changamwe Sub-County	131,882	11%	68,761	52%	63,121	48%	17.7	8%	7,457
Chaani Location	38,785	29%	20,474	53%	18,311	47%	3.9	22%	10,033
Kwa Hola Location	18,568	14%	9,530	51%	9,038	49%	0.6	3%	28,801
Port Reitz Location	65,496	50%	34,164	52%	31,332	48%	9.4	53%	6,950

Source: Population and Housing Census - Kenya National Bureau of Statistics (2019).

The County had a population density of 5,495 persons per Km² in 2019 which was projected to increase per Km² by next census owing to high population growth contributed to by the increased numbers of people seeking employment in the manufacturing, service and processing industries, the Port of Mombasa, Kenya Ferry Services, Container Freight Terminals, go downs and hotels. Highly populated areas are in Majengo, Bamburi, Bangladesh, Mikindani, Jomvu, Miritini, Migadini, Port Reitz, Mishomoroni and Bombolulu among others.

The high population densities in Mvita, Changamwe and Nyali are attributed to proximity to vital infrastructure such as roads, water, electricity and employment opportunities due to the presence of industries like the Export Processing Zones and other physical facilities such as the Port of Mombasa and the Moi International Airport, Mombasa. Kisauni (3,328 persons / Km²), Jomvu (4,432 persons/Km²) and Likoni (6,187 persons/Km²) are the least densely populated sub-counties in the county. This implies that Changamwe (7,457 persons / Km²), Nyali (9,610 persons / Km²) and Mvita (10,543 persons / Km²) require more resources towards expansion and erection

of additional social amenities. Low densities in Likoni, Jomvu and Kisauni can be attributed to inadequate social amenities and poor road network.

3.12. Population Distribution by Gender and Level of Education

Table 12: Population Distribution by Education Level and Gender

Sub-County	Total	Pre-Primary	% ECDE	Primary	% Prim	Secondary	% Sec	Middle Level/ Technical/ TVET	% Tech	University	% Univ	Other	% Other
Mombasa County	990,259	97,076	10%	430,763	44%	300,239	30%	108,066	11%	46,081	5%	8,034	1%
Male	507,180	48,282	10%	211,461	42%	162,278	32%	54,043	11%	27,031	5%	4,085	1%
Female	483,066	48,794	10%	219,295	45%	137,959	29%	54,022	11%	19,047	4%	3,949	1%
Changamwe Sub-County	113,346	9,412	8%	46,958	41%	38,842	34%	13,618	12%	3,955	3%	561	0%
Male	59,561	4,716	8%	23,470	39%	21,191	36%	7,386	12%	2,472	4%	326	1%
Female	53,785	4,696	9%	23,488	44%	17,651	33%	6,232	12%	1,483	3%	235	0%

NB: Other includes Adult Basic Education, Madrasa, Duksi, Non Responses)

Source: KNBS Vol. II, 2019

Literacy rate in Kenya for adult male population is 81.08% and 74.9% for adult female population.

It however evident in Table 11 above that majority (70%) of the population in the study area have either primary (41%) or secondary education (39%). Only 11% have tertiary education and 5% have university education. There is also no significance difference between male and female residents in terms of education.

3.13. Population Distribution of 5 years and above by Activity

Table 14 below shows that over 40% of the population are working while around 15% are unemployed. Given that majority of the population has had no access to skills training, it is likely that most of the working population constitute artisans and unskilled labor. Notably, close to 50% of the population are either children or the elderly, which represents a heavy economic burden to

the working group and the government. Private sector investment therefore becomes crucial for creation of direct and indirect employment opportunities.

Table 13: Population Distribution of 5 Years and above by Activity

County/Sub-County/Sex	Total	Persons in the Labour Force						
		Working	% Working	Seeking Work/ No Work	% Seeking/No Work	Persons outside the Labour Force	% Outside Laborforce	Not Stated
Mombasa County	1,043,603	423,439	41%	141,942	14%	477,965	46%	257
Male	523,840	252,197	48%	76,485	15%	195,024	37%	134
Female	519,747	171,233	33%	65,453	13%	282,938	54%	123
Changamwe Sub-County	115,799	50,074	43%	17,573	15%	48,141	42%	11
Male	60,352	30,762	51%	9,655	16%	19,932	33%	3
Female	55,447	19,312	35%	7,918	14%	28,209	51%	8
Source: KNBS Vol II, 2019								

3.14. Households Distribution and Tenure Status

Majority the population in Mombasa County (79%) and in Changamwe Sub-county (90%) live in rented or provided housing (i.e. government, parastatal, private company-owned). This means they would be heavily vulnerable should relocation of settlements for construction of the pipeline become necessary. The greatest proportion of the dwellings are iron-sheet roofed, with stone or concrete walls and concrete floors.

Table 14: Households Distribution and Tenure Status

Table 3: Distribution of Households by Tenure Status of Main Dwelling Unit									
County/ Sub-County	Households			Tenure Status (Conventional Households)					
				Owned		Rented/Provided		Not Stated	
	Total	Conventional	Group Quarters	Number	%	Number	%	Number	%
Mombasa County	378,422	376,295	2,127	78,346	21	297,830	79	119	0
Changamwe Sub-County	46,614	46,439	175	4,531	10	41,903	90	5	0
Source: KNBS Vol. II 2019									

CHAPTER FOUR

4. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

This section of the report discusses the policies, applicable EHS legislations and institutional framework governing the Proposed Project.

4.1. National Policies and Regulations

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

The main piece of legislation governing environmental management in Kenya is the Environmental Management and Co-ordination Act (EMCA) of 1999, Amended 2018. The main objective of this Act is to provide for the establishment of an appropriate legal and institutional framework for the management of the environment in Kenya. EMCA provided for the establishment of a National Environment Management Authority (NEMA), which became operational in July 2002. NEMA has the statutory mandate to coordinate all environmental activities.

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

The Act makes environmental impact assessment mandatory for activities specified in its Second Schedule.

4.2. National Policies

Table below shows the National Policies relevant to the Proposed LPG terminal

Table 15: Relevant National Policies

National Policy	Community development
The National Environment policy, 2013	<ul style="list-style-type: none"> • The National Environment Policy aims to provide a holistic framework to guide environmental and natural resource management in Kenya. • It also ensures that the link between the environment and poverty reduction is integrated into all government processes and institutions in order to facilitate and realize sustainable development at all levels in the context of a green economy, enhancing social inclusion, improving human welfare, creating employment opportunities and maintaining a healthy functioning of the ecosystem.
EPRA	<p>The government to ensure that there are strategic petroleum reserves in the country. Increased use of LPG shall be encouraged with a view to eliminate the use of Kerosene, charcoal and firewood in the households. The Government is also evaluating the possibility of using natural gas to support commercial and industrial activities including transportation.</p> <ul style="list-style-type: none"> • Government to ensure compliance with the environmental laws on restoration and decommissioning of projects • Government to develop and implement a compliance mechanism for safety and environmental pollution • Government to mainstream ecosystem and biodiversity management in energy and petroleum sector • Government to establish a Disaster Preparedness, Prevention and Management (DPPM) Unit to spearhead response to accidents and disasters in the energy and petroleum sector • Government to provide security for all energy and petroleum installations, which shall be gazetted as national protected zones
Sessional Paper No. 4 On Energy, 2004	<ul style="list-style-type: none"> • Envisions equitable access to quality energy services at least cost while protecting the environment • Requires the government to give legal authority to the Energy & Petroleum Regulatory Authority to permit and license generation, transmission and distribution. EPRA is also given mandate to facilitate issuance of permits and licenses by concerned authorities including NEMA • The Paper tasks the government to ensure environmental rehabilitation on project completion or abandonment • Encourage private sector investment in additional capacity for handling, storage and distribution of LPG; • Consistent with this policy, Government will pursue implementation of:: • Construction of LPG import handling, storage and distribution facilities in the short term. Storage and filling facilities will also be constructed in Nairobi,

	<p>Kisumu, Nakuru, Eldoret and Sagana and in other parts of the country in tandem with rising incomes and demand.</p> <ul style="list-style-type: none"> • Promoting wider use of both kerosene and LPG in households, as an alternative fuel to improve the quality of household energy and mitigate demand on wood fuel • Government will continue to promote distribution of petroleum fuels including liquefied petroleum gas (LPG) as part of the energy infrastructure to stimulate both on and off-farm income generating activities, in addition to providing clean energy for rural household use.
The Kenya Health Policy 2012 – 2030	<ul style="list-style-type: none"> □ The policy is based on the Constitution of Kenya 2010, Vision 2030 and global health commitments. □ Its broad aim is to ensure equity, people-centeredness and participation, efficiency, multi-sectoral approach and social accountability in delivery of healthcare services. □ It sets out the goal, objectives, guiding principles and policy directions aimed at achieving Kenya's health agenda and a comprehensive implementation framework. Also included is the institutional management plan under the evolved system of government taking into account the varied roles of the national and county levels of Government. □ The policy also sets out a monitoring and evaluation framework to track progress in achieving the policy objectives.
The National Environmental Sanitation and Hygiene Policy 2007	<ul style="list-style-type: none"> □ The Environmental Sanitation and Hygiene (ESH) Policy is intended to improve people's health and quality of life. <p>Strategic interventions have been developed to determine the success of the policy implementation.</p> <ul style="list-style-type: none"> □ One of the key purposes of this policy is to clarify the various roles in order to enhance the existing legal and constitutional framework and to encourage the private sector, civil society and community participation in the planning, implementation and ownership of ESH services. □ Sanitation and the Environment: One of the key objectives of the policy is to protect the environment from pollution and its negative effect on human health. The government will seek to minimize negative impacts arising from various types of sanitation systems, and maximize positive effects. □ Well-functioning sanitation and hygiene systems are a means of protecting the environment. □ The health risks associated with poor ESH increase poverty. <p>The government envisages that this policy is an important step towards poverty reduction.</p>

National Policy On Water Resources Management and Development (Seasonal Paper No.1 of 1999).	<ul style="list-style-type: none"> □ Recognizes the need to avoid the pollution of water resources and thus proposes development of strict stream effluent discharge standards for controlling the discharge of wastes into water bodies. Also recognizes the need to make water abstraction and disposal permits dynamic and economic instruments for water pollution control □ Proposes a process of water quality monitoring of all water bodies and pollution control inspection of potential polluting sources. Proposes that all factories and other waste water generating concerns be required to incorporate in their designs waste water treatment devices □ Proposes the monitoring of water quality parameters to provide baseline data for the purposes of pollution control. Also proposes monitoring of water abstraction and water use to work out naturalized river flows, misuse and over abstraction
Land Policy (Sessional Paper No. 3 of 2009).	<ul style="list-style-type: none"> □ Envisions the efficient, sustainable and equitable use of land for prosperity and posterity □ Seeks to secure rights over land and provide for sustainable growth, investment and the reduction of poverty in line with the Government's overall development objectives. □ Seeks to offer a framework of policies and laws designed to ensure the maintenance of a system of land administration and management that will provide inter alia, economically viable, socially equitable and environmentally sustainable allocation and use of land, efficient and effective utilization of land and land-based resources. □ Commits the government to restoration of the environmental integrity of land and facilitation of the sustainable management of land based resources. This is through incentives to encourage the use of technology and scientific methods for soil conservation; encouraging use of traditional land conservation methods; establishing measures to control degradation of land through abuse of inputs and inappropriate land use practices; and establishing institutional mechanisms for conservation of quality of land for environmental conservation purposes □ Government shall develop a comprehensive and integrated land use policy having regard to fragile areas and the needs of neighboring communities and individuals in such areas □ Government shall ensure that environmental impact assessments and audits are carried out on all proposed projects, programmes and activities on land that have a likelihood to degrade the environment.
The Kenya National Biodiversity Strategy and Action Plan, 2000	The overall objective of the NBSAP is to address the national and international undertakings elaborated in Article 6 of the Convention on Biological Diversity' (CBD). It is a national framework of action for the implementation of the Convention to ensure that the present rate of biodiversity loss is reversed, and that present levels of biological resources are maintained at sustainable levels for Posterity.

4.3. National Legislation

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

Table 16: Summary of Reviewed National Legislation

No	Legislation/Regulation/Standard	Provisions	Relevance to the Project/ License or Permit Required/ or Activity requiring regulation
1	The Constitution of Kenya (2010)	<ul style="list-style-type: none"> □ The Constitution has enhanced protection and enforcement of fundamental rights amongst other gains. It provides for a two tier structure of government, i.e. the National and the County Governments. It distributes the functions and powers between the two levels as detailed in Chapter Eleven and the Fourth Schedule. □ Specifically in relation to the energy sector, Part 1 of the Fourth Schedule provides that the National Government shall be responsible for: - (a) Protection of the environment and natural resources with a view to establishing a durable and sustainable system of development including water protection, securing sufficient residual water, hydraulic engineering and the safety of dams (b) Energy policy including electricity and gas reticulation and energy regulation; and (c) Public investment. □ In relation to the County Governments, Part 2 of the Fourth Schedule provides that they shall be responsible for county planning and development including electricity and gas Reticulation and energy regulation. 	□ The project shall be implemented in consultation with both the national government and the county government including the relevant authorities;
2	Environmental Management and Coordination Act 1999, Amended 2015	<ul style="list-style-type: none"> □ Provides for protection and conservation of the environment, environmental impact assessment, and environmental auditing and monitoring. □ Provides that all reasonable measures shall be taken to mitigate any undesirable effects not contemplated in the ESIA and an environmental audit report on those measures be prepared and submitted to NEMA 	□ Project has initiated this ESIA in compliance with regulations
3	Environmental (Impact Assessment and Audit) Regulations, 2003 Amended 2019	<p>Provides for the procedure for carrying out the Environmental and Social Impact Assessment (ESIA).</p> <p>Provides for the contents of an ESIA Study Report.</p>	□ The ESIA to be carried out in accordance to the regulations.
4	Environmental Management and Co- ordination (Water Quality) Regulations 2006	Provides for the protection of ground and surface water resources. Provides for the parameters in the quality of wastewater discharged from any facility/activity into the environment or sewer.	□ Any discharges to the surface water courses during operation phases to be monitored for conformance with the standards

5	Environmental Management and Co-ordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009	<p>Prohibits the generation of unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment.</p> <p>Provides for the maximum noise levels permissible in various environmental set ups such as residential areas, places of worship, commercial areas and mixed residential.</p> <p>Provides that where a sound source creates or is likely to emit noise or excessive vibrations, or otherwise fail to comply with the provisions of these Regulations, a license is required</p>	<ul style="list-style-type: none"> □ Sound level limits of 60dB (day) and 35dB(night) to be observed during operations □ License to emit noise/vibrations in excess of permissible levels to be acquired if necessary
6	Environmental Management and Co-ordination (Waste Management) Regulations 2006	<p>Provides for standards for handling, transportation and disposal of various types of wastes including hazardous wastes.</p> <p>Requirements to ensure waste minimization or cleaner production, waste segregation, recycling or composting.</p> <p>Provides for licensing of vehicle transporting waste.</p> <p>Provides for the licensing of waste disposal facilities</p>	<ul style="list-style-type: none"> □ Disposal of generated waste from operations under the Project; □ Generation of hazardous wastes such as used oil and oily parts from servicing of equipment and vehicles
7	Environmental Management and Co-ordination (Fossil Fuel)	Provides for emission standards for internal combustion engines.	<ul style="list-style-type: none"> □ Use of diesel-powered generators and compressors in operations □ SEASCAN Energy Ltd vehicles in use by staff
8	Environmental management and co-ordination (conservation of biological diversity and resources, access to Genetic resources and benefit sharing) Regulations, 2006	<ul style="list-style-type: none"> □ Provides that a person shall not engage in any activity that may have an adverse impact on any ecosystem; lead to the introduction of any exotic species; or lead to unsustainable use of natural resources, without an Environmental Impact Assessment License □ Provides for the imposition of bans, restrictions or similar measures on the access and use of any threatened species in order to ensure its regeneration and maximum sustainable yield □ Provides for the inventory and monitoring of the status of threatened, endangered or rare species 	<ul style="list-style-type: none"> □ Pipeline Project activities are within the mangrove ecosystem

9	Environmental Management and Coordination (Air Quality) Regulations, 2014	<input type="checkbox"/> Provides for ambient air quality tolerance limits. <input type="checkbox"/> Prohibits air pollution in a manner that exceed specified levels. <input type="checkbox"/> Provides for installation of air pollution control systems where pollutants emitted exceed specified limits. <input type="checkbox"/> Provides for the control of fugitive emissions within property boundary. <input type="checkbox"/> Provides for the control of vehicular emissions. <input type="checkbox"/> Provides for prevention of dispersion of visible particulate matter or dust from any material being transported. <input type="checkbox"/> Provides for acquisition of an emission license.	<input type="checkbox"/> Exhaust/stack emissions from equipment at the Gas facility SEASCAN vehicles in use by staff
10	The Public Health Act (Cap 242)	<input type="checkbox"/> Provides for the prevention of the occurrence of nuisance or conditions dangerous/injurious to humans	<input type="checkbox"/> Generation of wastes from operations under the SEASCAN Facility <input type="checkbox"/> Handling, storage and disposal of waste at the SEASCAN Facility
11	Occupational Safety and Health Act (OSHA), 2007	<input type="checkbox"/> Provides that every occupier shall ensure the safety, health and welfare at work of all persons working in his workplace <input type="checkbox"/> Provides that before any person occupies or uses any premises as a workplace, he shall apply for the registration of the premises <input type="checkbox"/> Provides that workplace shall be of sufficient size for work to be carried out with ease and shall further have the necessary free space and, having regard to the nature of the work, an adequate amount of air for each employee, the minimum permissible being ten cubic meters per person <input type="checkbox"/> Provides that an occupier shall ensure that effective and suitable provision is made for securing and maintaining, by the circulation of fresh air in each workroom, the adequate ventilation of the room <input type="checkbox"/> Provides that an occupier shall ensure that effective provision is made for securing and maintaining sufficient and suitable lighting, whether natural or artificial, in every part of his workplace in which persons are working or passing <input type="checkbox"/> Provides that sufficient and suitable sanitary conveniences for the persons employed in the workplace shall be provided, maintained and kept clean, and effective provision shall be made for lighting the conveniences; and,	<input type="checkbox"/> Site registration as a workplace <input type="checkbox"/> Safety measures are required in use of tools and machinery on sites <input type="checkbox"/> Protection of the workers and general public with any form of interaction with the sites is necessary

		<p>where persons of both sexes are or are intended to be employed (except in the case of workplaces where the only persons employed are members of the same family dwelling there), such conveniences shall afford proper separate accommodation for persons of each sex</p> <p>□ Provides that all plant, machinery and equipment whether fixed or mobile for use either at the workplace or as a workplace, shall only be used for work which they are designed for and be operated by a competent person</p>	
12	The Factories and Other Places of Work (Noise Prevention and Control) Rules, 2005	<p>□ Rules provide for the maximum noise exposure levels for workers in places of work and for the provision of protective equipment for those exposed to high noise levels.</p> <p>□ Provides that an occupier shall also institute noise reduction Measures at the source of noise in the workplace.</p>	□ Noise emitted during the operation of the emergency diesel generator require provision of PPE to workers and minimization of noise exposure to the public
13	The Factories and Other Places Of Work (Fire Risk Reduction) Rules, 2007	□ These rules apply to every workplace, process and operations to which the provisions of the Act apply	The project will be involved with handling “Class B fire” - fire involving flammable gases,
14	Water Act 2016	□ Provides that a permit shall be required for any use of water from a water resource, especially where there is abstraction and use of water with the employment of works.	□ Use of water abstracted from the natural spring requires an abstraction permit.
15	Water Resource Management Rules 2007	<p>□ Provides for application by all those intending to abstract ground water.</p> <p>□ Provides that where any borehole or well is intended to be equipped with a motorized pump the application shall be accompanied by a hydrogeological assessment report.</p>	□ Depending on the proposed source of water for construction activities, permits may be required

16	The Energy Act 2019	<ul style="list-style-type: none"> □ It sought to consolidate 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; □ Enforcement and review environmental, health, safety and quality standards □ Need to promote environmental protection and compliance with environmental, health and safety requirements □ Construction permit request to be accompanied by ESIA Study Report 	<ul style="list-style-type: none"> □ Applicable for importing, transporting, refining, storing and selling petroleum or petroleum products; Construction permit shall be sought from EPRA.
17	The Energy (Energy Management) Regulations 2012	<ul style="list-style-type: none"> □ Provides for the development of an energy management policy with inter alia, commitment to improve energy efficiency and conservation, and commitment to provide resources necessary to achieve energy efficiency and conservation. □ Provides for maintenance of energy consumption records. 	<ul style="list-style-type: none"> □ Development and implementation of an Energy Management Policy by SEASCAN Energy Limited is required since the existing complex is connected to the national grid □ Energy audits should also be carried out on the facilities to identify opportunities for improving efficiency
18	Liquefied Petroleum Gas (LPG) Regulations 2019)	Promulgated for Management of LPG in Kenya Covers on Export Transport storage, import, Retail of wholesale LPG	<p>The Regulations requires the proponent to;</p> <ul style="list-style-type: none"> □ Apply for/obtain license from EPRA prior to operating bulk LPG storage facility. <p>Application for the license should be accompanied by the follow:</p> <ul style="list-style-type: none"> □ EIA License issued in accordance with EMCA 1999, Amended 2015 □ Proof of compliance with OSHA 2007 and Public Health Act; □ Certificate of compliance issued in accordance with Physical Planning Act of 1986;

			<ul style="list-style-type: none"> □ Copy of approved drawing accordance with County Government Act 2012, with specifications and plans in duplicate; □ A clearance certificate from Chief Fire Officer; □ A declaration of the intended use of LPG that is to be stored □ A copy of certificate of adherence to the KS1938(1-5) □ Transport LPG by road in accordance with the Act and terms and conditions of a valid license issued by the Commission;
19	Land Registration Act, 2012 (Act No. 3 of 2012)	□ Provides for the registration of titles to land, to give effect to the principles and objects of devolved government in land registration, and for connected purposes.	□ The proposed project site is registered and has a title deed.
20	The Physical and Land Use Planning Act, 2019	□ Provides for zoning of areas for storage, distribution and retailing of petroleum products and construction of electric power sub- stations and other infrastructure.	□ The Proposed Project has been approved by the County's Physical Planning Department.
21	Land Act, 2012 (Act No. 6 of 2012)	□ Provide for the sustainable administration and management of land and land-based resources, and for connected purposes. The Act also provides for the repeal of the Way leaves Act (Cap. 292) and the Land Acquisition Act (Cap. 295).	□ The proposed project site is registered and has a title deed under Kenya Railways Corporation.
22	National Construction Authority Act, (Cap.449A) National Construction Authority Regulations, 2014	□ Regulates construction activities and registration of contractors in Kenya.	□ The Project shall seek development approval from the NCA and engage approved contractor during construction phase
23	The Standards Act, Chapter 496	□ Provides for establishment of minimum quality specifications, mode, materials and apparatus used in the country	□ The Project shall comply with this act in packaging and measurement.
24	The Weights and Measures Act, Chapter 513	□ Regulation under which storage tanks and dispensing equipment for sale of petroleum products are calibrated and regulated for accuracy	□ LPG Storage tanks

25	The Traffic Act, Cap 403	<p>□ Relating to traffic on all public roads. Key provisions include registration and licensing of vehicles; driving licenses; driving and other offences relating to the use of vehicles on roads; regulation of traffic; accidents; offences by drivers other than motor vehicles and other road users. It prohibits encroachment on and damage to roads including land reserved for roads</p>	<p>□ Many types of equipment and fuel shall be transported through the roads to the proposed site. Their registration and licensing will be required to follow the stipulated road regulations.</p>
26	Public Roads and Roads of Access Act Cap. 399	<p>□ Ensure non-interference with public roads when constructing the terminal and the pipeline infrastructure. Provision of safe passage</p>	<p>□ The Proponent to apply proposed mitigation measures in the ESIA Study Report to minimize impact and safeguard against explosion and fire.</p>
27	The KMA Act	<p>□ The KMA Act domesticates the ability of the Kenya government to implement IMO Conventions related to shipping and maritime safety that it has ratified</p>	<p>□ KMA is the designated national competent oil spill authority responsible for the development and provision of guidelines for the management of oil spills in the maritime environment. Under Sec. 5 (i) of the Act, KMA is required to enforce safety of shipping, including compliance with construction regulations, maintenance of safety standards and safety navigation rules.</p>
28	The BMU Regulations, 2007	<p>The BMU regulations were gazette through a legislative supplement No. 67 of 2007 to serve the following purposes:</p> <p>Strengthen the management of the fish-landing stations, fishery resources and aquatic environment</p> <p>Support the suitable development of the fisheries sector.</p> <p>Assist in alleviating poverty and improving fisher community livelihoods.</p> <p>Mainstream gender issues in the management of Fisheries resources</p> <p>Ensure the achievement of quality standards with regard to fish and fishery products.</p> <p>Build local fisher community capacities to effectively engage with other stakeholders in management of fisheries resources.</p> <p>Mitigate conflicts in resource use in the fisheries sector</p>	<p>□ KMA is the designated national competent oil spill authority</p> <p>Responsible for the development and provision of guidelines for the management of oil spills in the maritime environment.</p> <p>Under Sec. 5 (i) of the Act, KMA is required to enforce safety of shipping, including compliance with construction regulations, maintenance of safety standards and safety navigation rules.</p> <p>All ships operating at the jetty shall be registered and licensed by KMA</p> <p>BMUs in the area are key stakeholders of the project as they crisscross the area to access fishing grounds and land their catch. Decisions taken by the proponent should be undertaken in consultation with the fishermen</p>
29	Employment Act No 11 of	Prohibition Against Forced Labor	Project proponent undertakes to abide by the requirements

	2007	Prohibition of child Labor	of the Act
30	Wayleave Act Cap 292	An Act of Parliament relating to wayleaves	The 15km pipeline will pass through the wayleave
31	KS 1938:2006	Code of practice for by KEBS for handling, storage and distribution of LPG in domestic, commercial and industrial installations Part 3: LPG installation involving storage vessels of individual water storage capacity exceeding 500L	The Standard provides guidelines for: <ul style="list-style-type: none"> □ Design pressure; □ Fire protection; □ Construction and initial (production) testing of LPG vessel; □ Filling ratio and volumes of storage vessel; □ Storage vessel location; □ Installation of LPG vessels; □ Installation of vaporizers; □ Periodic inspection and retesting; □ Electrical equipment and other sources of ignition; □ Filling point for bulk storage vessel; □ Filling of portable containers; □ Container storage areas; and □ Filling shed for portable containers.
	<i>KS 1938-1:2012 KS 1938-2:2012 KS 1938-3:2012</i>	Kenya standards for handling, storage and distribution of liquefied petroleum gas in Domestic, commercial and industrial installations-code of practice. Part 1: Liquefied petroleum gas installations involving gas storage containers of individual capacity not exceeding 150 L and a combined water capacity not exceeding 3000L per installation second edition. Part 2: Transportation of LPG in bulk by road, rail and sea code of practice second edition. Part 3: LPG handling, storage and distribution in domestic, commercial	The main aim of the project is to store and retail LPG of 60,000 Metric Tons and will be transported on Rail
	<i>KS ISO 16486-3:2012</i>	Plastic piping systems, unplastic polyanide for supply of gaseous, with fusion joining and mechanical joints fittings	LPG will be conveyed through pipes from the Port to the Terminal

	KS ISO 16486-5:2012	Plastic piping systems, unplastic polyanide for supply of gaseous, with fusion joining and mechanical joints fitness for the purpose of system	LPG will be conveyed through pipes from the Port to the Terminal
	KS ISO 16486-6:2012	Plastic piping systems, unplastic polyanide for supply of gaseous, with fusion joining and mechanical joints handling and installation.	LPG will be conveyed through pipes within the terminal
World Bank Safeguard Policies			
1.	Environmental Assessment: OP/BP 4.01	<input type="checkbox"/> Used to identify, avoid, and mitigate the potential negative environmental impacts associated with a project	<input type="checkbox"/> Project has potential to impact the environment through pollution of soil and water and social impact to local community
2.	Involuntary Resettlement: OP/BP 4.12	<input type="checkbox"/> The policy aims to avoid involuntary resettlement to the extent feasible, or to minimize and mitigate its adverse social and economic impacts	<input type="checkbox"/> Involuntary Resettlement is not triggered since the proposed project will not result into displacement.
IFC Performance Standards			
1.	Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts	<input type="checkbox"/> Establishes the importance of integrated assessment to identify the environmental and social impacts, risks, and opportunities of projects.	<input type="checkbox"/> The nature of the project and the existing local regulation since the proposed project falls in the category listed in the Second Schedule of the Environmental Management and Co-ordination Act (EMCA), 1999 Amended 2015 under Management of hydrocarbons including—the storage of natural gas and combustible or explosive fuels.
2.	Performance Standard 2: Labour and Working Conditions	<input type="checkbox"/> Recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers as guided by the ILO Conventions.	<input type="checkbox"/> The proposed project is expected to create job opportunities for both skilled and unskilled Labor during construction and operation phases.
3.	Performance Standard 3: Resource Efficiency and Pollution Prevention	<input type="checkbox"/> Recognizes that increased economic activity and urbanization often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels.	<input type="checkbox"/> The proposed project is anticipated to generate negative impacts during its life cycle, however the significance of the impacts will range between minor to moderate before mitigation and will further reduce after implementation of mitigation measures.
4.	Performance Standard 4: Community Health, Safety, and Security	<input type="checkbox"/> Recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts.	<input type="checkbox"/> The proposed project causes great public concern especially in the event of a major disaster such as explosions and fire outbreaks. Liquefied Petroleum Gas is a highly flammable product and can be detrimental to the public safety if measures are not put in place.

5.	Performance Standard 5: Land Acquisition and Involuntary Resettlement	<input type="checkbox"/> Recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land.	<input type="checkbox"/> The proposed project will not create displacement since the project site is already developed with similar facility.
6.	Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	<input type="checkbox"/> Recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development.	<input type="checkbox"/> The existence of plant biodiversity in the Project area even though according to the IUCN plants Redlist (2014), no threatened species were recorded.
7.	Performance Standard 7: Indigenous Peoples	<input type="checkbox"/> Recognizes that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population.	<input type="checkbox"/> There are no Indigenous persons affected by the proposed project and hence this performance standard will not be triggered
8.	Performance Standard 8: Cultural Heritage	<input type="checkbox"/> Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, this Performance Standard aims to ensure that Proponents protect cultural heritage in the course of their project activities.	<input type="checkbox"/> There is no protected cultural heritage within the project area hence this performance standard will not be triggered.

3.4 Institutional Framework

Table 17: Relevant Institutional arrangements

Institution	Role in Proposed Project	Project cycle stage Required
NEMA	<ul style="list-style-type: none"> □ Issuance of EIA license □ Inspections and monitoring compliance with license and approvals conditions □ Protect public interests 	Throughout the Project Cycle
Directorate of Occupational Health and Safety	<ul style="list-style-type: none"> □ Registration of the facility as a work place □ Enforce compliance with OSHA No. 15 of 2007 □ Registration of the construction site as a work place □ Enforcing compliance with Occupational Health and Safety Regulations at the construction site 	Throughout the Project Cycle
Kenya Maritime Authority (KMA)	Development and provision of guidelines for the management of oil spills in the maritime environment	Throughout the Project cycle
Ministry of Energy and Petroleum (MOE&P)	MOE&P is in charge of formulating and implementing policies so as to create an enabling environment for efficient operation and growth of the sector. It sets the strategic direction for the growth of the sector and provides a long-term vision for all sector players	Throughout the Project cycle
The Petroleum Institute of East Africa (PIEA)	<ul style="list-style-type: none"> □ The Petroleum Institute of East Africa (PIEA) is the professional body for the oil and gas industry in the East Africa region. The mission of the PIEA is to provide a forum for expertise and excellence in the oil industry, promote professionalism and free enterprise in the petroleum business supported by the highest operations and business standards. 	Throughout the Project cycle
Energy & Petroleum Regulatory Authority (EPRA)	<p>The EPRA is established under the Energy Act, 2019 with the following objectives and functions:</p> <ul style="list-style-type: none"> □ Regulate the electrical energy, petroleum and related products, renewable energy and other forms of energy. □ Protect the interests of consumer, investor and other stakeholder interests. □ Maintain a list of accredited energy auditors as may be prescribed. □ Monitor, ensure implementation of, and the observance of the principles of fair competition in the energy sector, in coordination with other statutory authorities. 	Throughout the Project cycle

CHAPTER FIVE

5. PUBLIC CONSULTATION AND SOCIO ECONOMIC SURVEY

5.1. Purpose of Consultations with Community/Key Stakeholder

The main purpose of carrying out consultations with community and key stakeholders was to obtain views and concerns of the project area community and other interested parties regarding the project so as to incorporate their contribution into the project development to safeguard the environment and the interest of key stakeholders particularly the local community and project area leadership and agencies directly or indirectly affected by the project.

Stakeholder consultation was conducted to take the opportunity to elaborate the essence of the project, to inform the stakeholders of any potential negative impacts and elaborate on the positive aspects so that informed decision are made by the stakeholders.

The public consultation meeting was aimed at achieving the following specific objectives:

1. Collection of additional baseline data/ information on the project area community;
2. Conduct further stakeholder and community consultations and sensitization; and
3. Provide the project area community and stakeholders with an opportunity to directly interact with the project developer through the ESIA Consultants and ask questions, raise issues and concerns pertaining to the proposed project and contribute to the identification of project impacts, mitigation measures and project alternatives.

5.2. Methodology

Stakeholder identification was done through a social scan followed by categorization and recording. During the stakeholder identification, Business community, groups and local communities and Government agencies that may be interested and affected by the project. Broader stakeholders who may influence the outcome of the project were identified as well as the elected and non-elected community representatives. The vulnerable groups such as the Youths, Persons with Disabilities and women were also included in the process.

The key criteria used for the identification of stakeholders included:

- i. Proximity to proposed project site associated infrastructure
- ii. Proximity to project activities;

- iii. County, Constituency and Ward levels leaders
- iv. Traditional leadership in the proposed project area
- v. Regulatory authorities (NEMA, EPRA, KRC, EPRA, PIEA, KMA, NMK)

The table 37 below indicates the category and the list of stakeholders that were identified and consulted during the study. The copies of the register signed by the stakeholder are appended to this report.

Table 18: Lists of Stakeholders

Stakeholder Category	Stakeholder Name	Rationale for selection
National Government	County Commissioner (CC)	Responsible for coordination of National Government policies at the County/Subcounty level
	National Museums of Kenya (NMK)	Custodians of the national heritage and resources of archeological importance. Lead Agency and reviews ESIA reports submitted to NEMA for permitting
	Energy and Petroleum Regulatory Authority (EPRA)	Lead agency in Energy matters in Kenya. Reviews ESIA reports submitted to NEMA for permitting
	PIEA – Petroleum Institute of East Africa	An agency in trainings on Energy matters in Kenya.
	National Environmental Management Authority (NEMA)	The Institution that is responsible for the management of environmental resources in Kenya. Also responsible for permitting and issuance of environmental licenses for development of projects
County Level	County Commissioner (CC) Mombasa County	Responsible for coordination of National Government policies at the County/Subcounty level. Would validate

		the data on administrative units in the project area
Constituency level	Sub County Administrator - Changamwe Constituency	Responsible for coordination of National Government policies at Sub County level
Ward Level	Ward Administrator	Would validate data on administrative units in the project area
Chiefs/Sub-Chiefs	Chief – Kwa Hola Location	Lowest administrative unit close proximity to the project area/ infrastructure and activities along the Way leave
	Chief – Port Reitz Location	Lowest administrative unit close proximity to the project area/ infrastructure and activities along the Way leave
	Chief – Chaani Location	Lowest administrative unit close proximity to the project area/infrastructure and activities along the way leave.

5.3. Approach to Consultations with Community/Key Stakeholders

The Consultant visited key stakeholders in their offices and discussed the proposed project and administered questionnaires with them. For the community stakeholders, the Local Area Chief helped organize for a public meetings (Barazas) where the community was informed of the project and also sensitized on the benefits and dangers of LPG.

The ESIA employed three main methods of consultations to get the data presented in this report. These are:

- Meetings and discussions with Key Stakeholders;
- Questionnaire administration and interviews; and
- Convening of Public Consultation Meetings (PCMs) within the project area.

Key informants included local leaders and representatives from various Government Departments Private establishments. Upon the conclusion of the meetings they filled questionnaires airing their views.

5.4. Consultation with Key Stakeholders

Consultations with the Key stakeholders enabled the consultant team to understand the project area well, especially regarding the magnitude of the project. The EIA team consulted the following key stakeholders or received no objection letters regarding components of the proposed project:

- NEMA Mombasa County;
- Mombasa County Government;
- Changamwe Sub-County Administration;
- NEMA Mombasa County;
- Directorate of Occupational Safety and Health (DOSH) Mombasa;
- National Museum of Kenya (Mombasa);
- Kenya Ports Authority;
- Oil Spill Mutual Aid Group Society (OSMAG)
- Energy & Petroleum Regulatory Authority;
- Mombasa County Government;
- Changamwe Sub County Administration.

The team undertakes to make continuous consultation throughout the ESIA process.

5.5. Public Consultation Meetings

Three Public Consultation Meetings were convened within the locations where the project area communities reside namely Portriezi location, Kwahola location and Chaani Location on 27th, 28th and 29th October 2020 respectively. Three focus group namely Women, Youths and Persons with disabilities with Changamwe Sub County were also engaged on 30th October, 2020. Minutes of the above meetings were recorded and are attached as Annex 4 while the filled stakeholder questionnaires have been given as Annex 5 of this report.

The Consultant's team organized 3 public consultation meetings in each of the 3 locations traversed by the KPC pipelines wayleave. A total of 73 participants (43 male, 30 female) participated in the meetings presented in the Table below.

Table 19: Gender Distribution of PCM Participants

Location	Participants		
	Male	Female	Total
Kwa Hola	18	9	27
Chaani	12	15	27
Port Rietz	16	6	22
Total	46	30	76

The meeting were held as follows

- I. Kwahola Location PCM at Kwahola Chief's camp with 27 participants 18 male , 9 female
- II. Chaani Location PCM at Chaani Primary School with 22 participants 11 male, 11 female.
- III. Port Reitz Location PCM at Port Reitz Chief's Camp with 24 participants 14 male, 10 female

Figure 7: - PCM at Kwa Hola Location



Figure 8: - PCM at Chaani Location



These meetings were organized in collaboration with the respective location chiefs namely, Chief Mr. Omar Swaleh of Kwa Hola Location, Chief Mr. Faraji Kibwana of Port Rietz Location and Chief Mr. Kombo Farjala of Chaani Location.

Key Stakeholders Meetings



Meeting with Chaani



Meeting with Chaani Chief



Public Meeting



Persons With Disability representing stakeholders at Chaani



Persons With Disability representing stakeholders Kwahola Magongo



Chief addressing the stakeholder meeting at Portriez



Ward representative addressing the meeting at Portriez



Ecoscience expert addressing the meeting at Portriez



Research assistant guiding the stakeholders on filling the questionnaires at Chaani



Chief addressing the stakeholder meeting at Chaani



Research Assistant facilitating the meeting in Kwahola Magongo



Head of Persons With Disabilities addressing the Focus Group Discussions at Chaani Social Hall



Focus Group Discussions with Persons With Disabilities at Chaani Social Hall

5.6. Findings from the PCMs

1. Land and Settlements

It was reported that most of the residents (86%) do not own land and are squatters on either public land or private land. Majority live on rented houses while Landlords live in other towns. We also have informal settlements for instance Mazunguka in Chaani.

2. Key Economic Activities

The main economic activities in the area cutting across both men and women is business which includes cooked fish vending, roasting meat, mama Pima, *vibanda vya mboga*, and groceries and, “*mali mali*” traders who sell household items, charcoal and firewood, while others are in *boda boda (motorcycle) riding* and tuk tuk business. Some of these businesses are carried out on the targeted KPC wayleave.

- Youth in the area engaged in activities such as boda boda riding, Garbage collection, selling of Local brew and Miraa, water vending, transport industry, and hawking.
- Women on the other hand mainly engaged in food businesses such as and service.
- Men do small businesses, garbage collection, Jua Kali jobs such as welding, casual labor among others.

3. Familiarity with LPG Products

The PCM participants were quite familiar with the term Liquefied Petroleum Gas frequently referred to as “cooking gas”. This emanates from the fact that most communities are only familiar with domestic use of LPG products. The participants also easily named LPG companies operating in the area. Some of the LPG products said to be in the local market were Hashi Energy, Total, Shell, Seagas, Oilbya and Pro-Gas.

4. Use of LPG Energy as Compared to other Energy Sources

Approximately half of the participants reported being users of LPG. The other sources of energy used were kerosene, charcoal, and firewood. Some households use a mixture of energy sources for different purposes. For instance, charcoal and firewood were mainly used to cook for food types that take long such as grains and cereals, while LPG was used for beverages and meals that cook quickly like rice, vegetables, tea and coffee.

5. Advantages of LPG Over biofuels

Participants agreed that LPG products are environmentally friendly, more affordable, faster to cook with, and are more affordable. LPG products are mainly used for domestic cooking but a few hotel businesses have started using them.

6. Why LPG Energy was not widely embraced

Financial Constraints - they stated that refilling the gas cylinders was manageable but the initial cost of buying a cylinder and its accessories is quite high and makes it difficult for most community members to acquire them.

Safety Concerns - Most participant has felt that LPG cylinders are dangerous and the effects when accidents occur are. LPG companies only provide a sticker on their cylinders explaining the use of their products, which is inadequate as most members are not educated enough to read and understand the instructions. A community health worker noted an incident where a woman was burnt after a gas explosion happened at her house, which rendered her unable to live her normal life thereafter. Another one cited an incident where community members put off a fire that broke out while children were using a Meko to cook in the absence of their parents.

Poor access in terms of location- some communities live far from the town and access to LPG products is poor as compared to biofuels.

Measures stated that can help increase LPG adoption

- Community education on handling of LPG cylinders, LPG use in relation to other biofuels, and to eradicate fear and misconceptions, an opinion that was supported by other participants.
- More LPG depots be opened in areas that are far from the urban centers to ease access as with firewood and charcoal which are more readily available.
- Proponent to consider making their product cheaper so that more people can get to use gas; a youth representative suggested that the proponent considers a credit system where buyers can pay in instalments to reduce the financial burden, and to make a promotional offer during the launch of their products, by catering for half the cost and the community meets the other half.

A consolidated summary of positive and negative impacts anticipated during the project cycle by participants and other stakeholders is presented in Chapter 7, in Section 7.1 of this report:

Participants recommended that the proponent supports the following programs if the project proceeds to implementation:

To mitigate these negative impacts, the following measures were suggested;

- Employment opportunities for at least 100 skilled and unskilled community members by project and potential surveys during the project cycle
- Proponent to hold safety trainings and educate the community on how to protect themselves from gas related accidents.
- To provide sponsorships for education and training of youth to empower them.
- Support through cost share or free LPG depots to the most vulnerable members of the community (i.e women, youth and PWDs), to help spur business for the larger community.
- Set affordable prices and maintain quality standards for its LPG products.
- Provide gauges with cylinders to enable consumers detect when gas is running out.
- Provision of piped fresh water to the community and boreholes as water has been a challenge.
- Renovate and equip the polytechnic that was left unfinished due to lack of funds.
- Support establishment of a rehabilitation center drug addicts in the area.

- To offer education and training sponsorships for youth as this will help empower them.
- Work with existing NGOs to mobilize community groups to pool finances to acquire LPG merchandise.
- Set affordable prices and maintain quality standards for their LPG products.
- Provide meter gauges with cylinders to enable consumers detect when gas is running out.
- Reforestation of Mangroves as CSR.

5.7. The Focus Group Discussions

Three (3) Focus Group Discussions (FGDs) focused on the most vulnerable members of the community – youth, women and persons with disabilities. This aimed at interrogating issues affecting these groups and to elicit their perceptions on the proposed project. Participants included the employed, traders, casual laborers and the unemployed. The FGDs were held on 30th October at Changamwe Social Hall.

5.8. Community Interviews (Primary Stakeholders)

The consultant's team interviewed 43 community members (drawn from the 3 locations neighboring the project area, Kwa Hola, Chaani and Port Rietz. The composition of respondents was quite inclusive reflecting all possible community characteristics and groups including the most vulnerable.

According to the community interviews undertaken, 74% of respondents confirmed having participated in public consultation meetings in the past one year. It is therefore important for the Proponent to ensure the Complaints Redress Committee (CRC) becomes operationalized from the onset of the project and throughout its cycle. Of these 60% are men and 40% women so they is greater representation of men than women.

Table 20: *Expected Positive Impacts of the project*

Anticipated Positive Impact	%
Reduced Energy Cost	21.3
Improved Health	9.7
Reduced Environmental Pollution	22.1
Improved Business Environment	12.4
Increased Employment Opportunities	22.5
Reduced Felling of Trees and associated environmental degradation	2.3
No Response	7.0
Increased Land Value	1.6
Increased time for women/girls	1.2
Total	100.0

5.9. Key Informant Interviews

In addition the team interviewed 27 key informants (24 males, 3 females as listed below)

Table 21: Key Informants interviewed

Category	# of Persons Interviewed	
	Male	Female
Security Agents – Senior Chief Police Commissioner	1	0
General Administration - Assistant County Commissioner 1, Ward Administrator, Sub-County Administrator	3	
Chiefs, Village Elders & Nyumba Kumi	5	3
Road users (truck, matatu, tuktuk, motorcycle operators)	4	
NGOs – Haki Kenya, Clarion	1	1
CBOs – Local Urban Forum Coordinator, Kwa Hola Community Unity, G.E Garbage Collectors Chaani, Mkono wa Vijana, Community Health Worker	5	1
Health facilities – Jomvu Model Health Centre at Kwa Hola	1	
Education facilities – Umoja Primary Kwa Hola & Bomu Primary, Chagamwe	1	1
Total	24	3

Although the study focused on the three Sub-locations directly neighboring the pipeline wayleave, the Chief and some representatives from Chagwamwe Location were also interviewed as the area might be affected indirectly by the pipeline construction works.

5.10. SOCIO ECONOMIC SURVEY

5.10.1. Socio-economic Status

Employment issues were a major concern in the area. Most youths lack employment and have become a challenge to the security in the area. More than 80% of the community stakeholders encountered were either unemployed or engaging in small businesses such as water vending and selling vegetables. Owing to this, most families are poor.

5.10.2. Crop production

The main crops under cultivation in the county include cassava, cucurbits family, maize, vegetables, millet and sorghum. These are most preferred due to their resistance to diseases and pests. The climatic conditions of the county make plants very prone to diseases and pests and therefore, highly resistant varieties are encouraged. The total acreage under food crop stands at 400 ha while the total acreage under cash crop is 500 ha. The County is generally a net importer of food and other agricultural products and this makes the cost of food high and inaccessible to most of the low-income earners. There is need to invest more in value addition for agricultural products and better post-harvest management systems and facilities. Livestock keeping and fishing is also practiced in the County.

5.10.3. Gender of Respondents

There was representation of gender at the survey of 50.5% male and 49.4% female.

5.10.4. Religious Following

Mombasa has a cosmopolitan population, with the Swahili people and Mijikenda predominant. Other communities include the Akamba and Taita Bantus as well as a significant population of Luo and Luhya peoples from Western Kenya. The major religions practiced in the city are Islam, Christianity and Hinduism. Over the centuries, many immigrants and traders have settled in Mombasa, particularly from the Middle East, Somalia, and the Indian sub-continent, who came mainly as traders and skilled craftsmen. Majority of the community members follow the Islam faith (79%) followed by Christians (21%). Being an area where industries are growing fast, the population growth is largely driven by commercial activities and therefore cosmopolitan.

5.10.5. Drinking Water Source

The County of Mombasa is severely deficient in reticulated domestic water supply. It is only able to meet 24% of its water demand, production being 43,000m³/day, against a demand of 182,000m³/day. The shortfall is as a result of an old water reticulation system which results in frequent breakdowns leading to water losses and disruption of supply. The other cause of water scarcity is the lack of water sources within the county. This is further complicated by the county's rapidly growing population. The water problem is negatively impacting development of the county as most of the industries are relocating their operations to other Counties. This has also led to the emergence of water vendors who not only sell water at exorbitant prices but also sell water whose quality has not been certified.

In the project area, most of the residents get their water from community water tanks installed by the County government and well-wishers within the community.

5.10.6. Source of Energy for Cooking

Majority of the community stakeholders who responded said that they use charcoal, kerosene and firewood for cooking. They stated that LPG was expensive thereby causing them to opt not to use it. Some had a notion that LPG is so dangerous and should not be used at home.

For cooking purposes, Table 16.0 below shows Paraffin (32,1%) and LPG (37.6%) as the most popular energy sources as is the case in Changamwe Sub-County. Charcoal follows with 23.2% and 18.8% in Mombasa and Changamwe, respectively (KNBS, 2019).

Table 22: *Distribution of Households by main type of cooking fuel*

Couty/Sub-county	Conventional Households	Type of Cooking Fuel (%)						Solar/Not Stated
		Electricity	Paraffin	Gas (LPG)	Biogas	Firewood	Charcoal	
Mombasa County	376,295	1.4	32.1	37.6	1	4.7	23.2	0
Changamwe Sub-County	46,439	1.2	38.8	38.8	0.7	1.6	18.8	0
Source: KNBS, 2019								

5.10.7. Source of Energy for Lighting

The Kipevu power plant produces power which is fed into the national grid. The county has a high potential for generation of solar and wind energy, but this remains unexploited. Though the area is connected to electricity supplied by KPLC, 52% of the questionnaire respondents stated that they use kerosene lamps. Approximately 38% are connected to electricity in their homes while

10% are connected to solar as their main source of lighting. Kerosene lumps are also a major contributor URTI. Sensitization of the community is required so as to make them appreciate the importance of using clean sources of energy for lighting e.g. solar and electricity.

5.10.8. Road and Railway Network

The proposed project site is situated within the Kenya Railways Corporation (KRC) land within the industrial area. The Plant site is close to other oil and gas installations including KPRL, Hashi, Oilibya and Total. The roads serving the project area are the Mombasa-Mariakani A109 Road and the Magongo Road both running east to west and then changes direction to northwards in Miritini Centre. The Magongo Road also end at Miritini. The road that leads to the site area from Magongo Road is made from concrete paving blocks.



Figure 9: The current site access road

5.10.9. Telecommunication

Within the industrial area is well served with proper communication network including mobile network (Airtel, Safaricom and Orange) and land line telephone network from telecom.

5.10.10. Electricity Supply

The SEASCAN Energy Limited site area is well served with electricity supply from the national grid. The proposed project site will also use the electricity supply to run its operations. A standby generator with the capacity to operate the facility will be installed.

5.10.11. Settlement Patterns

The houses are mostly semi-permanent. They are concentrated within the three villages surrounding the proposed project site. The locations are Kwa hola, Chaani and Port Rietz.

5.10.12. Employment Opportunities

There are a number of employment opportunities in the area. The area is home to many companies that carry operations from Miritini. However, based on the qualifications of the local community only a few are eligible for employment opportunities for positions that require formal education or skills. Majority can only offer services in the areas that do not require formal education or specialized skills.

5.10.13. Ethnic Groups

Different ethnic groups occupy Changamwe Sub county area. The groups are Mijikenda, Rabai, Luo, Luhya, Digo, Kikuyu etc. The majority ethnic group is Mijikenda.

5.11. Health Status

5.11.1. Most Prevalent Diseases

According to the 2015 Kenya National Malaria Strategy, although malaria prevalence has dropped in the country, from 11 to 8 per cent, it has increased from 4 to 8 percent in the coast. In 2015, the county reported 282,000 malaria cases in the health facilities across the county, translating to 23 per cent of all outpatient visits. Source: Daily Nation Tuesday April 26 2016.

According to Mombasa County Health at Glance report, HIV/AIDS, Tuberculosis and Malaria are the major diseases in the county as per Table 5 below.

Table 23: Showing Prevalent Diseases

Indicator	County 2012	County (2016)	Kenya (2016)
No. of people tested for HIV	259,638	267,427	7,161,215
No. of people living with HIV on antiretroviral treatment	26,442	28,075	561,225
Mother-to-child transmission of HIV (%)	7.9	9.1	8.5
Malaria test positivity rate (%)	22.9	54.0	41.0
Malaria cases ⁸ (per 100,000 people)	16,893	14,823	20,252
Malaria admission	3,646	1,287	179,966
Tuberculosis (TB) prevalence (per 100,000 people)	519	444	208
Tuberculosis incidence (per 100,000)	22211	186	79

Diseases common in the three villages surrounding SEASCAN Energy Limited site include Respiratory tract infections, Asthma, Ulcers, Diarrhea and Typhoid.

5.11.2. Disease Vectors

It was established during the consultation with the community that dust emissions is a concern and cause of coughs in a number of people. Others stated that pungent smell experienced from release of gas to the atmosphere could cause problems in breathing and even some alluded it to TB problem in the area. These were fears expressed by the public and not based on any scientific evidence.

5.12. Land Use and Land Tenure

Land-use planning is the process of regulating the use of land in an effort to promote more desirable social and environmental outcomes as well as a more efficient use of resources. By and large, the uses of land determine the diverse socioeconomic activities that occur in a specific area, the patterns of human behaviour they produce, and their impact on the environment. The approved land use of the proposed site is predominantly industrial. The industrial activities in Mombasa are located at Mombasa Island, Changamwe and Jomvu and a few industries are located at Bamburi. The overall land under industries is 1,230 hectares with an industrial worker density of 120 persons per hectare. The ISUD Plan (2015-2035) for Mombasa recommended an increase in the area allocated to industrial development to 2782 hectares.

Mombasa is strategically placed in East Africa, well connected with northern and central corridors connecting Mombasa with Kampala in Uganda, Kigali in Rwanda and Bujumbura in Burundi, and Dar-es-salam and Dodoma in Tanzania. The proposed 'Lamu Port-South Sudan-Ethiopia Transport' (LAPSSET) corridor (300kms in north of Mombasa) and ongoing International Freight Rail corridor - Standard Gauge Railway (SGR) provide Mombasa with the concept of a Compact City an opportunity to strengthen its connections further with neighbouring countries in the region. Thus, with the upgraded Port, Mombasa holds a strong potential to become a regional hub.

5.13. Population and Demography

In 2019, total population of the county was 1,208,333 persons comprising 610,257 males and 598,046 females. Looking at the Mombasa County population, its settlement patterns and growth trends, several issues emerge.

The size and composition of the population are important variables in the development of the local economy. Table 3.0 presents the population distribution in Mombasa and in Changamwe Sub-County with 1.2m people and 132,000 people, respectively. Changamwe Sub-County therefore hosts 11% of the County population (52% male, 48% female). Looking at the specific locations

affected by the proposed project, Kwa Hola Location has the highest population density (29,000/Km²), followed by Chaani Location (10,000persons/Km²), as compared to the County population density that is about 5,600persons/Km².

Table 24: - Population distribution by gender

Area	Total	% of Total	Male	% Male	Female	% Female	Area (Sq. Km)	% of Total Area	Persons per Sq. Km
Mombasa County	1,208,333	100%	610,257	51%	598,046	49%	219.9	100%	5,495
Changamwe Sub-County	131,882	11%	68,761	52%	63,121	48%	17.7	8%	7,457
Chaani Location	38,785	29%	20,474	53%	18,311	47%	3.9	22%	10,033
Kwa Hola Location	18,568	14%	9,530	51%	9,038	49%	0.6	3%	28,801
Port Reitz Location	65,496	50%	34,164	52%	31,332	48%	9.4	53%	6,950

5.14. Water Supply

5.15. Water Supply and Surface Drainage (Rivers and Streams)

They complement this water supply by getting water from a nearby spring. The stream that drains the project area passes on the eastern side of the site. It originates approx. 500m north of the project site. It passes approx. 200m on the eastern side and drains southwards to the sea.

5.16. Surface Water Drainage

The surface drainage at the proposed facility area is largely to the East and South East of the proposed site. The surface runoff water joins the stream that drains the area and proceeds southwards to the sea.

5.17. Water Supply for Operation Activities

The water that will be used for operations of the upcoming facility will be obtained from the current sources of spring water and from the Mombasa Water and Sewerage Company piped network.

2.13 Community Based and Non-Governmental Organizations (CBOs/NGOs)

The county has over 214 registered co-operative societies and a total membership of 35,987. The number of active women groups and youth groups in the county are 877 and 884 respectively while self-help groups in the county are 782. There are several NGOs in the county with the main ones being The Kenya Red Cross Society, Action Aid (K), World Vision, APHIA Plus Coast and Care International. These NGOs have played a critical role in supporting development issues (both social and economic) and also in mitigating disasters whenever they occur in the county.

Table 25: CBOs and Organizations Offering Services to the Community

#	Organization	Base/Focus
1	North Star Alliance	Provide long distance truck drivers, sex workers and surrounding communities with sustainable access to basic health care and safety through: <ul style="list-style-type: none"> □ Setting up of Roadside Wellness Centres (RWC) □ Provision of Health Care Services
2.	Action Aid	Community development
3.	United States Agency for International Development (USAID) and UNAIDS	HIV/AIDS education programme
4.	Care International	Community development

6. ANALYSIS OF PROJECT ALTERNATIVES

6.1. Background

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

6.2. Storage Type alternatives

During the initial conceptualization stages of the project, multiple storage mediums were considered based on several factors such as special constraints, environmental factors and economic benefits. The first step in selecting the storage type was to begin between determining which of the two below options would be utilized.

- Refrigerated Storage Tanks or
- Pressurized Storage Tanks

As per applicable standards and codes, Refrigerated tanks are ideal for large capacities of approximately 42,000MT or more. Pressurized storage tanks are applicable for capacities less than 42,000MT and the proximity to the port (10 km away from the discharge). In this case, lag pipes will be used. Following the selection of the pressurized tanks, the next stage was to determine the ideal storage type within the proposed project site. Due to several factors such as large communities based in close proximity i.e. within 1km, to the site, as well as available space considerations, the following storage types were considered:

- Caverns;
- Spherical Tanks;
- Aboveground Tank; and

- Mounded Bullets.

The cavern type of storage was not considered in great detail due to the required capacity not meeting the minimum threshold to utilize this form of storage. As for aboveground bullets, the site limitations in terms of space and excessive requirement of firefighting capacity mean that this too was eliminated before further analysis. The assessment was then left between LPG spherical tanks and mounded vessels. Below is a comparison of the two, discussing both the benefits and shortcomings of either form of storage.

6.3. LPG Spheres or LPG Mounded Bullets

The choice between a bullet and a sphere is a matter of economics and project logistics. So one is better than the other only in the matter of which has a cheaper overall installed cost and less of an environmental impact on the community. The sphere of course uses less material than a bullet for the same amount of liquid storage but is somewhat more difficult to fabricate. The diameter for shipping of a storage tank is in the order of 10 to 14 feet depending on the method of transport. This would limit a sphere's storage capacity if it is shop fabricated. For a 10 foot diameter tank, you can get 10 or more times the storage in a bullet than a sphere. For this reason, you usually only see spheres used for very large volumes (maybe in the order of 1,500m³ or more) because they must be field fabricated to compete with the bullet in cost. For smaller storage capacities, the bullets are preferred because they can be shop fabricated and more easily transported. Although the storage capacity here is greater than 1500m³, which allows for a further comparison, the effects on the environment and community should also be taken into consideration.

6.4. Advantages of LPG Mounded Bullets over LPG Spheres

- Lower initial investment and financial risk in case of LPG mounded vessels/storage tanks as compared to sphere of similar or larger volume;
- LPG sphere of similar volume requires more construction time as compared to LPG mounded vessels;
- LPG mounded vessels take lesser implementation time making the project more economical, easier to install and operate thus making turnaround time from designs to operation shorter than for spheres;

- LPG mounded vessels are much safer since their weight is distributed evenly over a larger area thus reducing chances of collapse as compared to spheres. This rings true for areas prone to earth quakes, cyclones and Tsunami;
- Furthermore, LPG mounded vessels an added advantage that the load is distributed over a larger area thus the problem of uneven settlement /collapse is diminished;
- In case of installations with mounded LPG vessels, if there is any problem/maintenance/repair/ breakdown of any one tank, then the tank can be isolated via shutting of relevant valves, allowing for operation to continue unimpeded, albeit with lesser capacity. Product can also be easily transferred from one tank to another thus increasing safety of the plant. In the case of spheres if there is any problem with the sphere or its valves or pipeline, then the entire plant comes to a standstill; and
- Though there is a common notion that for the same volume a sphere has the least surface area and least thickness and hence lesser weight and less cost, it has been established that the weight saved whilst construction spheres is negated due to the wastage in the development of various sections (petals and crown) thus leaving little or no benefit of the weight saved.

6.5. LPG Storage Technology alternatives

Project has advocated the procurement of environment friendly LPG through import, in order to meet the primary and secondary demands of energy sector. Currently, the majority in the rural regions prefers inefficient wood fuel and charcoal for supply of heat energy. The technology alternatives for importation, refining, storage, handling and transportation of LPG are limited and have been greatly reduced after the only refinery in the region, Kenya Petroleum Refineries Limited (KPRL), ceased operations a couple of years ago. This therefore means that the only source of supply for LPG in the region is through imports. This is widely viewed as the most cost effective option.

6.6. Alternative to Additional Import Pipeline Design

Alternative designs for various components of the pipeline and other infrastructure components have been subjected to cost benefit analysis to select the best option considering safety, environment and cost. The EPC contractor will incorporate the LPG line with appropriate modifications. This will include enhanced monitoring, leak detection, fire suppression and

firefighting. Enhanced evacuation mechanism will also be included in the safety procedures to be put in place to address occurrence of disaster.

CHAPTER SEVEN

7. ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT

Several environmental and social impacts (positive and negative) associated with the proposed project were identified through the use of experts' judgment and consultation methods. The following section highlights the impacts anticipated throughout the lifecycle of the proposed project. The associated impact assessment tables for each impact will be categorized according to project phases, prior to and post mitigation. Effects of activities are categorized as negative impact and or positive impact.

7.1. Assessment of impacts

Section one of this report presents the methodology used in assessing the potential impacts of the proposed project. The key impacts identified for the proposed project are highlighted according to the relevant project phases. The Consultant utilized precautionary principles to establish the significance of impacts and their management and mitigation.

7.2. Potential impacts of the proposed project

The proposed project is anticipated to generate the following impacts, however the significance of the impacts will range between minor to moderate before mitigation and will further reduce after implementation of mitigation measures:

- Soil Impacts
- Air quality Impacts
- Noise Impacts
- Impacts of waste generation
- Impacts on water resources
- Impacts on Biodiversity
- Socioeconomic impacts
- Health and Safety Impacts

7.3. Impacts on Soil

The proposed development is anticipated to have minimal impact on soil. The anticipated impacts are soil contamination by oil spills; and disturbance of project site top soil and geology during

excavation activities leading to soil erosion. Construction vehicles and equipment are likely to release fugitive spills to the soil. Depending on the size and source of the spill, liquid and gaseous phase petroleum hydrocarbons may remain mobile for long periods of time, and can potentially pollute groundwater. Exposed soil during construction and decommissioning phases are likely to be exposed to agents of erosions mainly water and wind.

During operation phase impact on soil is not anticipated because of the presence of the concrete paved surface over the LPG storage which will protect soil from agents of erosion as well prevent any potential contaminant from reaching the subsurface layers, and is thus not assessed.

Summary of characteristics and significance respectively of impacts on soil during the project cycle.

Table 26: *Summary of Soil Quality Impacts*

Project Phase	Impact	Significance
Construction Phase	Soil contamination; Soil erosion	Minor negative
Operation Phase	Not anticipated	N/A
Decommissioning Phase	Soil contamination and soil erosion	Minor negative

Table 27: *Summary of Soil Impact Significance*

Nature	Construction and Decommissioning activities will result in negative soil quality impact
Impact	Extent: The extent of the impact would be site specific as it is not likely to extend beyond the site boundary,
Magnitude	
Low	Duration: the impact will be short-term during construction and Decommissioning phases Intensity: The intensity of the impact will be low
Likelihood	There is likelihood that the impact will occur

Mitigation Measures

- The mitigation measures proposed for managing soil resources are:
- Minimise the areas to be excavated;
- Ensuring that vehicles/equipment used during construction and decommissioning phases are serviced regularly;
- Use excavated soils for backfilling while carry away excess soil for appropriate disposal.
- Carry out slope protection along the steep slopes to rehabilitate areas where excavation has taken place to prevent future collapse and erosion;
- Re-vegetating disturbed areas once construction and demolition works are completed during construction and decommissioning phases respectively.

7.4. Air quality

The existing air quality at the Project Site is influenced by industrial and traffic sources of air pollutants within the vicinity. The activities that influence air quality in the area include:

- Vehicle movement on nearby roads; and
- Current emissions from operations of current facility and the neighboring industries

The potential sources of emissions from the project during construction stage will include exhaust emissions from vehicles and equipment; odour from paint work; dust released from construction materials and excavated grounds.

During operation phase minimal exhaust emissions will be generated by trucks coming for bulk LPG from the facility and other company vehicles.

During decommissioning phase there will be exhaust emissions from vehicles and equipment used in demolition work and dust and odour from demolished materials/waste.

The above sources are anticipated to temporarily increase the local concentrations of particulate matter and exhaust gases but are likely to be short-term and localised. Dust generated during construction will be a health hazard to workers and project area community and could lead to chest problems, coughs, flu and have serious effects on asthmatic and sinus sufferers. Table 22 below present significance of air quality impacts during construction and decommissioning and operational phases, respectively of the project.

Table 28: Significance of Air Quality Impacts

Nature	Construction, Operation and Decommissioning activities will result in negative air quality impact
Impact Magnitude – Low	Extent: The extent of the impact would be local as it is likely to extend beyond the site boundary, but not beyond a 1 km radius from the site. Duration: the impact will be short-term during construction and decommissioning phases but long term operation phase as it will last life time of the Facility which is anticipated to be approximately 50 years. Intensity: The intensity of the impact will be low
Likelihood	There is likelihood that the impact will occur

Mitigation Measures

The mitigation measures proposed for managing air quality are as follows:

- Relevant legislative and Kenya Standard design requirements will be adhered to where appropriate;
- Vehicles and machinery will be regularly maintained;
- The speed of construction vehicles are to be controlled to avoid excess dust and smoke generation;
- Idling of vehicles and machinery is to be prohibited to avoid excess smoke generation;
- Water is to be sprayed during the construction phase on areas under excavation and dusty roads to reduce dust emission;
- Install standard leak detectors for hazardous area installations; and
- Any detected leaks will be repaired as a high priority.

7.5. Noise and vibration

The existing background noise environment at the Facility is typical of a commercial set up with moderately low levels of background noise dominated by noise from operational areas of the pump house, compressor shed and the standby generator areas where elevated noise levels were recorded.

Noise generated during the construction stage will be largely associated with heavy vehicles delivering and removing construction materials, and the operation of vehicles and equipment on-site. This will result in intermittent short-duration increases in noise levels within the immediate vicinity of the Facility during the daytime.

Table 29: *The Noise impacts during Construction phase*

Nature	Construction activities will result in negative noise impact
Impact Magnitude – Low	Extent: The extent of the impact would be local as it would likely extent beyond the site boundary, but not beyond a 1 km radius from the site. Duration: the impact will be short-term as it will only last the duration of mounded tanks installation and removal respectively. Intensity: The intensity of the impact will be low since ambient noise level are fairly high
Likelihood	There is likelihood that the impact will occur

5.5.1 Operation phase

Noise during operational phase is expected to come from vehicle coming to load LPG from the facility and is expected to be low and therefore not considered further in this section.

5.5.2 Decommissioning phase

Decommissioning phase of the Project will be mainly demolition of the facility and offsite disposal of removed materials. Noise generated during the decommissioning stage will be largely associated with the transit of heavy vehicles carting away materials, and the operation of vehicles and equipment on-site. As is the case with the construction phase, it will result in intermittent short-duration increases in noise levels within the immediate vicinity of the Site during the daytime.

Mitigation Measures

The following hierarchy of noise management will be applied to the extent that it is reasonable to do so:

- Avoid (e.g. locating an activity in an area that is not near a sensitive receptor). Minimise, in the following order of preference:
- Instruct machinery operators to avoid raving of engines;
- Carry out site preparation activities during the day;
- Use best available technology (e.g. noise abatement barriers or enclosures) and
- Post signs warning about high noise levels and the requirement to wear hearing protection.

SEASCAN Energy Limited and the Contractor will address noise nuisance, in the first instance, through complaints based process. Management and mitigation measures will be adopted to avoid environmental nuisance at any sensitive place. The mitigation measures proposed for managing acoustic quality are:

- Construction activities near sensitive places shall be restricted to normal working hours (typically 7.00 am to 6:00 pm, 7 days a week) unless otherwise agreed with the potentially affected stakeholder(s);
- Relevant legislative and Kenya Standard design requirements will be adhered to where appropriate;
- Adequate community notice of any scheduled, atypical noise events will be provided; and
- Equipment will be fitted with noise control devices where possible and appropriate

7.6. Impacts of waste generation

A review of the construction methodology and LPG facilities was carried out to identify the wastes likely to arise from the construction of the proposed project and potential environmental impacts associated with the handling and disposal of the identified wastes. Waste streams anticipated during construction phase will include: excavation spoil, general waste; construction waste and sewage and wastewater.

Waste anticipated during operation phase will include redundant pipes replaced during maintenance; empty paint containers and waste packaging from maintenance and repair material. And during decommissioning phase, the anticipated waste will included redundant equipment, decommissioned LPG tanks and piping, concrete boulders, and scrap metals. Table 24 and Table 25 below present characteristics and significance, respectively, of impact of waste generation during the project phases.

Table 30: Waste impacts characteristics

Project Phase	Project Aspect/activity	Impact type	Stakeholder /Receptor Affected
Construction phase	Waste generated from construction activities: domestic waste from construction works; and excavation waste	negative	Surrounding areas

Operation phase	<ul style="list-style-type: none"> □ domestic waste from operation personnel; □ waste generated from maintenance works such as redundant equipment, metal parts □ waste water from cleaning operations 	negative	negative
Decommissioning phase	□ Waste generated from demolition activities:	negative	Surrounding areas

Table 31: Waste Generation Impacts

Nature	Waste generated during construction, operation and decommissioning of the proposed development would result in a negative direct impacts if not managed properly.
Impact Magnitude – Low	<p>Extent: The extent of the impact is site specific.</p> <p>Duration: The duration would be short-term for construction and decommissioning phases waste as the impacts will not persist after construction and decommissioning phases respectively. However, impact of waste generated during operation will be long term- lasting the life of the project.</p> <p>Intensity: the intensity can be considered low as the work will be temporary.</p> <p>Similarly intensity of impact of waste generated during operation is low as they are not anticipated to occur on a daily basis or frequently</p>
Likelihood	There is a definite likelihood of waste generation throughout project cycle.
Impact significance	Low

Mitigation Measures

The waste management will be based on the objects and principle of waste and resource management hierarchy, that is that is, avoidance, re-use, recycling and disposal of waste. The mitigation measures proposed for managing waste generated from the project are:

Develop strategies (waste management plan) for management of specific waste streams prior to construction phase.

Provision of toilet facilities for use by the contractor staff and other workers during construction and operation phases respectively;

Provision of solid waste collection bins to all the operation areas; the waste is segregated and collected for disposal at a designated site approved by Mombasa County Government and NEMA;

Sensitization of the contractor staff and other workers on the appropriate usage of the bins including a programme for regular disposal;

Stockpile and salvage reusable and recyclable wastes, such as timber skids, fibre/nylon rope spacers, pallets, drums and scrap metals.

Store hazardous wastes such as used oils and other chemicals in bunded areas away from watercourses.

Collect and remove (via NEMA approved waste handler) waste from site for recycling, reuse or disposal at facility licensed to accept such wastes.

All personnel will be instructed in project waste management practices as a component of the environmental induction process.

All litter and general waste disposal will be at a local municipal landfill utilizing an approved waste contractor.

Records of all controlled wastes stored, and removed from site will be maintained.

Safety and response training will be provided for all personnel.

Materials and equipment for responding to hazardous spill incidents will be provided and maintained.

7.7. Residual Impacts

If wastes that can be reused or recycled are recovered, if all those that are supposed to be disposed are disposed of correctly and if the quantity of the remaining wastes that need to be deposited at the landfill/dumpsites can be minimized, the residual impact associated with wastes generated the project should be of minor significance and of a short-term duration. The Proponent also undertakes to comply with IFC Performance standard 3 of Resource efficiently and pollution prevention throughout the project's life cycle. Project has advocated the procurement of environment friendly LPG through import and storage in mounded LPG Bullets in order to meet the primary and secondary demands of energy sector. The reliability and adequacy of the supply

of LPG shall guarantee sustainable development and reduced reliance on wood fuel attributed to increased indoor air pollution causing Upper Respiratory Tract Infections (URTI) thus protecting the environment from overexploitation and degradation.

7.8. Water resources

The impact on water resources during project cycle are likely to arise through the following ways: use of water during construction and operation; and contamination of water during the entire project cycle. Water will be required during construction phase to provide drinking water for construction staff; concrete batching and dust suppression. Contamination of water during construction project phase may be caused by:

- Oils and grease from vehicles and equipment/machines used at the construction sites;
- Left over materials and waste containers that may have been holding classified materials for construction;
- Petroleum products and other chemicals released by trucks; and
- Sanitary and domestic waste from the construction camp.

During operation phase, water will be required for firefighting, welfare and hygiene and cleaning. Water contamination during this phase could arise from waste storage and handling and releases occasioned by abnormal events such as fire. There will be a potential for oil and fuel spills during the operations of the pipeline. Fuel handling equipment will be required for refueling of boats visiting the jetty and inspecting the pipeline. Oil and fuel spills have a negative impact on marine ecosystems for example oil spills cause hypothermia, poisoning and internal damage, increased predation, bio- accumulation in food chains and fouling of habitats. Outboard engines mounted on boats have long been associated with polluting of waterways through passive discharge of fuel and lubricants.

During decommissioning of the facility the decommissioning of vessels and associated pipework; and removal of piles and foundation could cause contamination of water resources.

Table 32: *Characteristics of Impact on water resources*

Project Phase	Project Aspect/Activity	Impact type	Stakeholder/Receptor Affected
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Construction Phase	<ul style="list-style-type: none"> □ Water usage – drinking, concrete batching and dust suppression □ Water contamination 	Negative	Local Water Resources
Operation Phase	Water usage-firefighting, drinking and cleaning Refuelling of boats visiting the jetty	Negative	Local Water Resources
Decommissioning Phase	Contamination of Water by demolition Waste	Negative	Local water resources

Table 33: Significance of Impacts of Water Resources

Nature	Some activities during construction and decommissioning phases would result in contamination of water resource.
Impact Magnitude – Low	<p>Extent: The extent of the impact is site specific.</p> <p>Duration: The duration would be short-term for construction and decommissioning phases and long term for operation phase.</p> <p>Intensity: the intensity can be considered low as the work will be temporary.</p>
Likelihood	There is a definite likelihood of impact on water resources.
Impact significance	Low

Mitigation Measures

- Develop strategies for management of water resources;
- Regular checking and maintenance of all plant and machinery to minimize the risk of fuel or lubricant leakages;

- Storing hydrocarbons, fuels, lubricants and chemicals to be used in bunded and lockable oil storage tanks, with hoses and gauges kept within the bund;
- Preventing wet concrete and cement from entering watercourse;
- Stockpiles to be kept away from watercourses;
- Prepare a spill contingency response plan and procure appropriate equipment for oil and fuel spill management;
- Develop a water quality monitoring programme for the channel in collaboration with relevant lead agencies; and
- Procure an oil spill response kit and build capacity of staff to respond effectively to potential oil spills;

7.9. Residual Impacts

With the application of the mitigation measures described previously, No significant impacts are likely to occur during construction, operation and decommissioning phases.

7.10. Impacts on Biodiversity

The construction of the pipeline and associated dredging works will result in albeit to a small extend the loss of the sub tidal seabed and the mangrove forest that provide habitats for organisms such as crabs, brittle stars, worms, starfish, sea urchins, etc. Preparatory work for excavations for the placement of the pipeline from the jetty will result in clearance of mangrove patch thus impacting negatively on the integrity of ecosystems that serve as critical habitats to a wide range of marine organisms. This will in turn affect marine fauna such as fish and crustaceans.

Temporal deterioration of water quality due to the increase of turbidity and suspended solids related to dredging activities can negatively affect the functioning of light-dependent organisms such as phytoplankton, coral polyps and visual predators, e.g. fish.

Compliance with IFC Performance standard 6: Biodiversity conservation and sustainable management of living natural resources. This performance standard shall be triggered since there exist biodiversity in the Project including the mangrove forest strip in the project area which according to the IUCN plants Redlist (2014) found 11 out of 70 mangrove species threatened with

extinction. Mangroves form one of the most important tropical habitats that support many species, and their loss can affect marine and terrestrial biodiversity much more widely.

The contractor is to be informed to carry out a survey of the channel to identify as far as practical areas that have low densities of mangrove for the placement of the pipeline. As part of the site restoration after construction activities, there is going to be concerted effort to plant mangrove trees to enhance the project area biodiversity. Local community will also be sensitized on the importance of environmental protection and conservation of the natural vegetation.

Moreover, the proposed project aims to increase the supply capacity of LPG to industrial, commercial and residential customers throughout Kenya and East Africa thereby promoting reliance on LPG as opposed to wood fuel and charcoal in order to enhance the biodiversity and environmental conservation.

Table 34: *Characteristic of Impacts on biodiversity*

Project Phase	Project Aspect/activity	Impact type	Stakeholder /Receptor Affected
Construction phase	<input type="checkbox"/> Cutting down Mangrove vegetation	negative	Biodiversity
	<input type="checkbox"/> Dredging activities		
Operation phase	<input type="checkbox"/> Introduction of invasive species	negative	Biodiversity
Decommissioning phase	<input type="checkbox"/> Trampling of vegetation	negative	Biodiversity

Table 35: Significance of Impacts on Biodiversity

Nature	Some activities during construction and decommissioning phases would result in loss of biodiversity.
Impact Magnitude – Low	<p>Extent: The extent of the impact is site specific.</p> <p>Duration: The duration would be long-term for construction and decommissioning phases.</p> <p>Intensity: the intensity can be considered low as no threatened species were Recorded.</p>
Likelihood	There is a definite likelihood of impact on biodiversity.
Impact significance	Low

Mitigation Measures

Construction work will be short term and localized to a particular area;

- Excavation for placement of pipeline should be undertaken during low tide period;
- Use of efficient excavation machinery and best technology so as to facilitate uptake of excavated soil materials and disposal in less sensitive areas of the sea;
- Ensure that site machinery have no leakage of oil or other lubricants. Oil change and machinery servicing shall be undertaken onshore; and
- Invasive species monitoring and control should be done during and immediately after the construction phase to keep the existing population in check. Plants should be controlled before they reach maturity and gain more germplasm for future proliferation.

7.11. Health and safety

7.11.1. Occupational health and safety

The development of the proposed facilities involves a number of activities that pose potential health and safety risks to the workers. The workers are potentially exposed to risks as a result of

working a height, operating tools and equipment and exposure to dust. During the construction phase, the potential H&S risks include:

- Exposure to excavation dust;
- Hazards of falling objects; and
- Occupational hazards when working at height.

The potential occupational health and safety impacts anticipated for operation phase include: injuries to workers from preventive and corrective maintenance especially of electrical equipment, work at heights and workers with boats using the channel especially at night.

During decommissioning phase, the potential H&S risks include hazards of falling objects; work at height hazards, injuries from operating tools and equipment.

Table 36: *Characteristic of Impacts on Health and Safety*

Project Phase	Project Aspect/activity	Impact type	Stakeholder /Receptor Affected
Construction phase	Construction activities, operation of construction equipment and tools.	negative	Construction workers
Operation phase	Undertaking preventive and corrective maintenance.	negative	Operation phase personnel; contractors hired to undertake maintenance
Decommissioning phase	Demolition activities, operation of demolition equipment and tools	negative	Local water resources

Table 37: *Significance of Impacts on Health and Safety*

Nature	Some activities during construction, operation and decommissioning phases would result in health and safety impacts.
Impact Magnitude – Low	Extent: The impacts will affecting the personnel involved in the respective phases of the project Duration: The duration would be short-term for construction and decommissioning phases and long term during operational phase. Intensity: the intensity can be considered low.
Likelihood	There is a definite likelihood of impact on health and safety.
Impact significance	Low

Mitigation Measures

In order to mitigate health and safety impacts associated with the project, the Proponent will develop and implement occupational health and safety plan. Mitigation measures shall include the following:

- Appropriate lighting shall be deployed at night marking the boundaries of the construction area to avoid accidents;
- The contractor and proponent will comply with the Occupational Safety and Health Act No. 15 of 2007 i.e. by insuring the construction workforce and providing training and PPE;
- The pipeline ROW being a wetland, the proponent will have to comply with the provisions of Legal Notice No.19 of 2009 (Rev. 2017) and other legislative measures imposed by relevant lead agencies such as Department of Fisheries and the Kenya Maritime Authority; and
- First aid services and an emergency vehicle to be readily available at site;

The Proponent is recommended to enforce the existing H&S operation procedures for minimizing potential health and safety impacts. During construction phase, the Proponent is recommended to ensure that toolbox talks are done every day. Toolbox talks address actual and anticipated safety concerns for scheduled project work. The talks provide an opportunity to relate specific safety concerns with the jobs to be performed.

Compliance to IFC Performance standard 4: Community Health, safety and security This performance standard has been triggered by the nature of the proposed project that causes great public concern especially in the event of a major disaster such as explosions and fire outbreaks. Liquefied Petroleum Gas is a highly flammable product and can be detrimental to the public safety if measures are not put in place. The Proponent in conjunction with the Contractor and the community shall implement a health and safety plan that shall include:

- Adherence to OSHA 2007 Act and its subsidiary legislations to ensure that health and safety of immediate neighbors and the public is not threatened;
- The Contractor to ensure that construction work is undertaken in manner not likely to pose risks to community health and safety;
- The Proponent to undertake an independent quantitative risk assessment prior to operation of the facility. The findings of this assessment will inform the development of an emergency safety plan;
- The Proponent to create awareness among the neighbors on the community safety and security procedures; and

- The Proponent will also assist and collaborate with the neighboring Communities, County government and the neighboring facilities in their preparations to respond effectively to emergencies.

7.12. Socio-economic

7.13. Impacts Positive

The proposed project will generate job opportunities (skilled and unskilled Labour) during construction, operation and decommissioning phases. It is anticipated that proposed project will provide opportunities for local employment and service provision, such as the use of local transport companies and sourcing of some construction materials locally. There is also likely to be trickledown effect results from the employment opportunities as well as services provided by the facility. The positive socio-economic impacts of the project are identified in the Table below:

Table 38: Positive Socio-Economic Impacts

Project Phase	Project Aspect/ Activity	Impact Type		Stakeholder/Receptor Affected
Construction Phase	Creation of employment Creation of Business Opportunities	Direct, induced impacts	Indirect positive	Construction personell and Local and internal suppliers
Operation Phase	Reduction in Deforestation Reduced cost of LPG gas Catalyst for development	Direct, induced impacts	indirect positive	Operation personell and Local suppliers
Decommissioning Phase	Employment	Direct, induced impact	Indirect positive	Demolition personell

These positive impacts are as follows;

- Generate employment opportunities for skilled, semi-skilled workers and unskilled workers including women, youth and PWDs.
- Increased incomes for community members as new LPG business opportunities emerge. Better standards of living (84% of respondents).

- Increased forest cover / Reduced environmental degradation (Mangrove forest recovery, cleaner air) into the future
- Reduced health problems among women and children owing to cleaner, more easily accessible and less time consuming cooking energy
- LPG saves time for women and girls who spent many hours in a day fetching firewood and cooking with biofuels. This time will be invested in educational, business development and other productive activities that develop them and their families
- LPG will spur industrialization thus boost the County and regional economy. i.e. cottage industries, hotels and hospitals to use LPG for heating and cooking. Better services to residents by County Government
- More LPG energy a products entering the market will present different options to choose from, create competition and hence lower product prices. More savings, business expansion and greater investment capacity.
- A more informed community on LPG use will contribute to an expanded LPG market and greater local and national economic growth
- Interaction of local community and incoming project workers to result in creased business opportunities, intermarriage, exposure and cultural exchange.
- Employment opportunities for PWDs during the project cycle; their participation in the Complaints Redress Committee to advocate for a PWD friendly work environment.
- CSR projects to benefit communities and particularly the vulnerable groups - youth, women and PWDs

7.14. Negative Impacts

It is anticipated that proposed project will result in behavioral change among the construction crew and the residents as they socialize. The result may be upsurge in prostitution, family break ups, and sexually transmitted diseases including HIV/AIDS. Employment of "outsiders" rather than local residents, may create tensions causing disruptions thereby affecting project implementation. The negative socio-economic impacts of the project are identified in the Table below:

Table 39: Negative Socio-Economic Impacts

Project Phase	Project Aspect/Activity	Impact type	Stakeholder/ Receptor Affected
Construction Phase	Prostitution, family break ups and sexually transmitted diseases including HIV/AIDS Employment of outsiders	Indirect induced negative impacts	Construction personnel Local host community
Operation Phase	Employment of outsiders in skilled areas	Indirect induced negative impacts	Operation personnel Local host community
Decommissioning	Employment of outsiders in skilled areas	Indirect induced negative impacts	Demolition personnel Local host community

Mitigation Measures

In order to mitigate socio-economic impacts associated with the project and to avoid negative impacts and to comply with the relevant policies and laws, the Proponent will develop and implement socio-economic plan including the following mitigation measures:

Table 40: Negative impacts and mitigation measures

General Negative Impacts	Mitigation Measures
Short term Impacts	
Heavy dust and fumes emissions by construction trucks and machines causing air pollution, respiratory and eye diseases (90% of respondents).	Cover waste/sand/murram transportation trucks to suppress dust emissions Water the construction sites to reduce dust emissions Regular maintenance of vehicles and plant equipment
Increased noise levels due to excavations and vibrations as well as transport vehicles	Erect noise buffers on noise emitting areas Alter working hours or days i.e. excavations near a school or hospital on weekends or at night.
Displacement / temporary closure of markets, relocation of businesses thus loss of business and therefore source of livelihood	Adequate notice period to relocate business wares and structures, minimize damages Compensate traders for damages, time and income lost Hasten the construction process to reduce period of inconvenience/length of impacts
Reduced sales for firewood, charcoal and kerosene for 7% of respondent traders as LPG usage and outlets increase (12% of respondents).	Community sensitization for update of LPG business opportunities and LPG driven enterprises

<p>Death of aquatic life including fish and therefore reduced income by fish vendors.</p> <p>This may be due to ocean water pollution by soil and oil spills during excavation for pipeline construction.</p>	<p>Emergency preparedness and response in case of oil spills to prevent or minimize damage</p>
<p>Environmental pollution and disease outbreaks due to poor management of domestic waste at workers residential quarters</p>	<p>Provision of waste collection bins on site and agreement with public water and sewerage company for regular collection or local garbage collection companies.</p> <p>Train workers on domestic waste separation.</p> <p>Water supply</p> <p>Provide adequate water supply at the Plant site for workers from the Mombasa Water & Sewerage Company.</p> <p>Enter into an agreement with private water vendors for wayleave construction works.</p>
<p>Illegal dumping of construction waste in public utility areas, cultural physical assets and schools blocking access, causing inconvenience, longer walking distances, and land pollution.</p>	<p>Complaints Redress Committee (CRC) established including local community representatives</p> <p>Appropriate and efficient waste disposal i.e. contract local youth groups for appropriate disposal</p> <p>Protect through fencing off social amenities such as community and school playgrounds, burial sites, other idle public utility land (i.e. Mazunguka burial site and religious places)</p>
<p>Flooding of storm water due to blocked drainage channels</p>	<p>Construction of temporary water drainage channels before blocking existing drainage system.</p>
<p>Traffic congestion, obstruction and accidents causing increased travel time and cost (63% of community respondents)</p>	<p>Diversions / alternative access road be provided with clear road signs; maintain road to remain passable and environmentally friendly to users; provide traffic management staff.</p> <p>Phased construction to reduce level (scope) and length of impact</p>
<p>Destruction of water pipes or disruption of water supply, sewer and power lines</p>	<p>Adequate prior notice to PAPs to stock water, charge lanterns in preparation for the disruption.</p> <p>Immediate relocation of pipes, sewer and power lines where prolonged delay is expected to reinstate services.</p> <p>Phased construction (one section at a time) so that not all areas are affected at the same time. Reduces the impact i.e. the inconvenience</p>

Water shortage for community use due to competition with construction works.	Proponent to secure meter connection on a main line to avoid inconveniencing community members. Get alternative/supplementary water supply from private vendors
Medium term impacts	Mitigation Measures
Possible gas leaks at Plant or wayleave	Quality control of products Install gas leak detectors and install necessary management facilities Insure workers and property Community sensitization on dangers of doing business with open fire on the wayleave. Partner with EPRA, OSMAG, KPA, KPC, KPRL, NEMA for effective response Ensure continuous monitoring of lines and the line parameters
Social decadence - drug abuse and alcoholism, immorality, rape, unwanted pregnancies and early marriages owing to community interactions with project personnel and traders who may come as a result of the project.	In collaboration with Government and NGOs: - Community/youth education and awareness raising on social morals - Measures for child protection be put in place to ensure safety of children including in the police stations.
Increased prevalence of commercial sex, abortions, HIV/Aids and STIs, marriage breakdown	Counselling and sensitization on good social behavior; HIV&Aids counseling and treatment; family planning and counseling in partnership with other players
Occupational hazards such as equipment operation related accidents, falling objects and falling into trenches, causing short term injuries on workers and residents during construction at the Plant site or on the wayleave. No hospitalization.	Accident and medical insurance covers for workers Provide protective gear to workers and ensure proper usage Cover trenches and holes; hire security personnel for protection against theft and other security issues. Provide emergency response facilities & health personnel at construction site i.e. health clinic, ambulance, counselling services Hired qualified personnel Regular refresher training of workers on equipment use, safety measures and emergency response Fence off/enclose construction sites to isolate the public (i.e. onlookers and children)
Long term Negative Impacts	

Accident causing Injury of worker(s) leading to permanent disability requiring hospitalization or death	Life insurance Trained medical personnel, health clinic, ambulance and other facilities Counseling services for stress management
Potential fire on Plant site on the existing pipelines on the wayleave during construction of new pipeline	Train staff on emergency preparedness Install fire fighting equipment, adequate water supply, security cameras and fire detectors as required by EPRA, DOSH and NEMA. Establish partnerships with other LPG emergency response teams (i.e. OSMAG), security agents and community to save time and cost, and reinforce safety and security measures Insurance cover for LPG plant, pipeline, and workers Sensitize community on and train community representatives on fire fighting Community sensitization on LPG cylinder use; train community responders for effective emergency response in case of fire outbreak.
Demolitions and relocation in case the wayleave will be expanded to accommodate the proposed pipeline.	Adequate notice and consultation with PAPs and government institutions on relocation and/ or resettlement plans Undertake a proper Resettlement Action Plan if need be Compensation and facilitation to move. Adhere to World Bank/IFC and GOK NEMA regulations at every step.
Negative Impacts Specific to the Proposed Plant Site	Mitigation Measures
The proposed Plant Site lies in an area with KRC sidelines going into KPRL compound, to the combined warehouses and to the parking ramp near Mega Garments Factory on the Eastern side. The sidelines will be destroyed during construction of the Plant.	Negotiate with KRC for compensation reinstatement should KPRL, warehouses and other businesses desire to use the KRC MGR services in the future.
KRC rail lines require a 30m wayleave, which will be reduced to less than 10m if the site is leased out to the LPG plant proponent. This	Seek alternative site that provides the required space between KRC and the proposed LPG Storage Plant

compromises the safety requirements of KRC and EPRA requirements for LPG plants - potential fires, traffic accidents	
KRC is currently packing fuel for Vivo, AGOL and Nanyuki Light, highly inflammable. Having LPG bullets (tanks) so near is a safety risk.	Seek alternative site that provides the required space between KRC and the proposed LPG Storage Plant
The only entry/exit road into KRC Station from Mombasa Road (A109) is too narrow to accommodate heavy vehicles into or out of the Plant site.	Negotiate with KENHA for expansion of the entry/exit section of the KRC road into the highway and for creation of accelerating and decelerating lanes to allow construction vehicles easily exit into and out of KRC land Erect speed bumps before KRC entry/exit point to prevent possible accidents Seek alternative entry road to the Plant site i.e. create a road from the EPZ Mega Garments side that can be used by all KRC clients from the Eastern side. Negotiate an exit road via KPRL property
This KRC entry road also crosses over eight rail lines and the main lines. Regular use by heavy tankers will destroy the rail lines and thus affect KRC service provision to its clients.	Seek alternative entry road to the Plant site i.e. create a road from the EPZ Mega Garments side that can be used by all KRC clients from the Eastern side. Negotiate an exit road via KPRL property
Proposed project location might deny access to existing and potential KRC MGR transport clients including factories, warehouses, farmers and other oil and petroleum depots.	Allow use of the new proposed road on the eastern side by other KRC clients
During Operation Phase	
Short-term / Less severe	Mitigation measures
Domestic fires leading to loss of property, injury and death	Train communities on LPG cylinder handling and gas use at home Train community responders for effective emergency response in case of gas leakage Support Changamwe Fire Station with functional fire-fighting

	equipment, staff refresher training and in community areas, water hydrants in designated hotspots Encourage LPG dealers and outlets to install fire extinguishers and train them on fire fighting.
Risk of fire explosions at plant site or on wayleave	Life and Medical Insurance cover for employees and property Adequate fire handling equipment and detectors on site; regular staff safety and fire fighting trainings Collaboration with security agents, and other LPG players for effective response
Risk of gas leaks during construction	Life insurance cover for workers and property Gas leakage detectors and management equipment on site Liaison with security agents, other LPG players and neighboring business community for synergies
Occupational hazard causing death of worker	Life insurance cover for employees Health & Safety PPES provided to staff and use enforced Well-equipped health clinic & trained staff on site or nearby Landscaping after closure of a site
Tanker Movement – Possibility of incidents on railways crossing.	Have in place safe working procedures Have competence in monitoring for risks and implementation of mitigating measures Observe safety as provided in the railways safety rule book Install booms, traffic lights and personnel to operate.
The Mombasa Integrated Urban Development Spatial Plan (IUDSP,2025) proposes establishment a township at Kwa Jomvu. Housing densities are projected to increase putting pressure on the available interior road infrastructure leading to increased traffic densities and congestion on these roads.	Expand the existing roads serving the industrial area and its neighborhood
Potential for accidents and LPG explosions during transportation by road	Use of the KRC Meter Gauge Railway line (plans underway for its renovation) for LPG transportation is safe and cheaper

Entry/Exit road into the A109 Mombasa road is inadequate to move LPG products during the operations phase. Can cause obstruction, traffic congestion and accidents, at the exit/entrance	Create a road from the EPZ Mega Garments side that can be used by all KRC clients from the Eastern side
Decommissioning Phase	
Deep trenches and holes appearing on construction camp sites	Proponent to restore construction camp sites back to their original state i.e. through landscaping.
Construction materials waste strewn all over the sites	Appropriate waste disposal
Domestic waste remaining at workers camps	Waste disposed appropriately

- Carrying out sensitization on health issues facilitation of preventive measures to site workers and truck drivers for protection against diseases that can be transmitted through sexual contacts;
- Maximize local employment. Local residents are looking forward to employment opportunities, especially women and youth; and
- Ensure meetings to discuss and address emerging issues are held regularly (every week and at the beginning then monthly when the project has picked up.

Compliance to IFC Performance standard 2: Labor and working conditions

The Proponent undertakes to observe International Labor Organization (ILO) and the United Nations (UN) labour laws in addition to compliance which has been domesticated under the Employment Act, 2007. The Proponent shall seek:

- To promote the fair treatment, non-discrimination, and equal opportunity of workers;
- To establish, maintain, and improve the worker-management relationship;
- To promote compliance with national employment and labour laws such as non-engagement of child labour;
- To protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the client's supply chain;

- To promote safe and healthy working conditions, and the health of workers;
- To avoid the use of forced labour; and
- During construction phase, the Contractor will be encouraged to source where possible labour from the local community.

7.15. Cumulative impacts

Cumulative impacts are impacts of an activity that in themselves may not become significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area. The proposed construction of the Proposed Project facility will attract people to the project area. The area going to experience improved economic activity. This will include gradual increase of project area population seeking opportunities. The potential cumulative impacts will include:

- Progressive increase in demand for water for operations;
- Progressive congestion and constraints to the few available health facilities in the Project area;
- Potential Progressive increase in impacts from trucks collecting LPG from the facility;
- Progressive increase in persons visiting the facility;
- Progressive increase in the quantity of generated waste; and
- Potential increase in water and air pollution.

Mitigation Measures

In order to mitigate cumulative impacts associated with the project and to avoid negative impacts, the Proponent will develop and implement Corporate Social Responsibility plan in consultation with the relevant authorities and institutions operating in the area including the following:

There is need to facilitate the putting up of a health facility in the project area so as to assist the workers and the community;

- The largest contribution to respiratory disease occurrence is the use of wood, charcoal or kerosene as a source of cooking energy and kerosene lamp as source of lighting energy due to the amount of smoke produced and the presence of excessive dust in the project area. The local community need to be sensitized on the dangers of using firewood a source of cooking energy and kerosene lamp for lighting. The benefits of using clean

energy for lighting like solar energy for lighting and LPG for cooking need to be highlighted; and

- The community need to be encouraged to promote regular tree planting to enhance project area biodiversity.

CHAPTER EIGHT

8. ENVIRONMENT MANAGEMENT PLAN

The Environment Management Plan is an important process of ensuring project sustainability and environmental and social protection. Whereas efforts are usually made to develop mitigation measures for a proposed project, it is during the operation lifespan of the project that actual impacts are noted or experienced.

It is therefore important to integrate in the environmental and social impact assessment process, an environment monitoring and management plan that includes the monitoring of the progress of mitigation measures being implemented while also monitoring the project for any new negative impacts that were not earlier considered or anticipated.

The proponent shall ensure that the Contractor understands and implements all specified mitigation measures during the construction period. The proponent's Supervising Engineer is responsible for assessing the Contractor's Environmental and Social Management Plan and internally implements the Management Plan to ensure that the Environmental and Social Impacts are monitored and managed in an environmentally and socially acceptable manner.

Monitoring systems should be set up by the Proponent during the operational phase, so that potential environmental problem areas can be detected well in advance and the appropriate remedial action carried out. The Proponent shall have a checklist of items that need to be monitored as a matter of routine or periodically over agreed intervals, depending on the nature of the aspect to be monitored. The types of parameters that can be monitored may include proposed mitigation measures or design features, or actual impacts. Depending on the nature of impact or aspect to be monitored, monitoring can be done as part of routine or periodic maintenance. However, socio-economic and ecological parameters can be effectively assessed over a longer time span.

8.1. Environmental and Social Management Plan

Environmental monitoring is an integral part of the environmental management process.

It rationally completes the process that begins with establishing the environmental baseline condition followed by carrying out the Environmental and Social Impact Assessment then Implementation of Mitigation Measures and Monitoring the success of those measures.

The Environmental and Social Management Plan (ESMP) is provided in Table 35 below:

Table 41: Environmental and Social Management Plan (ESMP)

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

2.	Clearing of Proposed Project site vegetation	Vegetation damage, and invasion by exotic species	<ul style="list-style-type: none"> - Maintain native mangrove cover by selective removal of trees which cannot be incorporated in the project design by use of manual clearing techniques; <p>This is in line with:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Environmental Management and Coordination Act (EMCA), 1999 Amended 2015 <input type="checkbox"/> OP 4.01 Environmental Assessment 	SEASCAN Contractor	<input type="checkbox"/> Existing mangroves incorporated in the Constructed Site area	Approx. 600,000/=
3.	Clearing of Proposed site Project vegetation	Generation of Solid Waste	<ul style="list-style-type: none"> - Contractor to provide strategically located solid waste collection container (skip); - Collect together all generated waste from site clearing; - Transport and dispose all waste away from site; - Liaise with the County government on suitable dumping site for spoils; <p>This is in line with:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Environmental Management and Coordination Act (EMCA), 1999 Amended 2015, <input type="checkbox"/> Water Act 2012 and Public Health Act, Cap 242 <input type="checkbox"/> OP 4.01 Environmental Assessment 	SEASCAN Contractor	<input type="checkbox"/> Presence of waste collection bins <input type="checkbox"/> Contract with NEMA Registered Waste Disposal Firm	Approx. 100,000/= for waste collection bins 10,000/= per month for Waste Disposal

4.	Clearing of Proposed site and Project vegetation	Noise pollution (excess noise and vibration)	<ul style="list-style-type: none"> - Use of noise reduction/ hearing protection devices when working with noisy equipment; - Use of serviceable chain saws (low noise emission); - Instruct machinery operators to avoid revving of engines; - Carry out site preparation activities during the day; <p>This is in line with</p> <ul style="list-style-type: none"> □ Environmental Management and Coordination Act (EMCA), 1999 Amended 2015; □ Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 □ OSHA Act, 2007. <p>OP 4.01 Environmental Assessment</p>	SEASCAN Contractor	<ul style="list-style-type: none"> □ Records of machine and vehicle maintenance □ Availability and use of Ear Muffs 	Approx. 200,000/= for Provision of noise pollution
5.	Clearing of Proposed site Project vegetation	Sanitary other Domestic Waste	<ul style="list-style-type: none"> - Provide site clearing workers with solid waste bins for their use; - Ensure site has toilet facilities; - Sensitize workers on site cleanliness and hygiene <p>This is in line with:</p> <ul style="list-style-type: none"> □ Environmental Management and Coordination Act 1999 Amended 2015 □ Water Act 2012 	SEASCAN Contractor	<ul style="list-style-type: none"> □ Presence of waste bins and Toilets for use by workers 	Approx. 400,000/= for provision of Sanitary and waste collection facilities.

			<input type="checkbox"/> OP 4.01 Environmental Assessment <input type="checkbox"/> Public Health Act, Cap 242			
Construction Phase						
1	Soil Excavation at Proposed Project site	Soil Erosion	<ul style="list-style-type: none"> - Excavated soil is to be used for backfilling excavated areas while excess soil is disposed of off-site; - Soils are not to be left exposed to wind/water; - Soil erosion is to be reduced and river valley protection enhanced. <p>This is in line with:</p> <input type="checkbox"/> Environmental Management and Coordination Act 1999 Amended 2015 Water Act 2012, OP 4.01 Environmental assessment	SEASCAN Contractor	<input type="checkbox"/> Ground cover in constructed areas <input type="checkbox"/> Quality of surface water at the site and in the neighboring rivers, <input type="checkbox"/> Water abstraction permit.	Part of Construction Obligation
2.	Construction of the Proposed Project site	Air Pollution (dust, fuel and	<ul style="list-style-type: none"> - Control speed of vehicles and Prohibit idling; - Spray water during construction; - Maintenance vehicles & equipment regularly; 	<input type="checkbox"/> SEASCAN <input type="checkbox"/> Contractor	<input type="checkbox"/> Records of machine and vehicle maintenance	Approx. 500,000/= for air pollution prevention

		smoke emissions)	<ul style="list-style-type: none"> - Provision of dust masks for use in dusty conditions; - Use serviceable vehicles/machinery to reduce smoke; <p>This is in line with:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Environmental Management and Coordination Act 1999 Amended 2015 <input type="checkbox"/> Occupational Safety and Health Act (OSHA) 2007 <input type="checkbox"/> OP 4.01 Environmental Assessment; <input type="checkbox"/> Public Health Act, Cap 242 		<ul style="list-style-type: none"> <input type="checkbox"/> Availability and use of Noise Masks <input type="checkbox"/> Low dust generation during construction 	
3.	Construction of the Proposed Project site	Excess noise and vibration	<ul style="list-style-type: none"> - Use noise hearing protection devices when working with noisy equipment or noisy environment; - Use serviceable equipment with low noise emission; - Instruct truck/machinery operators to avoid raving engines; <p>This is in line with:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Environmental Management and Coordination Act 1999 Amended 2015 <input type="checkbox"/> Noise and Excessive Vibration Pollution (Control) Regulations, 2009 <input type="checkbox"/> Occupational Safety and Health Act (OSHA) 2007 OP 4.01 Environmental Assessment 	<ul style="list-style-type: none"> <input type="checkbox"/> SEASCAN Energy Ltd <input type="checkbox"/> Contractor 	<ul style="list-style-type: none"> <input type="checkbox"/> Records of machine and vehicle maintenance <input type="checkbox"/> Availability and use of Ear Muffs 	Approx. 300,000/= for Provision of noise pollution

4.	Construction of the Proposed Project site	Generation of Solid Waste	<ul style="list-style-type: none"> - Provide communal solid waste collection containers (skip) for the collection and storage prior to appropriate disposal; - County Government/NEMA to provide waste dumping site; - Engage a NEMA Registered Waste Collection Firm; - Excavation activities to be done during the dry season to avoid soil erosion and siltation of streams; - Site soil to be used to backfill excavated sites; <p>This is in line with:</p> <ul style="list-style-type: none"> □ Environmental Management and Coordination Act 1999 Amended 2015, □ Waste Management Regulations, 2006 □ Water Act 2012 □ Public Health Act, Cap 242 □ OP 4.01 Environmental Assessment 	<ul style="list-style-type: none"> □ SEASCAN □ Contractor □ NEMA Registered Waste Collection and Disposal Firm 	<ul style="list-style-type: none"> □ Clean, Organized, Neat Site □ Presence of waste collection receptacles □ Contract with NEMA Registered Waste Disposal Firm 	<p>Approx. 200,000/= for waste containers</p> <p>10,000/= per month for waste collection and disposal</p>
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5.	Construction of the Proposed Project site	Generation of Liquid Waste – used oil and other Chemicals (Hazardous Waste)	<ul style="list-style-type: none"> – Construct a paved containment for storage of oils and other liquid chemicals being used in the construction site; – Provide containers for storage of used oils from vehicles /machines/equipment being used at the construction site; – Engage a NEMA Registered Firm for the collection, transportation and appropriate disposal of used oil; <p>This is in line with; Environmental Management and Coordination Act 1999, Amended 2015 Waste Management Regulations, 2006 Water Act 2012 Public Health Act, Cap 242 and Environmental Assessment</p>	<ul style="list-style-type: none"> □ SEASCAN □ Contractor □ NEMA Registered Used Oil Collection and Disposal Firm 	<ul style="list-style-type: none"> □ Presence of a paved area for storage of oils and other chemicals □ Presence of used oil containers. 	Approx. 400,000/= for paved containment & used oil containers. 10,000/= per month for collection and disposal of used oil.
6.	Construction of the Proposed Project site	Risk of fire	<ul style="list-style-type: none"> – Provide firefighting equipment at the construction site area; – Contractor staff to be sensitized on firefighting equipment use; – No burning of materials is to be permitted at the site. <p>This is in line with:</p> <ul style="list-style-type: none"> □ Occupational Safety and Health Act (OSHA) 2007 □ Public Health Act, Cap 242 □ OP 4.01 Environmental Assessment 	<ul style="list-style-type: none"> □ SEASCAN Energy Limited □ Contractor 	<ul style="list-style-type: none"> □ Performance records □ Presence of Fire Extinguishers at construction site 	Approx. 300,000/= for fire extinguishers

7	Construction of the Proposed Project Site	Potential pollution of Surface and Groundwater	<ul style="list-style-type: none"> □ No disposal of domestic waste at the project site; □ Provision of used oil containers at a central point; □ Use of waste bins/proper wastes management; □ Pave parking area for trucks and direct drainage to containment; □ Analysis of water at the site area 2 times year □ This is in line with; □ Environmental Management and Coordination Act (EMCA), 1999 Amended 2015, □ Public Health Act Cap 242 □ OP 4.01 Environmental Assessment 	SEASCAN Energy Ltd Contractor	<ul style="list-style-type: none"> □ Water Quality Report □ Waste Presence of Bins 	Approximate of 50,000/- for communal waste containers 200,000/- Per year.
8.	Construction of the Proposed Project site	Safety of Workers and other visitors to construction site	<ul style="list-style-type: none"> □ Use of construction site barrier tapes to isolate the site(working) area to bar intruders from accessing the area in case of a dropping object; □ Appropriate head, hand and foot protection (PPE) during the manual clearing of vegetation and construction activities; □ Adopting ergonomic work flow designs that fit physical tasks to employees and not vice versa. Maintain work productivity; □ Construction site visitors require appropriate safety Gear. <p>This is in line with:</p>	SEASCAN Contractor	<ul style="list-style-type: none"> □ Workers have Safety Gear □ Medical records □ Emergency contacts for Hospital and Police available 	Approx. 300,000/= for safety gear

			<ul style="list-style-type: none"> □ Occupational Safety and Health Act (OSHA) 2007 □ Environment Management and Coordination Act (EMCA), 1999 Amended 2015 □ OP 4.01 Environmental Assessment □ Public Health Act Cap 242 			
9.	Construction of the Proposed Project site	Working at heights	<ul style="list-style-type: none"> □ Testing of structures for integrity prior to undertaking work; □ Implementation of fall protection including induction on climbing techniques and use of fall protection measures, 	SEASCAN Contractor	<ul style="list-style-type: none"> □ Medical Records and Training records □ Availability and use of proper PPE 	Approx. 500,000/= for special safety equipment
			<ul style="list-style-type: none"> □ Provision of harnesses and scaffolds for working at heights; □ Inspection, maintenance, and replacement of fall protection equipment ; □ Use of helmets and other protective devices that are going to mitigate against scratches, bruises; lacerations and head injuries due to dropping objects[□ Provide first aid facilities at the site; <p>This is in line with:</p> <ul style="list-style-type: none"> □ Occupational Safety and Health Act (OSHA) 2007 □ OP 4.01 Environmental Assessment □ Public Health Act Cap 242 		<ul style="list-style-type: none"> □ Availability of Fall Protection Equipment at the Construction Site 	

10.	Construction of the Proposed Project site	Health issues of construction workers and Community	<ul style="list-style-type: none"> Occupational Safety and Health Act (OSHA) 2007 OP 4.01 Environmental Assessment 	<ul style="list-style-type: none"> SEASCAN Energy Ltd Contractor Ministry of Health NGOs and Donor Agencies Local Administration 	<ul style="list-style-type: none"> Pamphlets on Health Matters Records of disease incidences and prevalence 	500,000/= for sensitization and provision Of condoms. Health facility cost to be determined
11.	Construction of the Proposed Project site	Community misconceptions	<ul style="list-style-type: none"> Awareness creation amongst the Community on project facts; Community issues to be responded to promptly; Project progress reports and monitoring reports to be prepared and recommendations implemented; 	<ul style="list-style-type: none"> SEASCAN Local administration Local Leaders 	<ul style="list-style-type: none"> Records of Meetings with Community Records of community issues recorded and responses. 	Approx. 100,000/= for convening meetings
12.	Construction of the Proposed Project site	Increase in social vices/ Security Concerns	<ul style="list-style-type: none"> Conduct Information Education and Communication; (IEC) amongst the community and the project staff; Hold meetings between Contractor Staff and Community; Have regular police patrols at the beginning of project development; Collect information on persons coming into the project area to settle during project implementation. 	<ul style="list-style-type: none"> SEASCAN of Ministry Education Local Police Local Administration Local Leaders 	<ul style="list-style-type: none"> Meeting reports Police records on project area security 	Approx. 300,000/= for convening meetings

13.	Construction of the Proposed Project site	Surface run off and sedimentation from construction activities	<ul style="list-style-type: none"> - Construction of effective drainages and culverts; - Plant soil binding grasses and other native plants <p>This is in line with:</p> <ul style="list-style-type: none"> □ Environmental Management and Coordination Act 1999 Amended 2018 Water Act 2012 OP 4.01 Environmental Assessment 	SEASCAN Contractor	□ Surface runoff water impact protection facilities in the project area	Construction Obligation
14.	Construction of the Proposed project site	Sanitary facilities for construction workers	<ul style="list-style-type: none"> □ Installation of appropriate sanitary facilities; □ Having a monitoring programme for the septic tanks to ensure no overflow takes place □ This is in line with: Environment Management & Coordination Act (EMCA), 1999 Amended 2015, □ Waste Management Regulations, 2006 	SEASCAN Contractor	Presence of Toilet Facilities for Workers and Visitors to the Construction site	Construction obligation
15.	Construction of the Proposed Project site	Dangers of having Child Labour issues arising	<ul style="list-style-type: none"> □ Contractor to be strictly advised not to engage any underage persons (under 18 years of age) to perform any form of work at the site during construction □ Contractor will be required to comply with the Employment Act, 2007 <p>This is in line with</p> <ul style="list-style-type: none"> □ Employment Act, 2007 	SEASCAN Contractor	□ List of workers that does not contain underage persons	Construction Obligation
Operational Phase						

1.	Operation of Proposed Project Facility	Maintenance of facilities Working at heights	<input type="checkbox"/> <input type="checkbox"/> Use of protective devices to mitigate against injury; <input type="checkbox"/> <input type="checkbox"/> Provide first aid facilities at the site; This is in line with <input type="checkbox"/> Occupational Safety and Health Act (OSHA) 2007 <input type="checkbox"/> OP 4.01 Environmental Assessment	SEASCAN SEASCAN Site Manager	<input type="checkbox"/> Use of Proper PPE and Equipment <input type="checkbox"/> Handouts on safety	Approx. 200,000/=
2.	Operation of Proposed Project Facility	Risk of Fire	- Sensitization of Workers on Fire Safety Risks; - No burning of any materials near or in the site This is in line with: <input type="checkbox"/> Occupational Safety and Health Act (OSHA) 2007 <input type="checkbox"/> Environmental Management and Coordination Act 1999 Amended 2018 <input type="checkbox"/> OP 4.01 Environmental Assessment	<input type="checkbox"/> SEASCAN Site Manager <input type="checkbox"/> County government	<input type="checkbox"/> Handouts on Fire Hazards and Safety	Routine Site Operation Activity
3.	Operation of Proposed Project Facility	Pollution of surface water and Waste management	- Ensure solid waste is collected and appropriately disposed of; - Ensure that used oil from trucks are not released to the ground; - Used oil is to be put into containers and appropriately disposed of by a NEMA approved agent; - Provision of used oil containers for use by truck drivers; This is in line with: <input type="checkbox"/> Environment Management and Coordination Act (EMCA), 1999 Amended 2018,	<input type="checkbox"/> SEASCAN Site Manager	<input type="checkbox"/> Presence of solid waste containers for <input type="checkbox"/> Containers for storage of used oil recovered from trucks	Approx. 20,000/= for provision of used oil containers

			<ul style="list-style-type: none"> □ Water Act 2012 □ Public Health Act Cap 242 □ OP 4.01 Environmental Assessment 			
4.	Operation of Proposed Project Facility	SEASCAN Site Solid Waste Management during Operation	<ul style="list-style-type: none"> □ Provision of communal solid waste containers (skip); □ Provision of secured solid waste collection containment where waste container (skip) is to be placed; □ Regular disposal waste depending rate fill up. <p>This is In line with:</p> <ul style="list-style-type: none"> □ Environment Management and Coordination Act (EMCA), 1999 Amended 2015, □ Waste Management Regulations, 2006 □ Water Act 2012 □ Public Health Act Cap 242. 	SEASCAN Site Manager	<ul style="list-style-type: none"> □ Waste Collection and Disposal Reports □ Presence of Waste Bins 	Approx. 20,000/= for Waste Containers 10,000/= per month for waste disposal by NEMA Approved Firm
5.	Operation of Proposed Project Facility	Health issues of Facility Workers, Truck Drivers and Community	<ul style="list-style-type: none"> - Sensitize workers and community on sexually transmitted diseases especially STIs and HIV/AIDS which is spread through socialization and unprotected sex; - Provide workers and community with condoms. - Encourage Workers, Truck Drivers and Community to go for HIV Testing and Counselling in order to live a productive life; <p>This is in line with:</p>	<ul style="list-style-type: none"> □ SEASCAN □ Ministry of Health □ Local Administration 	<ul style="list-style-type: none"> □ Presence of a HIV Programme at the Facility □ Records of disease incidences /prevalence (URTI, HIV/AIDS, Water Borne Diseases etc. 	100,000/= for sensitization and provision Of condoms.

			<input type="checkbox"/> Public Health Act Cap 242 <input type="checkbox"/> Occupational Safety and Health Act (OSHA) 2007			
6.	Operation of Proposed Project Facility	Monitoring and Evaluation of the effectiveness of project Mitigations	Implementation of monitoring of facility operations and success of proposed mitigations - Health Trends (URTI, Malaria, STIs and HIV/AIDS); - Livelihood and socio-economic status of project area community; - Community perception on the SEASCAN Energy Limited facility - Any new emerging issues, threats and benefits of the LPG Storage Facility	<input type="checkbox"/> SEASCAN Site Manager <input type="checkbox"/> Local Administration	<input type="checkbox"/> Quarterly Reports on Facility performance	Routine Operation of the Facility
Decommissioning Phase						
1.	Decommissioning of Proposed Project Facility	Air Pollution (dust, smoke, fuel emissions)	- Control of demolition vehicle speeds; - Prohibition of idling of vehicles; - Water is to be sprayed on building undergoing demolition during decommissioning to reduce dust emission;	<input type="checkbox"/> SEASCAN <input type="checkbox"/> Decommissioning Contractor	<input type="checkbox"/> Decommissioning Records	Approx. 200,000/= for nose protection equipment (dust masks)

			<p>Regular maintenance of vehicles and equipment;</p> <ul style="list-style-type: none"> - Provision of dust masks for use in dusty conditions. - Use of serviceable vehicles and machinery to avoid excessive smoke emission <p>These is in line with:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Environmental Management and Coordination Act 1999 Amended 2018 <input type="checkbox"/> Occupational Safety and Health Act (OSHA) 2007 			
2.	Decommissioning of Proposed Project Facility	Noise pollution	<ul style="list-style-type: none"> - Noise reduction/ hearing protection devices when working with noisy equipment; - Use of serviceable equipment with low noise level; - Instruction to truck/machinery operators to avoid raving engines; - Use of noise protection (ear muff) during demolition; <p>This is in line with:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Environmental Management and Coordination Act 1999 Amended 2015. <input type="checkbox"/> Occupational Safety and Health Act (OSHA) 2007. 	SEASCAN Decommissioning Contractor	<input type="checkbox"/> Decommissioning Records	Approx. 200,000/= for noise pollution mitigation

3.	Decommissioning of Proposed Project Facility	Potential Injury to Workers	<ul style="list-style-type: none"> □ Use of appropriate head, hand and feet protection (PPE) during demolition of structures □ Adopting ergonomic work flow designs that fit physical tasks to employees and not vice versa while maintaining a balance with productivity; <p>This is in line with:</p> <ul style="list-style-type: none"> □ Occupational Safety and Health Act (OSHA) 2007 	SEASCAN Decommissioning Contractor	<ul style="list-style-type: none"> □ Availability of appropriate gear/Records □ Use of Proper PPE 	Approx. 200,000/= for PPE and other safety equipment
4.	Decommissioning of Proposed Project Facility	Working at heights	<ul style="list-style-type: none"> □ Use construction site barrier tape to isolate the site to guard site visitors from accidents and injuries; □ Implement a fall protection program that includes training in climbing techniques and use of fall protection measures, Provide Harnesses; 	SEASCAN Decommissioning Contractor	<ul style="list-style-type: none"> □ Availability of appropriate Safety Gear/Records □ Proper use of PPE 	Approx. 100,000/= for PPE and other safety equipment
			<ul style="list-style-type: none"> □ Use of helmets and other protective devices to mitigate against injury, □ Provide first aid facilities at the site <p>This is in line with:</p> <ul style="list-style-type: none"> □ Occupational Safety and Health Act (OSHA) 2007 			

5	Decommissioning of Proposed Project Facility	Site area rehabilitation and restoration	<ul style="list-style-type: none"> □ Remove all demolished waste material; □ Repair and restore project area site □ Evaluate site contamination □ Plant trees and other appropriate vegetation <p>These is in line with:</p> <ul style="list-style-type: none"> □ Environmental Management and Coordination Act 1999 Amended 2015 □ Occupational Safety and Health Act (OSHA) 2007 	<ul style="list-style-type: none"> □ SEASCAN □ Site Restoration Contractor 	<ul style="list-style-type: none"> □ Site Pollution Report □ Well restored site 	1,000,000/= for Site Pollution assessment
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9. ENVIRONMENTAL HEALTH AND SAFETY IMPACTS MANAGEMENT PROGRAMMES

This section presents the programmes for managing the identified impacts. It is worth noting that the use of management programmes to manage the impacts is necessitated by the fact that most of the mitigation measures cannot be implemented as discrete, isolated actions because there are spatial, temporal and casual interactions among impacts. The programmes recommended for managing the potential impacts of the proposed project include:

- Air quality management programme
- Noise management programme
- Occupational Health and Safety

The implementation of the EMP is also linked to a series of comprehensive management plans. Management and mitigation measures should be in compliance with legislative requirements. Where no legal guidance is provided, industry and/or international good practices should be applied as far as is practicable.

9.1. Air quality management programme

The aim of this programme is to ensure that air quality is maintained through construction, as well as operation phases. The air quality management programme includes the following:

9.2. Dust management

- Dust abatement measures shall be implemented to control dust generated from construction activities. Refer to the construction control plan and construction management plan for dust abatement measures;
- A complaints register and protocol will be drawn up as a means for surrounding establishments, workers and neighbouring community to voice their issues and concerns, particularly those relating to the nuisance effects of dust and noise. The register will be set up prior to the commencement of construction activities. These public complaints should be responded to as a matter of urgency and where possible, measures taken to minimize the cause of dust and noise.

9.3. Emissions

- The Contractor shall ensure that the construction machinery and equipment are appropriate and fit to prevent fugitive emissions, as per national standards or international practices. The Proponent shall ensure the regular maintenance of this equipment.
- A maintenance plan for the construction machinery and vehicles shall be implemented to prevent excessive emissions during the construction phase of the project.

9.4. Noise management programme

- This programme aims to ensure that noise generated by construction and operation activities is kept to a minimum and adheres to relevant noise standards. The noise management programme includes the following:
- The Contractor shall ensure that construction activities are limited to working hours (i.e. between 06h 00 and 18h 00 daily) from Monday to Saturday, or as required in terms of legislation and/or negotiated with the neighboring community;
- Noise generating equipment will be designed to control and dampen noise emissions, and will be located at a distance far enough from the nearest noise sensitive development, to ensure that the increase in ambient noise level will comply with ISO standards; and
- The surrounding establishments, workers and neighboring community shall be able to register their complaints and concerns about noise through complaints register set up prior to the commencement of construction activities. These public complaints should be responded to as a matter of urgency and where possible measures must be taken to minimize the noise.

9.5. Occupational Health and Safety Programme

The aim of this programme is to ensure that the Safety and Health of the employees' quality is maintained through construction, as well as operation phases. The OHS management programme includes the following: Undertaking S&H risk assessments, S&H audits, Provision of adequate and appropriate firefighting equipment, Provision of Personal Protective Equipment to the workers and Issuing of work permit systems for hot jobs at the site.

9.6. Management Plan

9.6.1. Overview

The following management plans will be implemented during construction, operation, and decommissioning phase of the proposed project:

- Construction management plan
- Construction control plan
- Labour and human resources plan
- Workplace health and safety plan
- Community safety plan
- Emergency management and response plan
- Rehabilitation and closure management plan

9.6.2. Construction Management Plan

The construction management plan for the proposed project shall include the following:

Management of fuels and other hazardous materials

- The Contractor shall comply with all applicable laws, regulations, permit and approval conditions and requirements relevant to the storage, use, and proper disposal of hazardous materials;
- The Contractor shall manage all hazardous materials and waste in a safe and responsible manner, and shall prevent contamination of soils, pollution of water and/ or harm to people or animals as a result of the use of these materials;
- The Contractor shall prepare a hazardous materials and waste management plan for inclusion in the site specific environmental plan to be submitted to the Proponent prior to establishment on site. The plan shall include, but not limited to, measures to prevent safe siting and storage;
- The contractor shall place on-site tools and equipment, such as generators, compressors on bunded impermeable sheeting to prevent oil spills/leaks from causing subsurface contamination;

- The contractor shall ensure oil spills/leaks are prevented or minimized. This can be achieved through: instructing employees not to overfill diesel bowzers and equipment tanks; regular auditing to verify that no leaking or defective equipment is brought/used onsite; any oils or lubricants discharged during servicing of the machinery or vehicles are contained in dry trays or other appropriate containment measures;
- The Contractor shall ensure that fueling and repairs are carried out by trained personnel familiar with spill containment and clean-up procedures; and
- The Contractor shall ensure that all the employees working onsite are trained on good housekeeping practices.

9.6.3. Management of the construction site

- The contractor shall prevent littering and the random discard of any solid waste on or around the construction site;
- The contractor shall manage hazardous waste; and
- The Contractor to determine safe traveling speeds for the construction site and ensure that restrictions are enforced.

9.6.4. Emergency Preparedness

- The Contractor shall develop an emergency plan that will enable rapid and effective response to all types of environmental emergencies in accordance with recognized national and international standards. The emergency plan shall include establishment of a network of communication between the Contractor and emergency services including police, ambulance services, and fire brigades among others; and
- The Contractor shall test emergency preparedness with drill operations and shall review drills, conduct mock emergencies and remedy shortcomings to ensure a high level of emergency readiness to deal with environmental and third party incidents.

9.6.5. Fire Prevention and management

- The Contractor shall take all necessary precautions to prevent fires caused either deliberately or accidentally during construction process;
- The Contractor shall prepare a fire prevention and fire emergency plan as a part of the;

- Environmental Plan to be submitted to SEASCAN Energy Limited;
- The Contractor shall provide adequate firefighting appliances at specified localities on the worksite to meet any emergency resulting from ignition of a fire; and
- The Contractor shall ensure that hot work is prohibited under specified meteorological conditions with high fire risks and that appropriate and adequate firefighting equipment would be required to be on standby at all times where hot work is being carried out.

9.6.6. Management of air quality

- The Contractor shall institute appropriate measures to minimize or avoid air quality impacts. This can be achieved through formulation of air quality management plan;
- The Contractor to minimize/control emission of dust due to traffic movement and wind erosion of stockpile material and exposed soil;
- The Contractor to mitigate emissions of gases vapours and odours by conducting initial risk assessment and the installation of procedures to control the risk; and
- The Contractor to ensure that all equipment used and all facilities erected on site are designed and operated to control the emission of smoke, dust, fumes and any other air impurity into the atmosphere.

9.6.7. Noise Management Programme

The noise management programme is geared towards minimizing the amount of noise generated by the construction and operation activities as well ensure adherence to the relevant noise standards. The noise management programme includes the following:

- The Contractor shall comply with the legal requirements for the management of noise impact specified in the noise quality regulations; and
- The Contractor shall formulate noise management plan for minimizing the generation of noise and vibration from construction activities occurring on site and its impact on surrounding residents, businesses and workers.

9.6.8. Complaints register

The Contractor shall establish and maintain a register for periodic review by the Proponent that logs all the complaints raised by the neighbours or the general public about construction activities.

The register shall be regularly updated and records maintained including the name of the complainant, his/her domicile and contact details, the nature of the complaint and any action taken to rectify the problem.

9.6.9. Health management

- The Contractor shall comply with all relevant legislative requirements governing worker health and safety (e.g. OSHA 2007 and its subsidiary legislations); and
- The Contractor shall prepare and implement a programme to minimize diseases likely to be contracted by the construction workers as a result of the proposed project such as HIV Aids.

9.6.10. Construction Control Plan (CCP)

The CCP for the proposed project shall cover on the following:

Control of access

The contractor shall ensure that the construction is not accessed by unauthorized persons.

Control of top soil and subsoil

- The contractor shall store topsoil excavated from the site in a wind row or stockpile which shall be discernibly separate from wind rows or stockpiles of any other excavated materials;
- Top soil shall be protected from any contaminant that might impact on vegetation;
- The Contractor shall temporarily stockpile topsoil in a location that will minimize any loss due to erosion or mixing with other material; and
- The Contractor shall ensure that topsoil is stockpiled in a manner and for a period of time that does not result in deterioration in its plant support capacity.

Control of material supply and borrow areas

- The Contractor shall, as far as possible, source all material needed to construct the proposed project from the licensed mines;
- In instances where materials are to be obtained from a new borrow area the Contractor shall comply with relevant legislations; and

- The Contractor shall prepare a method statement including plans, detailing the expected quantity of excavation, temporary and permanent drainage control, the final contouring of the borrow pit and the proposed method of rehabilitation.

Rehabilitation

- After completion of construction activities, the Contractor shall clear the site of construction materials and dispose wastes in appropriate disposal sites; and
- The Contractor shall remove all temporary works on the construction site and grow grass on the sloppy areas where retaining wall will not be constructed to control soil erosion.

9.6.11. Labor and Human Resources Plan

In designing the Labour and human resources plan Contractor shall:

- Comply with the provisions of Employment Act, 2007; and
- Wherever possible, give priority to qualified local people when hiring employees.

9.6.12. Workplace Health and Safety Plan

The workplace health and safety plan to be implemented by Synergetic Energy Partners, SEASCAN Energy Limited and Contractor shall include the following key measures:

- All relevant national legislation, including the OSHA 2007 and related regulations, shall be adhered to ensure that health and safety of proximate communities and the public at large are not threatened during construction and operational phases of the Project;
- The Proponent shall ensure workplace health and safety during the operational phase of the facility; and
- Health and safety performance will be continuously monitored and procedures reviewed with the aim of eliminating risk as far as reasonably practicable.

9.6.13. Community health and safety plan

The community health and safety plan to be implemented by the Contractor, Synergetic Energy Partners and SEASCAN Energy Limited shall include:

- Adherence to OSHA 2007 Act and its subsidiary legislations to ensure that health and safety of immediate neighbours and the public is not threatened;

- The Contractor to ensure that construction work is undertaken in manner not likely to pose risks to community health and safety;
- The Proponent to undertake an independent quantitative risk assessment prior to operation of the facility. The findings of this assessment will inform the development of an emergency safety plan; and
- Synergetic Energy Partners and SEASCAN Energy Limited to create awareness among the neighbors on the community safety procedures.

9.6.14. Emergency Management and Response Plan

The Proponent shall rollout and implement their documented emergency response plan at the completed footprint. The EMRP shall include:

Emergency management planning

The components of the Emergency management planning shall include:

- Structure and operation of the emergency management team;
- Establishment of an emergency management centre;
- Information retained by the emergency management team;
- Incidents requiring activation of the plan;
- Incident severity classification; and
- Process to be followed in the event of an emergency.

Information pertaining to emergency management shall be reported through the HSE reporting process. A quantitative risk assessment report will be compiled by an independent company prior to commissioning of the facility.

9.6.15. Emergency Response Plan

The Proponent shall implement a community health and safety plan which shall include the following measures:

SEASCAN Energy Limited will compile a comprehensive safety emergency management plan (SEMP) for the facility. The SEMP will cover the following aspects:

- Kenya's Safety regulations;

- Scope of the SEMP;
- Notification of local authorities;
- Details of the facility's system;
- Aim of the SEMP;
- Objectives of SEMP;
- Roles and responsibilities in the event of an emergency;
- Information requirements in the event of an emergency;
- Evacuation of people;
- The role of local communities;
- Regular testing of the SEMP;
- Planning for the eventuality of failure on the facility;
- Causes of the facility's failure;
- Probability of facility's failure;
- Size and duration of the facility;
- Hazards and effects of facility's failure;
- Hazard range and emergency planning distances; and
- Anticipation of worst credible incidents.

9.6.16. Rehabilitation and decommission management plan

The rehabilitation and decommissioning management plan include the following:

Planning for closure

- The Proponent shall develop rehabilitation and decommissioning plan in conjunction with relevant stakeholders at least one year before the end of facility's operations;
- The Proponent shall investigate practical options for closure of the facility at least one year before decommissioning and submit a report to relevant authorities NEMA included; and

- The Proponent to explore options of re-use and recycling of the facility's components/structures.

9.7. Decommissioning

- The Proponent shall take into consideration the health and safety of personnel, contractors, neighbors and the public during the planning and implementation of the demolition process; and
- The Proponent shall undertake a further survey to identify any contaminated areas remediate them accordingly.

9.8. Post Closure

The Proponent shall ensure that the facility's site is free of impacts associated with the abandonment/closure. The Proponent shall develop, rollout and implement a monitoring plan that includes:

- Monitoring of the rehabilitated site to confirm whether progress is satisfactory; and
- Outline of how land improvement and future land use will be affected by the past operation and decommissioning of the Proposed Project.

9.9. Monitoring

The proposed programmes and plans will be subjected to monitoring. Monitoring will have two elements: routine monitoring against standards or performance criteria; and periodic review or evaluation. Monitoring will often focus on the effectiveness and impact of the programme or plan as a whole. During construction phase, the Proponent shall monitor the Contractor's activities in order to verify that the management measures/procedures/specifications are implemented as contained in the EMP.

Compliance will mean that the Contractor is fulfilling their contractual obligation.

During operation phase, the Proponent will monitor facility's operations to ensure compliance with management measures in the EMP and operation procedures. As part of this monitoring, the Proponent will undertake statutory initial environmental audit as required by the EIA/EA Regulations, 2003 Amended 2019 and subsequent annual self-environmental audits.

9.9.1. Programme Monitoring

The Proponent shall regularly monitor programme implementation. The process will include the regular monitoring of:

- Erosion of soil resulting in the immediate surroundings of the facility caused by the presence of facility or impacting on structures associated with the facility;
- Air quality and ambient emissions, including dust generated by construction activities; and
- Noise generation during construction and operation phases.

9.9.2. Plan Monitoring

All of the management plans make provision for monitoring and evaluation. Special attention should be given to the monitoring arrangements relating to biophysical impacts, occupational health and safety, facility operational and emergency response.

During the construction phase of the project, the Contractor's HSE Officer shall report all environmental impacts as well as accidents and incidents to the Proponent's HSE Officer. The reported impacts and incidents will be captured on a database to ascertain trends and track progress in the implementation of preventive and corrective actions, and benchmarking against other, similar operations.

Depending on the level of severity, accidents and incidents will be investigated by the Contractor's HSE division, with key input from the line management to ensure accountability.

During operation, the Proponent's HSE department will monitor the health and safety of personnel and contractors, in compliance with legislative requirements. Emergency incidents should be reported to the relevant authorities. The reported impacts and incidents will be captured on a database to identify weakness in the emergency response plan and track progress in the implementation of preventative and corrective and benchmarking against other similar operations.

The above information is vital for the smooth running of the facility and therefore SEASCAN Energy Limited is encouraged to ensure that the contractor and monitoring staff are able to monitor all activities and keep records for review by SEASCAN Energy Limited and other Authorities.

Additional Mitigation Measures During operations includes:

- Install fire extinguishers at the LPG Plant – Only mentioned for communities around
- Clearly mark fire exit points and the fire assembly area

- Provide sand buckets at strategic locations
- Workers should be trained on firefighting skills by a qualified trainer
- Fire drills should be conducted at least once a year
- A firefighting team should be established and standby fire engine at site
- Warning and informational signs be displayed appropriately
- Conduct fire audit once a year
- Formulate and bring to the notice of all workers and clients fire safety policy and rules
- Regular testing and servicing of fire-fighting equipment and appliances.
- Full compliance with the Fire Risk reduction Rules, 2007

Table 42: Proposed Project Facility Monitoring Plan

#	Environmental Component	Activity	Standard/ Reference	Location	Frequency	Implementation	Supervision
Pre-Construction Phase							
1.	Project Design	Provision of Solid and Liquid Waste	NEMA Guidelines	Proposed Project Facility	Quarterly until Design is ready	<input type="checkbox"/> SEASCAN <input type="checkbox"/> Design Consultant	<input type="checkbox"/> SEASCAN <input type="checkbox"/> Supervision Consultant
2.	Vegetation cover	Monitor clearing to ensure consistent with ESMP	ESMP	Proposed Project Facility	As required during site preparation	Contractor	Supervision Consultant
Construction Phase							
1.	Noise levels	Noise levels on dB (A) scale from excavation and construction areas not to exceed the Maximum Noise Level Permitted (Leq) in dB(A)	NEMA guidelines	Noise level meter kept at a distance of 30m from source	When noisy construction activities are in progress. Or as directed by	Contractor	Supervision Consultant
2.	Air Pollution	Dust and Smoke Emission	NEMA guidelines	Construction area of Proposed Project Facility	As required by the Supervision	Contractor	Supervision Consultant
3.	Soil Erosion	Turbidity in ocean	NEMA Guidelines ESMP	Construction area of Proposed Project Facility	During and after the rainy seasons	Contractor	Supervision Consultant
4.	Accidents	Accident reports, community consultations	ESMP	Construction area of Proposed Project Facility	Monthly	Contractor	<input type="checkbox"/> SEASCAN

							▢ Supervision Consultant
5.	Health	URTI, HIV/AIDS, Malaria and Water borne disease prevalence	ESMP	Construction area of Proposed Project Facility	Monthly	▢ Contractor ▢ Local Public Health Centre	▢ SEASCAN ▢ Supervision Consultant
6.	Construction waste	▢ Quantity and Type of solid waste generated by construction activities. ▢ Waste Segregation	NEMA guidelines	Construction area of Proposed Project Facility	Monthly	Contractor	SEASCAN
7.	Sanitary waste	Contractor toilet facilities operation/performance	NEMA guidelines	Construction area of Proposed Project Facility	Monthly	Contractor	Supervision Consultant
8.	Project Area Population	Change in Community Population next to facility	ESMP	Construction area of Proposed Project Facility	Quarterly	▢ SEASCAN ▢ County	Supervision Consultant
Operation Phase							
1.	Solid Waste	▢ Quantity and Type of solid waste generated during operation ▢ Segregation	NEMA guidelines	Designated Waste Collection points at the site	Monthly	Waste Collection Firm Registered with NEMA	SEASCAN Officer

2.	Health	<ul style="list-style-type: none"> ▫ Changes in health trends ▫ Presence of Mosquitoes etc ▫ Records of Malaria and Water borne disease occurrence ▫ HIV/AIDS 	ESMP	Proposed Project Facility	Monthly	<ul style="list-style-type: none"> ▫ Local Public Health Facility ▫ New Health Centre Set up for Project area Community 	<ul style="list-style-type: none"> ▫ SEASCAN Officer ▫ Ministry of Health
3.	Sanitary waste	Site toilet facilities operation and performance	NEMA guidelines	Proposed Project Facility	Monthly	SEASCAN	Appointed SEASCAN Officer
4.	Performance of Proposed Project Facility	<ul style="list-style-type: none"> ▫ No of LPG Tankers Loaded every month ▫ Recorded safety incidences 	ESMP	Proposed Project Facility	Monthly	SEASCAN	Appointed SEASCAN Officer
5	Fire Fighting Equipment and Emergency Response Warning Facilities	<ul style="list-style-type: none"> ▫ checking as Regular by Safety Data required Sheets 	OSHA 2007	Proposed Project Facility	As recommended	<ul style="list-style-type: none"> ▫ SEASCAN Appointed Agent 	Appointed SEASCAN Officer
6.	Socio-economic status of Project Area Community	<ul style="list-style-type: none"> ▫ Records of Community income generation/livelihood 	ESMP	Proposed Project Facility	Quarterly	SEASCAN	Appointed SEASCAN Officer

CHAPTER TEN

10. INCIDENT PREVENTION AND HAZARD COMMUNICATION ACTION PLAN

The construction and operation activities of the proposed project might generate incidents and hazards to the health and safety of the employees. It is therefore imperative that the project is constructed and operated in a safe and incident free manner particularly in compliance with Kenyan legislation on safety (e.g. Legal Notice No. 40 titled “Building Operations and Works of Engineering Construction Rules”, 1984) and the Proponent’s HSE management system requirements. This section recommends the incident prevention and hazard communication actions that the Proponent should undertake in the construction and operations phase of the project.

10.1. Incident Prevention – Construction Phase

Contractor health and safety is an essential component of incident prevention during the construction phase of the project. It is recommended that contractor health and safety rules be implemented for the project containing the elements described below.

10.1.1. Responsibilities with regard to safety

The responsibilities with regard to safety must be documented by the Proponent for all contractors to follow while working at the project site. The Proponent’s responsibility is to issue procedures, safety rules and safety induction training for all contractors working on site. It is the responsibility of all contractors to strictly adhere to the Proponent’s HSE standards and to ensure that every person in the contractors’ employment observes the requirements of the Proponent’s regulations.

The contractor will be required to nominate a contractor supervisor for the project. This person will be responsible for all HSE compliance requirements of subordinates and will issue instructions regarding safety and health which have to be carried out by all contract employees.

10.1.2. Designation of First Aiders

In accordance with the Legal Notice 160 of 1977 (First Aid Rules), the contractor shall ensure that an adequate number of certified first aiders are available at the project site with properly equipped first aid boxes. At least one first aider for every 50 employees is recommended.

10.1.3. Contractor Employee Responsibility with regard to Safety

Any contractor employee who observes or is involved in an accident will immediately report such incident to the contractor supervisor who will record the details in a General Register as stipulated under the Occupational Safety and Health Act, 2007. The Contractor's Supervisor on site shall fill out an Accident Report Form and submit it to the nearest provincial DOHSS office within 24-hours of the accident.

10.1.4. Personal Conduct

It will be the responsibility of the contractor to ensure that their employees do not engage in any of the following practices during the construction phase of the project:

- Smoking;
- Personal business; and
- Misconduct.

10.1.5. Personal Protective Equipment (PPE)

Each contractor working at the project site shall ensure that all his or her employees are provided with appropriate and adequate PPE. The contractor will be required to maintain a register indicating the issuance, control and use of PPE which includes the following:

- Safety shoes;
- Safety helmets (hard hats);
- Hand protection (gloves);
- Eye and face protection (safety glasses);
- Hearing protection (ear plugs, ear defenders); and
- Clothing (overalls).

10.1.6. Safety Procedures

The contractor will be required to issue the Proponent with a comprehensive Safety Method Statement for carrying out each phase of the construction works. The contractor will further be required to comply with the safety procedures of the Proponent EHS Management System.

10.1.7. Fire and Emergency Procedures

The contractor and all the employees working for them shall be required to be familiar with the Proponent's fire and emergency procedures. The safety induction training to be provided by the

Proponent's Consultant for all contractors working at the project site will include the Proponent's emergency and evacuation procedures.

10.1.8. Security Procedures

The contractor will be required to familiarize themselves with the Proponent's security procedures and shall ensure that all employees comply with those security procedures.

10.1.9. Working Tools and Equipment

The contractor will ensure that no unsafe tools are used at the project site. The contractor will further ensure that all scaffolding and ladders, cranes, welding machines, compressors, etc. are in good serviceable condition at all times during the construction phase of the project and have been certified by DOHSS approved persons.

10.2. Incident Prevention – Operational Phase

10.2.1. Proponent's HSE Management System

The Proponent will develop, rollout and implement a detailed HSE management system for their project. It is expected that relevant parts of such an HSE management system will be rolled out and implemented at the project site during the operational phase of the project.

10.2.2. Emergency Response Plan

In the event of an emergency at the project site the Proponent's Emergency Response Plan will be activated in accordance with the procedures laid out in it. It will therefore be necessary for the Proponent to develop, rollout and implement their documented emergency response plan prior to the construction phase. The emergency response plan should as a minimum include the headings given below.

- Introduction;
- Purpose;
- Scope;
- Abbreviations;
- Definitions;
- Emergency response organization;
- Emergency notification system;
- Evacuation procedures;
- Emergency response plan activation;
- Contingency plans;

- Emergency management resources and logistics;
- Crisis control center;
- Deactivation and recovery plan;
- Training;
- Emergency response plan maintenance; and
- Emergency response plan distribution.

CHAPTER ELEVEN

11. CONCLUSION AND RECOMMENDATIONS

11.1. Conclusions

The project, including the construction and operation of the Proposed Project is anticipated to provide efficient and seamless transfer of LPG from the receiving jetty to the storage terminal in addition to the provision of sufficient stock of LPG to augment SEASCAN LPG storage capacity thereby increasing the supply capacity of LPG to industrial, commercial and residential customers throughout Kenya and East Africa. This will also reduce the deficit and meet the increasing demand of LPG and therefore promote LPG as environment friendly fuel source.

The potential adverse impacts associated with the proposed project are possible to mitigate successfully. The impacts before implementation of mitigation measures are assessed as very low to medium low and the ratings are expected to improve further with the implementation of the proposed mitigation measures. In particular, the LPG facility will be designed, constructed and operated according to the latest industry norms and standards. Programs and plans developed and implemented through the EMP will be monitored and audited to ensure compliance with current regulations and cleaner production practices.

11.2. Recommendation

The Consultant recommends that the proposed development should be allowed to proceed taking into account the implementation of the proposed Mitigation Measures and Environment Management Plan (EMP). An environmental audit is recommended upon the completion of construction works to corroborate the implementation of the proposed mitigation measures. Any unforeseen project impacts shall be identified and addressed through annual environmental audits.

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12. APPENDICES

12.1. Grievance Resolution Mechanism

1. Steps in dealing with grievances

- 1.1. Complaint received in writing from affected person
- 1.2. Recording of grievance in standard form
- 1.3. Reconnaissance site visit with the complainant.
- 1.4. Submission of detailed complaint to Resident Engineer for resolution by negotiation.
- 1.5. Submission of detailed complaint to the Grievance Committee for resolution by mediation.
- 1.6. Submission of complaint to The City of Kisumu for resolution.


2. Composition of grievance committee

	Name	Designation	Organization	Position
1		Resident Engineer		Committee Secretary
2		Assistant Resident Engineer		Committee Assistant Secretary
3		Contractor Representative		Member
4		Member of Surrounding Community		Member
5		Site Administrator		Member

12.2. INTRODUCTION LETTERS


To whom it may concern
Kindly give assistance to NEMA registered experts to carry out their work.

To all Chiefs - please kindly accord these Officers necessary assistance. Acc 1-Changamwe
26/10/2020
Ches


THE PRESIDENCY
MINISTRY OF INTERIOR AND COORDINATION OF NATIONAL GOVERNMENT

Telegrams: "PROVINCER", COAST
Telephone: Mombasa-2311201
Fax No.041-2013846
Email: msacountycommissioner@yahoo.com
when Replying please quote

COUNTY COMMISSIONER'S OFFICE
P.O. BOX 90424-80100
MOMBASA
Tel.0715040444


26 OCT 2020

REF. NO.MCC/ADM. 25/VOL.III/25 26th October, 2020

Deputy County Commissioner
CHANGAMWE SUB - COUNTY

RE: ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED CONSTRUCTION OF A BULK LPG STORAGE PLANT AND PIPELINE

This is to introduce to you experts from Ecoscience and Engineering Limited, Nairobi undertaking Research on Environment and Social Impact Assessment for the proposed construction of a bulk LPG Storage plant and pipeline at Changamwe, Mombasa.


Attached is a list of the experts for ease of reference.


Kindly accord them the necessary assistance.

To whom it may concern
This is to confirm that the NEMA registered experts paid us a courtesy call and we are aware of their intended activities within Mombasa County.

27/10/2020
B. Simion

PP
G.B. KITIYO, MBS
COUNTY COMMISSIONER
MOMBASA







ECOSCIENCE & ENGINEERING LIMITED.
Mitsumi Business Park, 11th Floor, Muthithi Road, Westlands Nairobi
P.O. Box 55533-00200
Nairobi, Kenya
Tel: +254202000582
Cell: +254713566825

Date: 26th October, 2020

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: INTRODUCTION LETTER

Ecoscience and Engineering has been contracted by Seascan Energy Limited to undertake Environmental and Social Impact Assessment for their proposed LPG plant in Changamwe.

Listed below is the team undertaking stakeholder's consultations. Any assistance to them is highly appreciated.

NAME	ID NUMBER
<u>Experts</u>	
Mariam Athman	32015896
Calvince Arum	22340696
Maryeve Gikwa	28060424
<u>Support Team</u>	
Elias Fondo	22559725
Rachel K. Kamwaki	22423549
Lucy Akamran	29387574
Mariam Ibrahim	31641701
Lawrence B. Masha	24777928

Yours Sincerely,


ECOSCIENCE & ENGINEERING LTD.
P.O. Box 55533 - 00200,
NAIROBI

Philip Abuor
Managing Director
Ecoscience & Engineering Limited

Cc: SEASCAN ENERGY LIMITED

12.3. KEY STAKEHOLDERS



Date: 27th October, 2020

SEASCAN ENERGY LIMITED
ENVIRONMENTAL SOCIAL IMPACT ASSESSMENT FOR
LPG BULK STORAGE AT CHANGAMWE, MOMBASA
LIST OF CONSULTED STAKEHOLDERS

NO.	NAME	ID NO.	TELEPHONE NUMBER	AREA OF RESIDENCE	DESIGNATION	SIGNATURE
13	MUHAMMAD BAKAR JUMA	4594080	072343778	POPEYE	S.H.R./KIM	[Signature]
14	FARAJI KIBWANA	13351460	0712955029	UNA-HOLE	CHIEF	[Signature]
15	ERIC KASYOKI	23691624	0726439292	BOMU	YOUTH	[Signature]
16	NAAMAN JUMA NARO	9474617	0722558213	BOMU	TEACHER	[Signature]
17	PHIDENCE MWACHALA	9318193	0713226180	BOMU	TEACHER	[Signature]
18	CHEMBE SHD	23204334	0799763552	BOMU	YOUTH	[Signature]
19	JANE KAVESA	12719065	0721641328	BOMU	CHV	[Signature]
20	RITHINDI AITHMAN	23908103	0706551512	BOMU	INFORMATION	[Signature]
21	MARIAM IBRAHIM MOHAMMED	31641701	0719856122	MIGADINI	Research Asst	[Signature]
22	LAWRENCE MASHUA	24777920	076840652	MIGADINI	Research Asst	[Signature]
23	LUCY KRAMON	29387574	0729412035	MIGADINI	RESEARCH ASSISTANT	[Signature]
24	RACHEED K. KAMWAKI	22423985	0720345985	MIGADINI	RESEARCH ASSISTANT	[Signature]

25) Magyeve H

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Date: 27th October, 2020

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15	ERIC KASYOKI	23691624	0726439292	BOMU	YOUTH	[Signature]
16	NAAMAN JUMA NARO	9474617	0722558213	BOMU	TEACHER	[Signature]
17	PHIDENCE MWACHALA	9318193	0713226180	BOMU	TEACHER	[Signature]
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19	JANE KAVESA	12719065	0721641328	BOMU	CHV	[Signature]
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21	MARIAM IBRAHIM MOHAMMED	31641701	0719856122	MIGADINI	Research Asst	[Signature]
22	LAWRENCE MASHUA	24777920	076840652	MIGADINI	Research Asst	[Signature]
23	LUCY KRAMON	29387574	0729412035	MIGADINI	RESEARCH ASSISTANT	[Signature]
24	RACHEED K. KAMWAKI	22423985	0720345985	MIGADINI	RESEARCH ASSISTANT	[Signature]

25) Magyeve H

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Date: 28th October, 2020

SEASCAN ENERGY LIMITED
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LIST OF CONSULTED STAKEHOLDERS

NO.	NAME	ID NO.	TELEPHONE NUMBER	AREA OF RESIDENCE	DESIGNATION	SIGNATURE
1	DLI IDSD	21254508	0790538648	Kwa Kala	Youth	[Signature]
2	JUSTICE MWASAMBO	12546212	0711491676	KALOLENI	NYUMBA KUMI	[Signature]
3	JOHN SIMANYA	37953933	0792781058	KALOLENI	YOUTH	[Signature]
4	WINNIE JOSIAH	30165696	0702340035	KWAHOLA	YOUTH	[Signature]
5	MARJIN MURUGU	83429972	0723219578	M. SUNDUKE	NYUMBA ID	[Signature]
6	SHAMUKI KIPUKA	12488716	0722447147	KALOLENI	NYUMBA	[Signature]
7	Josphina Kengo	8437597	0722914660	KALOLENI	Nyumbani	[Signature]
8	JAMES MUKHAMA	21773253	0723512958	KALOLENI	YOUTH	[Signature]
9	OMAR KAHAMARI	146919096	0702967251	KALOLENI	C.H.U	[Signature]
10	STANLEY KITHIRI	7739641	0727318419	KALOLENI	C. YOUTH	[Signature]
11	Mwinyamata Kombo	9715664	0724958963	Kwahola	VILDER	[Signature]
12	Diana Hamisi	25891965	0712431528	KWAHOLA	Youth	[Signature]

Date: 28th October, 2020

SEASCAN ENERGY LIMITED
ENVIRONMENTAL SOCIAL IMPACT ASSESSMENT FOR
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LIST OF CONSULTED STAKEHOLDERS

NO.	NAME	ID NO.	TELEPHONE NUMBER	AREA OF RESIDENCE	DESIGNATION	SIGNATURE
13	DUNCAN OTIENO	27965123	0716745838	NURU	YOUTH	[Signature]
14	ROSEBELLAH OTWANG'	27064638	0726247207	MKOMANI	HEALTH CARE WORKER	[Signature]
15	Philip Wabenge	37491576	0759315232	Kaloleni	Youth	[Signature]
16	LILIAN A. OGOT	33570840	0797411923	CHAANI	YOUTH	[Signature]
17	CATHERINE MWENI	24376689	0733251411	CHAANI	YOUTH	[Signature]
18	ROSEMARY OTIENO	8781658	0725223491	MIGADINI	YOUTH	[Signature]
19	OMAR E. MWIMBA	11459456	0735906772	KIPEVU	WARD ADMIN CGM	[Signature]
20	FREDRICK OTIENO	22940923	0721839984	KIPEVU	WARD MANAGER	[Signature]
21	RAYMOND NAOLE	5441895	0720727681	KIPEVU	N/ELDER	[Signature]
22	MOHAMMED SALIM	8388180	0787267022	KIPEVU	VILDER	[Signature]
23	SONGS KIMWILI	13264447	0721550447	KIPEVU	NYUMBA KUMI CHAIRMAN	[Signature]
24	OMAR SWALEH	846641	072123112	KWAHOLA	CHIEF	[Signature]



SEASCAN ENERGY LIMITED

Date: 28/10/2020

SEASCAN ENERGY LIMITED
ENVIRONMENTAL SOCIAL IMPACT ASSESSMENT FOR
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25	ABDALLA Kondo	543328	0714990179	KWANA	ELDER	[Signature]
26	KATANA KIBI	27306287	0718656089	KWANA	KWANA	[Signature]
27	MARY KARANJA	22162226	0718961509	KALOLEHI	WOMEN	[Signature]
28	Mariam Ibrahim Mohammed	31641701	0719856122	MIGADINI	Research Asst	[Signature]
29	LAWRENCE MUSAHA	2677722	0768601853	MIGADINI	Research Asst	[Signature]
30	LUCY AUGMAN	29387574	0729412035	MIGADINI	Research Asst	[Signature]
31	DAPHNE K. KAMUKU	22423985	0720345988	MIGADINI	RESEARCH ASST	[Signature]
32	Margaret Njiru	28060424	0711451260		Consultant	[Signature]
33	Chance Amari	2231696	0729252312	Jimnani	Asst	[Signature]
34	Mariam Amari	22015896	0720312891	Environmental	Expert	[Signature]
	Elias Pondo	2259725	0728144687	Research Asst	Changamwe	[Signature]

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SEASCAN ENERGY LIMITED

Date: 29th October 2020

SEASCAN ENERGY LIMITED
ENVIRONMENTAL SOCIAL IMPACT ASSESSMENT FOR
LPG BULK STORAGE AT CHANGAMWE, MOMBASA
LIST OF CONSULTED STAKEHOLDERS

NO.	NAME	ID NO.	TELEPHONE NUMBER	AREA OF RESIDENCE	DESIGNATION	SIGNATURE
1	Sunday Zuma	30109928	0741675296	KIPERU	Youth	[Signature]
2	George Ponda	27150678	0703525889	KIPERU	Youth	[Signature]
3	Niku Paul	11874808	0704953161	Modangini	PWD	[Signature]
4	ABISAGU MAGANGA	8470692	0721218556	MIGADINI	MOMBASA KUMI	[Signature]
5	AGNES MUI	10797103	0721804210	KIPERU	CHV	[Signature]
6	VIOLET MUKONJIA	13285463	0706331568	KIPERU	VIE	[Signature]
7	PEREGRINE O. JUMA	28062851	076579058	MIGADINI	Teacher	[Signature]
8	KATANA Z. NYANJA	22514692	070088034	MIGADINI	C.S	[Signature]
9	EMILY MWEKE	10958795	0723950562	MIGADINI	MOMBASA	[Signature]
10	EVANS OCHIELO	23910214	071722823	CHANGAMWE	Youth	[Signature]
11	SHARON KABIBI	34320670	0799184857	CHANGAMWE	Youth	[Signature]
12	JAEL MUMBO	28849102	0792425866	CHANGAMWE	Youth	[Signature]

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Date: 27th October, 2020

SEASCAN ENERGY LIMITED
ENVIRONMENTAL SOCIAL IMPACT ASSESSMENT FOR
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NO.	NAME	ID NO.	TELEPHONE NUMBER	AREA OF RESIDENCE	DESIGNATION	SIGNATURE
13	MARY KERS	2325794	072919572	CHAAHI	YOUTH	[Signature]
14	ANGELINE KILGA	30070639	0711882135	CHAAHI	YOUTH	[Signature]
15	CHRISTINE T. DDARO	8467217	0725722657	MIGADINI	TEACHER	[Signature]
16	SIPROZA MWAKO	8469963	0721656742	MWYUNI	V. Elder	[Signature]
17	FATUMA ALI	11789655	0722625787	MIGADINI	V. Elder	[Signature]
18	WAZO [unclear]	26687678	0116758227	CHAAHI	A.G. CHIEF	[Signature]
19	FATUMBE KILGA	8359410	072231145	MWYUNI	Businessman	[Signature]
20	WALTER OPAOK	21795570	0726288566	CHANGAMWE	C.S.O	[Signature]
21	MARY M. NIDI	13687932	0702509947	MIGADINI	C.H.V	[Signature]
22	MOHAMED ABUBAKAR	25231976	0723956771	CHAAHI	Nurse Kim	[Signature]
23	MARIAM IBRAHIM MOHAMMED	31641701	0719856122	MIGADINI	Research Asst	[Signature]
24	LAURENCE MASHA	24717768	07686455	MIGADINI	Researcher	[Signature]

Date: 27th October, 2020

SEASCAN ENERGY LIMITED
ENVIRONMENTAL SOCIAL IMPACT ASSESSMENT FOR
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NO.	NAME	ID NO.	TELEPHONE NUMBER	AREA OF RESIDENCE	DESIGNATION	SIGNATURE
25	LUCY Ahaman	29387574	0729412035	MIGADINI	RESEARCH ASSISTANT	[Signature]
26	DACHEK K. KAMWAKI	22423985	0720345985	MIGADINI	RESEARCH ASSISTANT	[Signature]
27	OMAR KHAMIS	11459456	0733906372	CHAAHI	WARD ADJ. IN	[Signature]
28	Mariam Ahaman	32018996	070312891	ecoscience	Environmentalist	[Signature]
29	Margere Njoni	28060402	01145162	Consultant	Sociologist	[Signature]
30	Abdullahi Xam	21216166	074582012	Invim.	Expert	[Signature]
31	Elias Fondo	22569725	0728144687	CHAAHI	RESEARCH ASSISTANT	[Signature]

FOCUS GROUP DISCUSSION ATTENDANCE FORM

TARGET GROUP: PERSONS WITH DISABILITIES (PWD) DATE: 30th October, 2020
 VENUE: CHANGAMWE SOCIAL HALL
 FACILITATOR(S) MARY EVE GIKWA

No.	Name	ID NUMBER	ROLE	TELEPHONE NUMBER	SIGNATURE
1.	CHRISTINE KAREU KIMBI	30917326	PWD	0792809496	<i>[Signature]</i>
2	RAYMOND MUWAMBELA	8452795	PWD	0722319315	<i>[Signature]</i>
3	JAMES KARANJA	13839572	PWD	0723860398	<i>[Signature]</i>
4	Julia Kothure	81288106	PWD	0707312502	<i>[Signature]</i>
5	BONIFACE WASAWO	2703522	PWD	0724769367	<i>[Signature]</i>
6	SHALINE KANGU	32174914	Sign-Language Interpreter	073240740	<i>[Signature]</i>
7	Margaret Wangeci	23622774	PWD	0719716235	<i>[Signature]</i>
8	Gabriel Wundela	14511746	PWD	0727067444	<i>[Signature]</i>

FOCUS GROUP DISCUSSION ATTENDANCE FORM

TARGET GROUP: WOMEN DATE: 30th October, 2020
 VENUE: CHANGAMWE SOCIAL HALL
 FACILITATOR(S) MARY EVE GIKWA

No.	Name	ID NUMBER	ROLE	TELEPHONE NUMBER	SIGNATURE
9.	SUSAN ADHAMBO	9286665	COMMUNITY VOLUNTEER	0719530168	<i>[Signature]</i>
10.	DETA MOHAMMED	23362417	COMMUNITY VOLUNTEER	0721621917	<i>[Signature]</i>
11	LYNA KUTEKA	16092913	Nyumba Kumi	0721724567	<i>[Signature]</i>



FOCUS GROUP DISCUSSION ATTENDANCE FORM

TARGET GROUP: WOMEN DATE: 30th October 2020
 VENUE: CHANGAMWE SOCIAL HALL
 FACILITATOR (S): MARY EVE GIKWAA

No.	Name	ID NUMBER	ROLE	TELEPHONE NUMBER	SIGNATURE
1.	MONICAH MUTUA	11477389	WOMAN	0709341321	Monica
2.	SUSAN AKINYI OTENO	30624614	WOMAN CHV	0728441405	Susan
3.	NAOMI Z MBARO	11764870	WOMAN N-KUM	0715682986	Naomi
4.	EVELYN WAWUZA	11655167	WOMAN CHV	0717584824	Evelyn
5.	JANE NDINDA	3791271	WOMAN	0722762832	Jane
6.	KAHUNDA KASHINDO	4981391	WOMAN	073957321	Kashinda
7.	ASHA JAMES	2160938	WOMAN	0710756098	Asha
8.	LILIAN OKACH	2211517	WOMAN	0708510923	Lilian



FOCUS GROUP DISCUSSION ATTENDANCE FORM

TARGET GROUP: YOUTH DATE: 30/10/2020
 VENUE: CHANGAMWE SOCIAL HALL
 FACILITATOR (S): MARY EVE GIKWAA

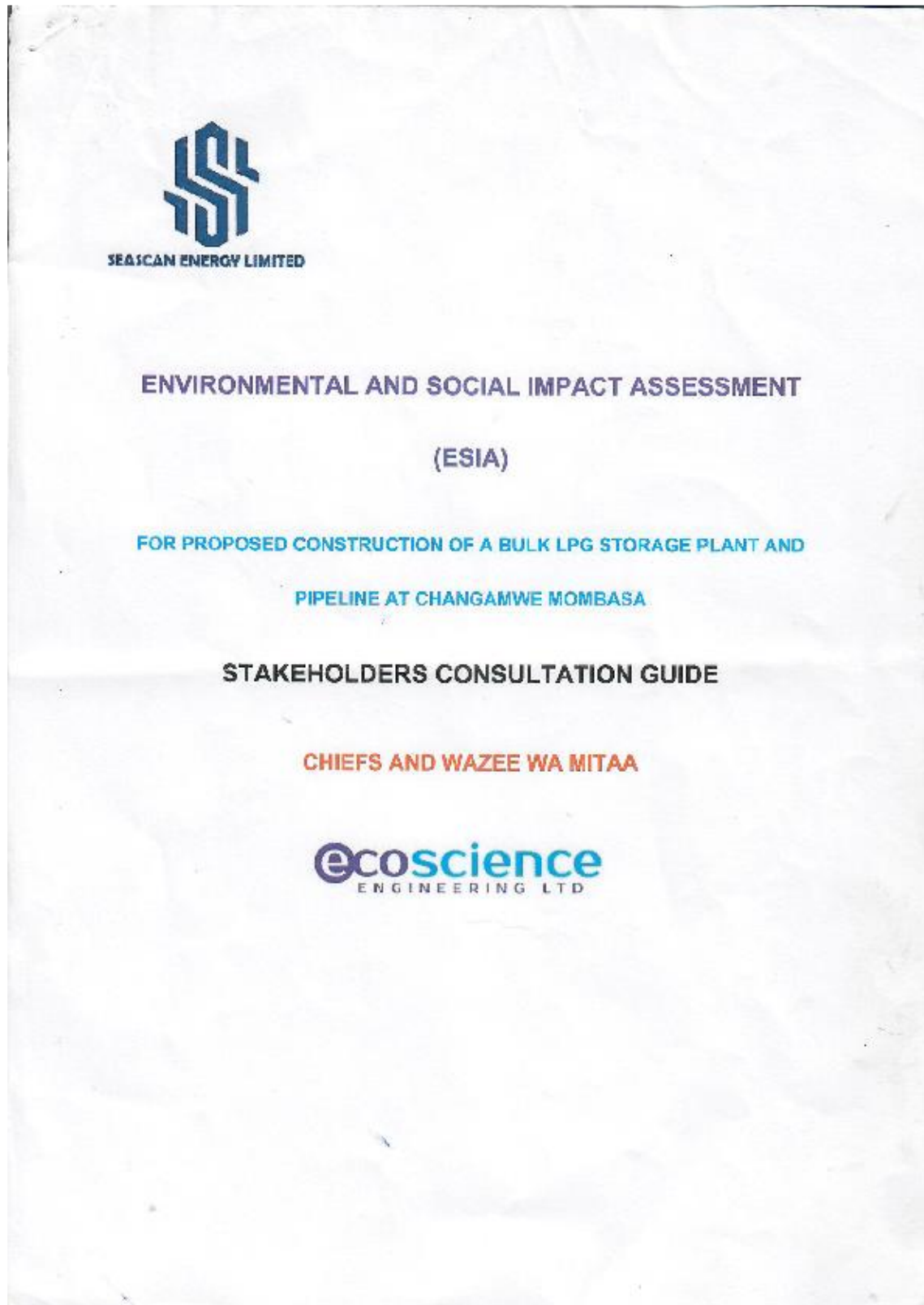
No.	Name	ID NUMBER	ROLE	TELEPHONE NUMBER	SIGNATURE
1.	PENINA WASHIKU	26846135	YOUTH	0727438775	Penina
2.	SIDI KASHINDO	25991169	YOUTH	0720815967	Sidi
3.	MARIAM IDDI	30505452	YOUTH	0758376089	Mariam
4.	GAMMIL KASHINDO	28133557	YOUTH	0796340649	Gammil
5.	LUCAS MWAVUO	36852036	YOUTH	0769013717	Lucas
6.	STEPHEN OTIEHO	27150376	YOUTH	0710537171	Stephen
7.	MAWA KUSA	37086621	YOUTH	0704939613	Mawa
8.	Samuel W. Ogara	37694319	YOUTH	0708504308	Samuel

FOCUS GROUP DISCUSSION ATTENDANCE FORM

TARGET GROUP: YOUTH DATE: 30/10/2020
 VENUE: CHATEAUMUS SOCIAL HALL
 FACILITATOR(S) MARY EVE GIKWAA

No.	Name	ID NUMBER	ROLE	TELEPHONE NUMBER	SIGNATURE
9.	EUNICE ONYESO	31620845		0706432248	EP
10.	ABDALLA KHEIZ	27505414		0724046011	Abd
11.	Brenda Klasike	29559917		0704720670	BK
12.	JOSEPH ODEZO	8144341	SOCIAL WORKER	0714590976	JO

12.4. SAMPLE STAKEHOLDER SHEETS



PROJECT OVERVIEW

INTRODUCTION

Ecoscience was contracted by Seascan to undertake Environmental and Social Impact Assessment (ESIA) for the constructing of a 60,000 MT LPG storage and filling plant, and a port-to-land pipeline connection of approximately 15KM in length.

SEASCAN ENERGY LIMITED (hereafter referred to as Proponent), a privately owned company is an upcoming LPG Infrastructure Developer. The Proponent is planning to develop a bulk LPG Marine terminal facility storing up a 50,000-metric tons and a filling plant in Mombasa county. The Proponent also proposes to construct a 15km pipeline from the port to the terminal.

The terminal will encompass:

- Five (5) batteries of mounded tanks, with each battery holding capacity being 10,000 MT
- Truck loading gantries of 20 trucks capacity at a time
- 300mm diameter LPG pipeline from KOT to the site through KPRL Way Leave approximately 15Kms
- Rail siding for LPG Wagons Loading
- Firefighting system
- Administration Block
- Driveway and truck parking facilities
- Green areas

The proposed development activities will mainly involve civil, mechanical and electrical works associated with the installation of the LPG tank and filling point and thereafter operations of the facilities. The main activities to be carried out in the development of the proposed project include excavations or earth works, installation of the LPG storage tanks, pump, pipe works and construction of office blocks.

In accordance with Legal Notice No. 101 (EIA/EA Regulations, 2003) and Environmental Management and Coordination Act (EMCA, Cap 387), the Proponent is *Environmental and Social Impact Assessment (ESIA) for Seascan Bulk LPG Storage*

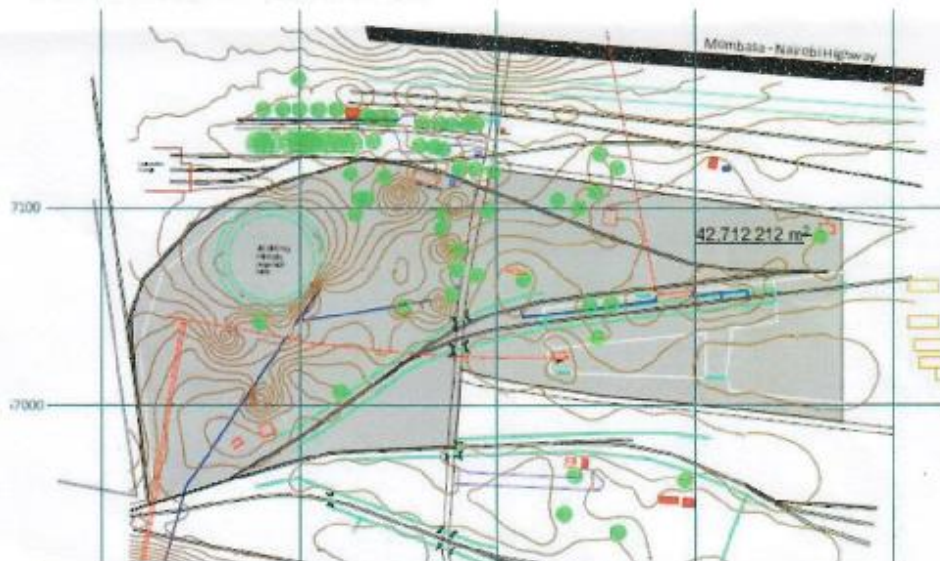
required by law to prepare an Environment Impact Assessment (EIA) study report for approval by National Environment Management Authority (NEMA) prior to commencement of the project development. The proposed project is also expected to comply with the energy act and its subsidiary legislation.

PROJECT OBJECTIVES

The main objective of the project is to;

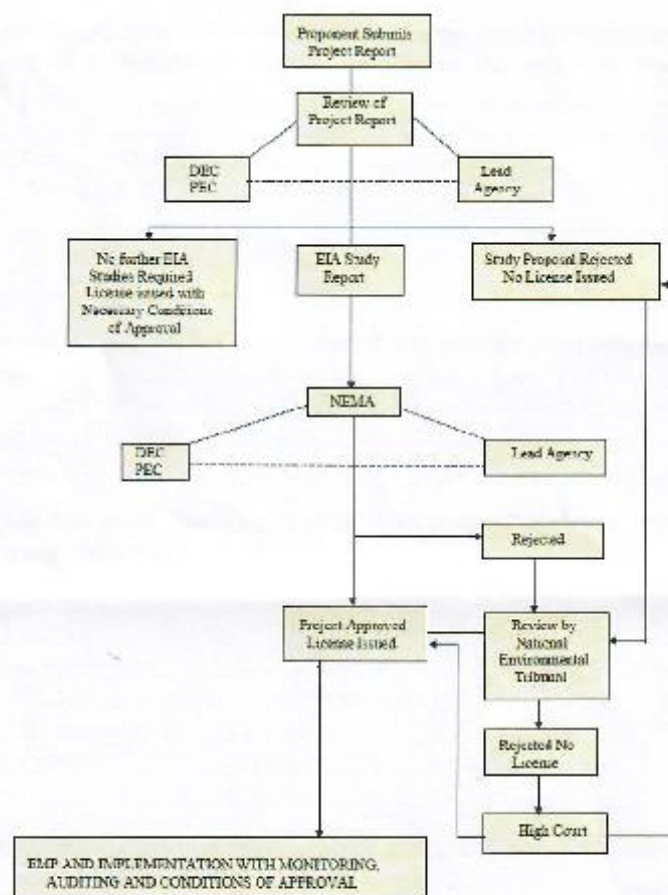
- ❖ Supply LPG stock for sale by increasing the availability and accessibility of LPG in Kenya. This is in line with Government of Kenya policy on promoting the use of more clean fuels.
- ❖ To contribute to an increased consumption of LPG by providing a consistent, affordable and quality supply of LPG into the Kenya market.
- ❖ To transform the current LPG distribution network in Kenya by utilizing the new and rehabilitated rail networks as the principal means of LPG transport. The Project will use a dedicated fleet of LPG ISO-rail containers and to move bulk volumes by rail in the country, complementing the available trucks.

PROPOSED PROJECT LOCATION MAP



Environmental and Social Impact Assessment (ESIA) for Seascan Bulk LPG Storage

EIA PROCESS



ESIA OBJECTIVE

The objective of the ESIA study is to ensure that anticipated adverse impacts on natural, physical and social environment likely to accrue on account of proposed project development are evaluated adequately and addressed through appropriate mitigation *measures incorporated into the design* and execution of development works.

Environmental and Social Impact Assessment (ESIA) for Seacan Bulk LPG Storage

Stakeholders consultations is a key aspect in an ESIA process. As one of the key identified stakeholders, kindly provide feedback to the questions in the following sections:

Q1. What are the main sources of cooking energy used by community members in your area of jurisdiction? (Rank them from the most to the least used)

1. Gas
2. Charcoal
3. Firewood

Q2. If firewood and charcoal are some of the energy sources, where are they obtained from?

Nearby forest & shrubs in our area

Q3. What are the main challenges related to access and use of these energy sources in your community area?

- 1) They are scarce and since level of income is low hence making competition for firewood to be high.
- 2) Charcoal causes lot of pollution.
- 3) Price of gas is high.

Q4. What community groups (gender, age category) are most affected by these challenges and in what ways?

- The old find it easy to use charcoal and since that gas is dangerous and hence become phobic.
- 20-30 yrs find it fast and easy to access.

Q5. How are /can these challenges be addressed?

1. People need to be trained on the usage of gas
2. People need to be told on the health and physical effects caused by coal

Q6. How many LPG installations do you have in Changamwe Sub-County (list them below) ?

No.	LPG Plant / Installation	Location

Q7. On a rate of 1-5 range usage of LPG in your area of jurisdiction

4

Q8. What are the key benefits being generated by the LPG projects?

(I) To the local community / local economy

- = Reduction of pollution
- = Creation of job opportunities
- = Lifting of the levels of living

Environmental and Social Impact Assessment (ESIA) for Seacore Bulk LPG Storage

Page 5 of 9

(ii) To the coastal region / nation at large

² Help in the attainment
of the Rio + Agenda

Q9. List any gaps that the proposed LPG project can fill?

Link between the community and the investor should be enhanced.

Q10. Do you perceive any risks / challenges from the development of the proposed LPG project (be they health, safety, security, environmental, social, economic or cultural)? If yes, please list them below)

~~Yes~~
Pollution since the involvement of gas.

Q11. How should such risks/challenges be addressed?

Ensure that the gas plant doesn't cause any pollution risks to the community.

Q12. Are there any sites of cultural and/or historical significance near the proposed plant site or along the pipeline wayleave that the Proponent should be aware of during the project development?


No.	Important Cultural and Historical Assets/ Sites	Location
1		
2		
3		
4		
5		

None.

Q13. Do you have any other recommendations for consideration by the LPG project proponent?

= Community liaison person.

STAKEHOLDER'S DETAILS

DATE:	29/10/20
NAME:	KOMISO FORTUNA
PHONE:	0799040076
DESIGNATION & AREA	KEST. CHIEF, Oshana
SIGNATURE:	

12.5. SAMPLE INTERVIEW SCHEDULE

Qn 20

-Youth Rep

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR AN LPG STORAGE AND FILLING PLANT, AND A PORT-TO-LAND PIPELINE CONNECTION IN MOMBASA KENYA

MEETING PARTICIPANTS INTERVIEW SCHEDULE

Information provided will be treated with utmost confidentiality and will not be provided to any other person.
If there is no additional space, you can write additional information at the back of the page you are on.

Questionnaire Number	
Date of Interview	28th October 2020
Name of Research Assistant	Mariam Ibrahim Mohammed

PART 1: DEMOGRAPHIC DATA

1.1	Sub-County	Changamwe
1.2	Location	Changamwe-Kwatha.
1.3	Estate	NURU
1.4	Name of Respondent	DUNCAN OTENO OMNOR.
1.5	Age	31
1.6	Tel. No.	0716 74 8838
1.7	Designation	YOUTH

PART 2: RESPONDENT'S INFORMATION

2.1 Gender

i. Male	<input checked="" type="checkbox"/>
ii. Female	<input type="checkbox"/>

2.2 Marital Status

i. Married	<input type="checkbox"/>
ii. Single	<input checked="" type="checkbox"/>
iii. Separated	<input type="checkbox"/>
iv. Widowed	<input type="checkbox"/>

2.3 Education Level

i. None	<input type="checkbox"/>
ii. Primary	<input type="checkbox"/>
iii. Secondary	<input type="checkbox"/>
iv. College/University	<input checked="" type="checkbox"/>

PART 3: SOCIAL-ECONOMIC DETAILS

3.1 What are your 3 main sources of Income (1 denoting main, 2 denoting second main and 3, third main)

i. Business/Trade (specify).....	
ii. Livestock Keeping (specify).....	
iii. Employed	
iv. No reliable source of income	
v. Casual Labourer	
vi. Other (specify).....	Electrician.

Environmental and Social Impact Assessment (ESIA) for Seacore LPG Project Changamwe Mombasa

Page 1 of 6

On 20

-100th Rep

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR AN LPG STORAGE AND FILLING PLANT, AND A PORT-TO-LAND PIPELINE CONNECTION IN MOMBASA KENYA

MEETING PARTICIPANTS INTERVIEW SCHEDULE

Information provided will be treated with utmost confidentiality and will not be provided to any other person.
If there is no additional space, you can write additional information at the back of the page you are on.

Questionnaire Number	
Date of Interview	28th October 2020
Name of Research Assistant	MARIAM IBRAHIM MBHAMME

PART 1: DEMOGRAPHIC DATA

1.1	Sub-County	Changamwe
1.2	Location	Changamwe - Kwakholo.
1.3	Estate	NURU
1.4	Name of Respondent	DUNCAN OTIENO OMNOR.
1.5	Age	31
1.6	Tel. No.	0716748838
1.7	Designation	YOUTH

PART 2: RESPONDENT'S INFORMATION

2.1 Gender

i. Male	<input checked="" type="checkbox"/>
ii. Female	<input type="checkbox"/>

2.2 Marital Status

i. Married	<input type="checkbox"/>
ii. Single	<input checked="" type="checkbox"/>
iii. Separated	<input type="checkbox"/>
iv. Widowed	<input type="checkbox"/>

2.3 Education Level

i. None	<input type="checkbox"/>
ii. Primary	<input type="checkbox"/>
iii. Secondary	<input type="checkbox"/>
iv. College/University	<input checked="" type="checkbox"/>

PART 3: SOCIAL-ECONOMIC DETAILS

3.1 What are your 3 main sources of Income (1 denoting main, 2 denoting second main and 3, third main)

i. Business/Trade (specify).....	
ii. Livestock Keeping (specify).....	
iii. Employed	
iv. No reliable source of income	
v. Casual Labourer	
vi. Other (specify).....	Electrician.

Environmental and Social Impact Assessment (ESIA) for Seacan LPG Project Changamwe Mombasa

3.2 Will the LPG plant project affect your source of income?

Yes	No <input checked="" type="checkbox"/>
-----	--

3.3 If yes, how will your source of income be affected (use Yes or No)?

Response	Y/N	Give details
Positively		
Negatively		

3.4. How can these effects be prevented or overcome?

.....

.....

.....

PART 4: LAND DETAILS

4.1 Do you own the land you reside in? (Y/N)..... NO.....

4.2 If yes, what is the approximate size (in Acres)?

4.3 What land ownership documentation do you have?

i. Title Deed	ii. Allotment Letter
iii. Share Certificate	iv. None <input checked="" type="checkbox"/>

4.4 Will the plant and pipeline construction works have an effect on your land? (Y/N) ... YES.....

4.5 If yes, how will your land be affected by the construction activities?

Demolition of a structure <input checked="" type="checkbox"/>	Removal of trees
Destruction of crops	Deposition of soil spoils in premises <input checked="" type="checkbox"/>
Dust generation <input checked="" type="checkbox"/>	Direction of storm water to premise <input checked="" type="checkbox"/>
Restricted access to premise	Direction of storm water to premise
Other (Specify).....	

4.6 How can these effects be prevented or overcome?

..... It can be prevented by putting on good surveillance on the project and also to inform the community about the upcoming project.

PART 5: TRANSPORTATION

5.1 What is the distance (in Km) from your homestead through the nearest road to:

i. Nearest trading centre	50 mtrs
ii. Where you sell your trading wares (business site)	←
iii. Public Education facility	100 mtrs.
iv. Public Health facility	100 mtrs.
v. Administrative offices (e.g. chief's office)	200 mtrs

5.2 What is your main means of transport through the road?

Environmental and Social Impact Assessment (ESIA) for Seascan LPG Project Changanwe Mombasa

i. Public Vehicle ✓	ii. Walking	iii. Bicycle
iv. Bodaboda ✓	v. Private car	vi. Other (specify).....

5.3 How much money do you pay per trip to the nearest trading centre as fare fee(in Ksh.)?

Bodaboda 50 KSH	Public Vehicle 50 KSH
-----------------	-----------------------

5.4 Will this project affect your travel activities (Y/N)?NO.....

5.5 If yes, briefly explain how this project will affect your daily travel/transport movements

.....

5.6. How can these effects be prevented or overcome?

.....

PART6: HEALTH ISSUES

6.1 What health concerns do you anticipate from the construction of the project on community health?

Concern	Yes/No
None	
Disease prevalence due to dust generation	✓
Increased accidents due to high speeds of motorists	
Increase in HIV/AIDs and STIs	✓
Pollution of water bodies leading to increase in water borne diseases	✓
Increased delinquent behaviour	
Other (specify)	

6.2. How can these health problems be prevented or overcome?

It can be prevented by educating the community.
 friendly machine that are not friendly

PART 7: WATER AND SANITATION

7.1 What are the main sources of water for your household?

i. Piped water	ii. Rainwater harvesting	iii. Borehole
iv. Well	v. Ocean	vi. River
vii. Mobile water vendor ✓	viii. Others (specify)	

7.2 Will your source of water be affected by the project construction activities? Y/N ...YES.....

7.3 If yes, how will your source of water be affected by the construction activities?

Pollution of the water source	✓
Reduction in water quantity due to abstraction for construction activities	✓
Removal/damaging of water pipes	✓
Other (specify)	

7.4 Will your waste disposal be affected by the project

- (i) During construction (Y/N) Yes If Yes, briefly explain the disposal area can be restricted by the construction company
- (ii) After Construction (Y/N) Yes If yes, please explain the disposal can be moved far away that may be difficult for the community to dispose their garbage

7.5. How can these problems be prevented or overcome?

It can be prevented by constructing another disposal nearby

PART 8: HOUSING

8.1 How far from the project road is the house you reside in (in Meters)? 500 Meters

8.2 Will your residence be affected by the project construction activities?

Yes	No ✓
-----	------

8.3 Will the comfort of your residence be affected

- (iii) During construction (Y/N) NO If Yes, briefly explain
- (iv) After Construction (Y/N) NO If yes, please explain

8.4 How can these challenges be prevented or overcome?

PART 9: ENERGY

9.1 What is the main source of energy for cooking?

i. Firewood	ii. Gas ✓
iii. Paraffin	iv. Electricity

Environmental and Social Impact Assessment (ESIA) for Seacan LPG Project Changamwe Mombasa

v. Charcoal	vi. Solar
vii. Biogas	viii. Other (Specify).....

9.2 What is the price of following commodities in the project area (in Ksh)?

LPG Cylinder	6 kg ✓	13kg
Charcoal	Debe Kasuku	1 bag
Firewood	1 Bundle	1 piece

9.3 Will the project affect your source of energy ?

(i) During Construction (Y/N) NO..... If yes, please explain.

.....

(ii) After Construction (Y/N) NO..... If yes, please explain

.....

6.2. How can these effects be prevented or overcome?

.....

PART 10: COMMUNITY PARTICIPATION

10.1 Are you aware of the proposed LPG Plant & Pipeline project?

Yes ☒ No

If yes, briefly explain... Because I have been informed by RCO Science Engineering Company about the project.

10.3 Do you attend development projects meetings in your area?

Yes ☒ No

10.4 If no, why do you not attend the meetings?-----

.....

10.5 Which gender is least represented in development project meetings?

Gender	Give Reasons
Female <input checked="" type="checkbox"/>	<u>Because they are not informed about developments.</u>
Male	

10.6 Are area residents employed in local public developments projects as

Casual laborers	(i) Yes (✓)	(ii) No ()
Permanent workers	(i) Yes ()	(ii) No (✓)

PART 11: ANTICIPATED PROJECT IMPACTS(Mark appropriately; 1 being 1stmain, 2being 2nd main and 3 being 3rd main)

What are the 3 major **positive**and 3 major **negative**impacts you anticipate from the implementation of this project?

Positive	Negative
Reduced energy cost ✓	Reduced fish business
Improved health particularly of women (upper respiratory diseases) due to increased access to clean energy	Increased moral decay ✓
Reduced environmental pollution ✓	Destruction of properties along the pipeline corridor ✓
Improved business environment ✓	Relocation due to loss of land thus disruption of lives ✓
Increase in land values	Ocean water pollution (i.e. oil spills)
Increased employment opportunities	
Reduced felling of trees	
Increased time for women and girls to participate in more economically empowering activities.	
Other (Specify) ...	

PART 12: WHAT ARE THE THREE MAJOR PROBLEMS AFFECTING PEOPLE ASSOCIATED WITH SIMILAR PROJECTS (Mark appropriately; 1 being 1st main, 2 being 2ndmain and 3 being 3rdmain)

Removal of water pipes / disruption of water supply ✓
Dust generation during plant construction ✓
Poor storm water drainage
Destruction of aquatic life (i.e. fish) and loss of income
Ocean water pollution during excavation
Destruction of mangrove forests
Other (specify)..... Lost of employment

Research Assistant's Signature..... 

12.6. MINUTES OF THE MEETINGS HELD

12.6.1. PWD's FOCUS GROUP DISCUSSIONS

FOCUS GROUP DISCUSSION AND INTERVIEWS AT CHANGAMWE SOCIAL HALL WITH PEOPLE LIVING WITH DISABILITIES FOR THE PURPOSE OF THE PROPOSED SEASCAN LPG COMPANY IN CHANGAMWE SUBCOUNTY.

Date: 30/10/2020

Venue: Changamwe Social Hall

Time: 11am - 1.00 pm

MEMBERS PRESENT (ATTACHED LIST)

AGENDA

1. Introduction
2. Project description
3. Focus group discussions
4. Question and answer
5. AOB.

MINUTE 1/30/2020: INTRODUCTION:

The meeting venue comprised of an open tent and portable chairs. Arrangements were complete and participants seated by 9.00am. The meeting started with a word of prayer from Mr. Julia Kathure. Mr. Fondo the community mobiliser introduced the participants and the consultants and stated a brief overview of our purpose for the day. He thanked the youth for showing up for the meeting on short notice and asked them to try as much as possible to represent the rest of the youth in the best way possible.

MINUTE 2/30/2020: PROJECT DESCRIPTION:

Mr. Fondo then introduced the Consultancy to lead the agenda. The Consultant Environmentalist Mr. Calvince Arum made a brief introduction on the purpose of organizing the consultation meeting with key representatives of the community. He stated that the community was the number one beneficiary of any project or developments done in a community. It is therefore most important that its people are consulted and advised accordingly about a project before its implementation.

He further explained the intention to bring up an LPG company in the Changamwe Sub-County. The developer being Seascan Energy Limited has identified a site for development of a loading zone, offices, storage facilities and pipes that would go through the way leave in their neighborhoods. The Consultant Ecoscience & Engineering is in the area to ensure that all social and environmental related issues are addressed amicably for the benefit of the society.

MINUTE: 3/30/2020: FOCUS GROUP DISCUSSIONS

The Consultant sociologist gave a brief overview of the purpose for Focus group discussion as to give insight to the kind of community we are living in today and the issues surrounding the youth in Changamwe. She explained that with the project approaching, it is important to understand the issues People living with disabilities go through.

Challenges facing PWDs

The discussions started with James Mwangi, who explained that PWDs were mainly discriminated in the society and Changamwe was not any exception. The general community look at PWDs as though they carry a plague, they are labeled to be cursed and that's why they carry some sort of disability.

It was noted that the discrimination was not only from society members but also from organizations and employers. It was noted that it is rare to freely employ a person with disability. Some companies do not follow the 10% requirement stated in the constitution. It is easy to find educated PWDs remain jobless while their counterparts without disability are given the same positions even if they are less qualified.

Credit loan companies giving funds to help startup businesses do not always give to PWDs with the common notion that they may not be able to repay. It is assumed that they are not capable to work with the same frequency as others.

Another form of discrimination is that 90% of those who work in offices of the PWDs, do not have any form of disability, they are insensitive of the needs of the PWDs. PWDs are discriminated in their very offices and treated as unimportant or beggars. The registration bodies for PWDs is not fairly done a lot of corruption is involved.

Most people with disabilities are not registered and the lucky ones are probably in government offices getting both a salary and funds set aside for PWDs. It is a common assumption that all

people with disabilities are funded, Ms. Julia Kathure giving an example of herself, she explained how she had a hard time trying to get recruitment for the kazi kwa vijana, those doing the recruitment bluntly stated that she did not need the job as much as the others without disability since she must be receiving the funds. This she stated was only an assumption.

The members present explained that most PWDs in Chagamwe are not employed. Those employed are working manual jobs at EPZ, the rest are working small businesses such as cobblers, water and Juice vending, small permanent and mobile shops, while some are lucky to have opened averagely big businesses in the neighborhood. They stated that they concentrate on how to provide for their families the best way they can.

Mr. Boniface Wasawo stated that there are people with disabilities are able to access education from primary to tertially levels without any issues. In schools children are taught about different capabilities by different people and are taught to accept and embrace disability. Mr. Bonface Wasawo, also noted that PWDs are able to access health care and insurance freely. Most of them are enrolled in NHIF, their C.B.O ensures that happens, and can also access other external insurance companies depending on individual capability. Mr. James Karanja. noted that there are other supporting bodies that aid PWDs as a priority such as :-

- Redcross
- APDK
- UDPK

They noted that most PWDs area able to access benefits in terms of relief, education certificates and representation when necessary.

MIN 4/30/2020:- RECCOMENDATIONS for PWDs

Mr. Raymond Mwombela, noted that this is the first group that considered PWDs in their consultation meetings and data collection procedures for any developments done in Chagamwe and they were grateful for not being marginalized. He stated that it was a good gesture and one that should continue in the same manner.

He suggested that the LPG plant should make an exception in giving employment to PWDs, those that are able, and strong to work, or their children for those that are old.

Mr. James Karanja Suggested that the company should consider promoting/ supporting the current CBO on matters disability mainstreaming and also make their company policy non-

discriminative for people with disability. He went on to speak of work place disability friendly features such as doors, made in such a way that they are easy to open, toilets that can easily be accessible, seats that are friendly to people with disability among other features. He suggested that they can involve experts to help in giving recommendations on the same.

MIN 5/30/2020: AOBs

There being no other business the meeting stopped at 1.30pm

ecoscience
ENGINEERING LTD

FOCUS GROUP DISCUSSION ATTENDANCE FORM

TARGET GROUP: PERSONS WITH DISABILITIES (PWD) DATE: 30th October, 2020

VENUE: CHANGAMWE SOCIAL HALL

FACILITATOR (S) MARYVE GIKWA

No.	Name	ID NUMBER	ROLE	TELEPHONE NUMBER	SIGNATURE
1.	CHRISTINE KARETI KIAMBI	30917326	PWD	0792809496	<i>[Signature]</i>
2	RAYMOND MUWAMBEKA	8452795	PWD	0722319315	<i>[Signature]</i>
3	JAMES KARANJA	13839572	PWD	0723860398	<i>[Signature]</i>
4	Julia KATHRE	07881108	PWD	0707312802	<i>[Signature]</i>
5	BONIFACE WASAND	2703522	PWD	0724769367	<i>[Signature]</i>
6	SHALINE KAMBU	32174414	Sign-language Interpreter	0713240740	<i>[Signature]</i>
7	Margaret Wanjeci	23622794	PWD	07197116235	<i>[Signature]</i>
8	Gabriel Wanjelg	14511746	PWD	0727007444	<i>[Signature]</i>

12.6.2. WOMEN FOCUS GROUP DISCUSSIONS

FOCUS GROUP DISCUSSION AND INTERVIEWS AT CHANGAMWE SOCIAL HALL WITH THE WOMEN FOR THE PURPOSE OF THE PROPOSED SEASCAN LPG COMPANY IN CHANGAMWE SUBCOUNTY.

Date: 30/10/2020

Venue: Changamwe Social Hall

Time: 10.30am – 12.00 noon

MEMBERS PRESENT (ATTACHED LIST)

AGENDA.

6. Introduction
7. Project description
8. Focus group discussions
9. Question and answer
10. AOB.

MINUTE 1/30/2020: INTRODUCTION:

The meeting venue comprised of portable chairs at the social hall. Arrangements were complete and participants seated by 9.00am. The meeting started with a word of prayer from Mrs. Asha James one of the Women. Mr. Fondo the community mobiliser introduced the participants and the consultants and stated a brief overview of our purpose for the day. He thanked the youth for showing up for the meeting on short notice and asked them to try as much as possible to represent the rest of the youth in the best way possible.

MINUTE 2/30/2020: PROJECT DESCRIPTION:

Mr. Fondo then introduced the Consultancy to lead the agenda. The Consultant Environmentalist Mr. Calvince Arum made a brief introduction on the purpose of organizing the consultation meeting with key representatives of the community. He stated that the community was the number one beneficiary of any project or developments done in a community. It is therefore most important that its people are consulted and advised accordingly about a project before its implementation.

He further explained the intention to bring up an LPG company in the Changamwe Sub-County. The developer being Seascan Energy Limited has identified a site for development of a loading zone, offices, storage facilities and pipes that would go through the way leave in their neighborhoods. The Consultant Ecoscience & Engineering is in the area to ensure that all social and environmental related issues are addressed amicably for the benefit of the society.

MINUTE: 3/30/2020: FOCUS GROUP DISCUSSIONS AND PROCEEDING

The Consultant sociologist gave a brief overview of the purpose of the Focus group discussion as to give insight to the kind of community we are living in today and the issues women are forced to face in Changamwe.

Mrs Naomi Mbaro stated that changamwe women were hardworking to different levels depending on what they do. A typical woman in Changamwe starts their day at 5 o'clock in the morning, she starts with the normal house chores until 8 o'clock in the morning, and she then waits to prepare lunch for the family and later prepares dinner. She may leave to meet with friends, socialize or go to the market depending. She stated most of the women in Changamwe are house wives. The number of housewife's in the meeting was 50% of the entire participants. Ms, Susan Otieno Stated that there were some women who went to work and others were in businesses. Those employed represented 10% and those in small businesses represented 40%.

Economic activities.

The women noted that small businesses like Ice making business, juice making and selling, food businesses, services such as on call house helps is what most women did for economic gain. Ms. Kahunda Kashinda Stated that there were other types of businesses such as selling cloths and utensils as well as mama mboga. She continued and explained that in a month, the normal woman with some type of business earns from KSH4,000 to KSH6,000. Some also depend on their husbands and grown children to provide for the basics in the house.

Education and Economic activities.

On enquiring about their levels of education, the women stated that most of them went up to O'levels and others just primary school. It was noted that collage was not for everyone and the majority got married soon after hitting puberty. The few that went to collage studied secretarial, nursing (mid-wifely), teaching among others. It was noted that a very small percentage ever got employed. Only 10% of the represented is employed as a secretary. Others that were once employed were laid off due to the new ideas and skill set learnt in school. About furthering their studies, the women noted that it was hard to further their studies with other responsibilities concerning the family.

Government Funds and Relief benefits

The Sociologist enquired whether there is any sort of relief the women receive from the government or other NGOs. It was noted that there some sort of relief by different organizations such as

- Redcross.
- County Relief food.
- World Food Programme.

Mrs. Susan Athiambo noted that the programs are there and very functional, but, the challenge was there are forces that hinder the even distribution of the benefits, such as nepotism, those that handle the relief foods first hand give such opportunities to their relatives and the people they

may now closely. Another issue being unequal representation to receive the relief products, in that, there is very little research and survey done on the women that are to benefit from the relief, therefore only a few and the same women or families get the different kinds of relief. The other is lack of information, some women are not even aware there is any form of relief going round.

Social Issues.

The women noted that a typical Changamwe woman has many social issues that cause emotional and psychological constraints. They noted issues such as:-

- Alcoholism.
- Single Parenting.
- Gender based Violence.
- HIV and AIDS.
- Overwhelming financial responsibilities.

Mrs. Susan Adhiambo, noted that Gender based violence was the most rampant in the area, and this applies especially to the married women. She stated 50% of the women in changanmwe were suffering in silence due to domestic violence issues. Mrs. Naomi Mbaro, sharing her experience, she stated that her husband is late, and she mourns the husband but she feels some sort of peace since the physical, emotional and sexual abuse also died with him. She claims that being a widow is hard enough but there are some advantages to it. She explained that most women were suffering from depression, stigma from their close neighbours, and having suicidal thoughts as a result of GBV.

It was noted that the women are the number one vendors of local brew “Mnazi” in the community, this also promoted alcoholism among women and their men and also following over to their youth. Mrs. Jang Ndinda Stated that the drug issue has escalated to selling of other narcotics such as bhang and heroin. She went further to state that prostitution was also growing at a fast late in Changamwe and both the young, old, married and single are part of it. The women noted this to be true and sited issues of financial constraints due to overwhelming responsibilities. A lot of families are let by the women, the men leave all financial responsibilities to their women as they go out with young girls, and engage in other social activities neglecting their families. All this has contributed to the spread of HIV and AIDS.

MIN 4/30/2020:- RECCOMENDATIONS AND QUESTIONS

The women contributed to some ideas as to how the women in the community would benefit from the LPG plant. Mrs, Evelynne wawuda Stated that they would want that the developer come up with sustainable kind of way to help the women, unlike other companies that just offer money and some food.

The community needed a form of support center where they can be free to share their experiences, get counselling services and advise on how to handle and face different situations. She stated that most women ran to the community elders and police who are not as sensitive

while dealing with such issues. In hospitals, they get treatment, but lack other kinds of support for wellness. It is such institution that they are made aware of their rights and options.

The women also suggested that the company can also give jobs to them as they are able to do clerical jobs, cleaning jobs and they have a maendeleo ya wanawake group that is involved in activities such as community cleaning, environmental conservation e.g. planting trees among others. Ms. Asha James, Also suggested that the developer could give tenders to women to supply materials and food for their employees during and after construction.

Mrs. Lilian Okach explained that most women have LPG gas in their houses, she explained that though gas was abit expensive to start up it is economic, environmental friendly, fast and reliable, however not all women use gas as a source of energy for their homes due to fear of explosions and fires. She stated that gas was used as an alternative, she therefore recommended that the company invests on training women on the use of gas products and protection measures to avoid explosions.

MIN 5/30/2020: AOBs

There being no other business the meeting stopped at 10.30pm

FOCUS GROUP DISCUSSION ATTENDANCE FORM

TARGET GROUP: WOMEN DATE: 30th October, 2020
VENUE: CHANGAMWE SOCIAL HALL
FACILITATOR (S): MARY EVE GIKWA

No.	Name	ID NUMBER	ROLE	TELEPHONE NUMBER	SIGNATURE
9.	SUSAN ADHAMBO	9286665	COMMUNITY VOLUNTEER	0719530168	<i>[Signature]</i>
10.	DEITA MOHAMMED	23262417	COMMUNITY VOLUNTEER	0721621917	<i>[Signature]</i>
11.	LYNA KITEKA	16092913	Nyumba Kumi	0721724567	<i>[Signature]</i>

FOCUS GROUP DISCUSSION ATTENDANCE FORM

TARGET GROUP: WOMEN DATE: 30th October 2020
VENUE: CHANGAMWE SOCIAL HALL
FACILITATOR (S): MARY EVE GIKWA

No.	Name	ID NUMBER	ROLE	TELEPHONE NUMBER	SIGNATURE
1.	MONICA MUYU	11477389	women	0701341321	<i>[Signature]</i>
2.	SUSAN AKINYI OTENO	30824614	women CHV	0728441403	<i>[Signature]</i>
3.	NAOMI Z MBARD	11764870	women N-KUM	0715682986	<i>[Signature]</i>
4.	EVELYN WAWUDA	11655167	women CHV	0717584824	<i>[Signature]</i>
5.	JANE NDINDA	31791271	women	0722762832	<i>[Signature]</i>
6.	KAHUNDA KASHINDA	4981391	women	073957321	<i>[Signature]</i>
7.	ASHA JAMES	2180938	woman	0710756098	<i>[Signature]</i>
8.	LILIAN OKACH	2211517	woman	0708570923	<i>[Signature]</i>

12.6.3. YOUTH FOCUS GROUP DISCUSSIONS

FOCUS GROUP DISCUSSION AND INTERVIEWS AT CHANGAMWE SOCIAL HALL WITH THE YOUTH FOR THE PURPOSE OF THE PROPOSED SEASCAN LPG COMPANY IN CHANGAMWE SUBCOUNTY.

Date: 30/10/2020

Venue: Changamwe Social Hall

Time: 9.00am - 10.30 am

MEMBERS PRESENT (ATTACHED LIST)

AGENDA

1. Introduction
2. Project description
3. Focus group discussions
4. Question and answer
5. AOB.

MINUTE 1/30/2020: INTRODUCTION:

The meeting venue comprised of and portable chairs at the social hall. Arrangements were complete and participants seated by 9.00am. The meeting started with a word of prayer from Brenda Wasike one of the youth. Mr. Fondo the community mobiliser introduced the participants and the consultants and stated a brief overview of our purpose for the day. He thanked the youth for showing up for the meeting on short notice and asked them to try as much as possible to represent the rest of the youth in the best way possible.

MINUTE 2/30/2020: PROJECT DESCRIPTION:

Mr. Fondo then introduced the Consultancy to lead the agenda. The Consultant Environmentalist Mr. Calvince Arum made a brief introduction on the purpose of organizing the consultation meeting with key representatives of the community. He stated that the community was the number one beneficiary of any project or developments done in a community. It is therefore most important that its people are consulted and advised accordingly about a project before its implementation.

He further explained the intention to bring up an LPG company in the Changamwe Sub-County. The developer being Seascan Energy Limited has identified a site for development of a loading zone, offices, storage facilities and pipes that would go through the way leave in their

neighborhoods. The Consultant Ecoscience & Engineering is in the area to ensure that all social and environmental related issues are addressed amicably for the benefit of the society.

MINUTE: 3/30/2020: FOCUS GROUP DISCUSSIONS.

The Consultant sociologist gave a brief overview of the purpose of the Focus group discussion as to give insight to the kind of community we are living in today and the issues surrounding the youth in Changamwe. She explained that with the project approaching it is important to understand the issues affecting the youth.

Daily Activities

Ms. Eunice onlteso explained the typical youth in Changamwe depending on the daily activities starts their day at 5 o'clock in the morning for those going to work in their respective work places. She stated that most of those working are employed by EPZ Company doing both skilled and unskilled labour, and Kazi kwa Vijana, the government program to support the youth. Others start their day at 9 o'clock in the morning, most of them are into local businesses such as sale of shops, garbage collection, construction works and water vending among others. Mr. Sidi Kashindo went on to say for such youth, their days end late due to other night jobs like car wash jobs and hotel works that close late.

Education and jobs

The youth went on to explain how much of a challenge it has been to get job opportunities in the county especially during the Covid pandemic. He went on to explain that most of those youth were educated to at least O'levels but are doing small income generating jobs due to lack of job opportunities. The youth members present were quick to conquer. It was noted that 50% of those in the meeting were educated up to collages doing various courses, 20% studied up to form four and the remaining 30% were class eight drop outs.

The Youth explained some of the scenarios that led to school drop outs as 30% was a big number were financial constraints, attributed to many children in the family, single parenting. Some of the children were orphans too while in some cases there is a percentage that chose not to go to school. The most common case however was due to early pregnancies. Ms. Hawa Musa, giving her experience, stated that at young age she was faced with many challenges that forced her to think she was too mature. It is that way that she found herself with a boyfriend who later left on learning she was pregnant. she explained that the community was full of such stories of young

girls either getting married soon or having to take care of other siblings when the parents are away, this includes finding some source of income.

Funding and Relief Benefits

The youth later explained that there are some organizations that work to support the youth in different ways. Such as KYEOP (Kenya Youth Employment Opportunities Project) that offers trainings on business literacy training. Life skills, stress management. They also issue certificates on completion or also give startup funds for businesses. There is stretchers youth organization that trains on legal rights, legal lanes, life skills, civil education, they also offer certification. This certificates help in securing jobs in some cases. Other bodies include Youth funds and N.G affirmative Action.

The youth explained some of the social issues the youth in Changamwe were facing. The most rampant being drug abuse, Mr.Sammy Wachira explained that even though the youth were engaging in some social economic activities, a majority of them are into drug and substance abuse. Another major issues is early pregnancies and prostitution, this is caused by poverty in families, the kind of upbringing some girls get, some parents also encourage their daughters to do prostitution so as to fend for the family or themselves. Ms. Mariam Iddi stated that some parents did not take time to teach their children on how to conduct themselves in some situations.

The youth came up with different ways in which such issues could be dealt with, Mr. Lucas Mavuo, speaking on drug abuse, advised that the youth need forums to learn about productive behavior. He also mentioned that there were drug cartels selling drugs to the youth that made it very hard to eradicate drug use, and it is by identifying the cartels that drug abuse will minimize.

CSR. Social Corporate Responsibility

The youth members noted that the project at hand may have its demerits however most of them are term and the youth would be most willing to make things easy if the bigger picture would be of benefit to them. He stated that, the youth that are losing their lives to drugs and crime everyday needed motivation and empowerment so as to have meaning in life. Engaging them in activities such as arts, football, mentorship programs and other things that can help support talent and abilities, changamwe could use a youth center to help redirect energies to those that are not yet into drugs and rehabilitation centers that will help those that are already in addiction.

Ms. Brenda Wasike, stated that job opportunities for those that are qualified and able bodied to work and earn some money would be such an advantage to the youth. She went on to state that some youth were able to make supplies to organizations and provision of tenders giving priority to the youth would be a good idea. Ms. Eunice Onlteso recommended that the developer could also fund some people to courses that are related to LPG products giving priority to the youth as they are the same people that will hold the community in future.

It was noted that half of the youth use LPG products and the rest do not due to fear of explosions and fire related accidents. The youths stated that LPG products were quite affordable, they save on time, are environmental friendly, fast and economical. However the fear surrounding its use was also felt deeply by the members.

MIN 4/30/2020:- RECCOMENDATIONS AND QUESTIONS

Mr. Lucas Mavuo, suggested that the youth needed to embrace the project fully since social change was the most constant thing in life and since the Consultants are there to ensure that the social and environmental issues are addressed, it is only fair that they saw the best of their community.

Ms. Brenda Wasike, stated that the number of benefits brought by a project may outweigh the disadvantages in most case scenario, she however noted that since they are the ones to suffer most of the effects, they should be well taken care of and considered for the best opportunities.

MIN 5/30/2020: AOBs

There being no other business the meeting stopped at 10.30pm

FOCUS GROUP DISCUSSION ATTENDANCE FORM

TARGET GROUP: YOUTH DATE: 30/10/2020
VENUE: CHANGAMWE SOCIAL HALL
FACILITATOR (S) MARY EVE GIKWA [Signature]

No.	Name	ID NUMBER	ROLE	TELEPHONE NUMBER	SIGNATURE
1.	PENINA KIAMIKU	26846135	YouTH	0727438775	[Signature]
2.	SIDI KASHINDO	25991169	YouTH	0720815967	[Signature]
3.	MARIAM IDDI	30505452	YouTH	0758376089	[Signature]
4.	Gamm-i KLAETRA	28132559	YouTH	0796340649	[Signature]
5.	LUCAS MWAVUO	36852036	YouTH	0769013717	[Signature]
6.	STEPHEN OTIEHO	27150376	YouTH	0710537171	O.T
7.	HAKA MUSA	37086621	YouTH	0704939613	[Signature]
8.	Samuel W. Ogere	37694319	YouTH	0708504308	[Signature]

FOCUS GROUP DISCUSSION ATTENDANCE FORM

TARGET GROUP: YOUTH DATE: 30/10/2020
VENUE: CHANGAMWE SOCIAL HALL
FACILITATOR (S) MARY EVE GIKWA [Signature]

No.	Name	ID NUMBER	ROLE	TELEPHONE NUMBER	SIGNATURE
9.	EUNICE ONGIESO	31620845		0706432248	[Signature]
10.	ABDALLA KHEIZ	27805414		0724046011	[Signature]
11.	Brenda KLASIKE	29559917		0704720670	[Signature]
12.	JOSEPH ODERO	8144341	SOCIAL WORKER	0714590976	[Signature]



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**PUBLIC CONSULTATION MEETING AND INTERVIEWS AT CHAANI PRIMARY SCHOOL
WITH KEY COMMUNITY REPRESENTATIVES FOR THE PURPOSE OF THE PROPOSED
SEASCAN LPG COMPANY IN CHANGAMWE SUBCOUNTY.**

Date: 29/10/2020

Venue: Chaani Primary School.

Time: 9.00am - 2.00 pm

MEMBERS PRESENT (ATTACHED LIST)

AGENDA

- Introduction
- Project description
- Public participation discussions
- Question and answer
- AOB.

MINUTE 1/28/2020: INTRODUCTION

The meeting venue comprised of an open tent and portable chairs. Arrangements were complete and participants seated by 9.00am. The meeting started with a word of prayer from Ms. Sharon Kabibi, the Youth representative Chaani Location. The chief Mr. Korzen Farjala, welcomed the consultancy group and gave them a chance to introduce themselves, followed by the community members. He thanked the members for coming to the meeting on such short notice and asked them to speak on behalf of their respective groups and represent them fully.

MINUTE: 2/28/2020: PROJECT DESCRIPTION

The Consultant Environmentalist Mr. Calvince Arum made a brief introduction on the purpose of organizing the consultation meeting with key representatives of the community. He stated that the community was the number one beneficiary of any project or developments done. It is therefore most important that its people are consulted and advised accordingly about a project before its implementation.



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He further explained the intention of establishing an LPG Plant in Changamwe Sub-County. The developer being Seascan Energy Limited has identified a site for development of a loading zone, offices, storage facilities and a pipeline that would go through the way leave in their neighborhood. The ESIA Consultant Ecoscience & Engineering Ltd is in the area to ensure that all social and environmental related issues expected to emanate from the proposed project are addressed amicably for the benefit of the community.

The Lead Research Assistant Mr. Elias Fondo with the help of a Sketch Map, explained the project location and the alignment of the way leave to the participants. The members are well aware of the KPC way leave and its use as well as the project site. So the Project Area was clear to the participants.

MINUTE: 3/28/2020: PUBLIC PARTICIPATION AND ENGAGEMENT

LPG PRODUCTS

The consultant Sociologist gave a brief overview of the stakeholders' role and responsibility, as giving information on behalf of the community on the effects the project may bring, both negative and positive. They were also expected to propose mitigation measures for the anticipated negative effects, give recommendations that may be of benefit to the society members in form of social, economic and cultural benefits.

The community seemed quite conversant with the use of LPG products, they stated that there were other similar products such as Hashi, Oilibya, Total, Pro-Gas and Seagas. The participants reported that the LPG products were in use within the community. Almost half of the participants in the meeting confirmed to be using LPG products in their homes. Madam Violet Muhonja noted that LPG was the most preferred source to energy although most people use other sources as well depending on need and capability.



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The community agreed with her that it was more advantageous to use LPG products for various reasons including:- Gas is environmental friendly, more affordable, fast to cook with, and has greater economic advantage over others. LPG products are commonly used for domestic use. Other than that, some people use them for their cooking businesses i.e. hotels.

Although the majority of the members are using LPG products, those that do not, cited issues of fear of their safety as accidents associated with LPG products can be quite fatal, madam Violet quoted an example where community members stopped a possible fire that could have been caused by children who were trying to use a gas cylinder to cook. Other examples came up as well.

Other issues included, financial issues, Mr. Katana Nyanje noted that the initial fee to acquire gas was quite high and made it quite difficult for the members to buy. He proposed that the Proponent should consider making the product more affordable for the people so that everyone can get to use gas. Participants supported his sentiments. Another suggestion made by one Ms. Mary Were, a Youth representative was that the proponent can allow for a credit system where buyers pay in instalments to reduce the financial burden. She further suggested that the proponent can also consider, during the launch of his product, offer to cater for half the cost and the community meets the other half.

ECONOMIC ACTIVITIES.

The consultant further enquired about the major economic activities of people in the area. It was noted that the community members engaged themselves in handy work and nonprofessional work. This was because, there was low rate of employment especially among the youth.

The community stated that the;

- ✓ Youth in the area engaged in activities such as boda riding, Garbage collection, selling of Local brew and Mlraa, water vending, transport industry, and hawking.
- ✓ Women on the other hand mainly engaged in food businesses and service delivery jobs as well as mama mboga.



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- ✓ Men do small businesses, garbage collection, Jua Kali jobs such as welding, casual labor among others.

It was noted that that even though some youth went to school and are employed professionally, they are very few, other youths are engaging in informal businesses that are not productive, and this has rendered them into using drugs to the point of addiction.

EDUCATION

The community stated that the level of education was quite low. Many children drop out at primary level or fail to enroll in Secondary schools. The community noted that the high level of poverty has caused such problems as the issue of school fees is a challenge to many. Mr. Gorge Zuma a Youth representative stated that the said free education was not free after all, as parents are asked to pay for some services, buy books and at times pay for food.

Madam Christine Ndaro, a teacher spoke at length about the need for the parents to take responsibility of their children and meet the government half way when it comes to the free Secondary education. She asked the members to appreciate the relief support provided and strive to be more independent especially on matters that affect their children.

The community members further stated that several opportunities for funding and food relief are often provided for the community by the county government and other donors. This relief food and funding include:-

- ✓ CDF funding - which has proven to be the most consistent and resourceful.
- ✓ County relief food- At least half of the participant's received relief food.
- ✓ Mombasa Cement- that has benefited quite a number in the community.
- ✓ Bursary fund.
- ✓ World food programme money transfers, and
- ✓ Red Cross society of Kenya.



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EXPECTED EFFECTS RELATED TO CONSTRUCTION OF THE PROPOSED PIPELINE ALONG THE WAY LEAVE

The Consultant Sociologist explained that the KPC pipeline way leave is targeted for construction of a pipeline to move the LPG products from the Port to the proposed Depot. She stated that construction may lead to positive and negative impacts on the community. The community proposed impacts such as:-

- ✓ Eviction of businesses located at the way leave-
- ✓ Businesses related to mama mboga shops and household vending will need to relocate due to interruption.
- ✓ Mr. Peterson a teacher suggested that the affected persons needed to be relocated to another location, compensated for time and money lost and also facilitated to move.
- ✓ Disruption of traffic that may cause congestion:-
- ✓ The members suggested that the major means of transport was by road. Construction is likely to cause traffic congestion.
- ✓ They suggested that diversions should be made to be passable and also should be maintained to be environmentally friendly to users.
- ✓ Social interaction and social vices

The participants reported that there is possible social interaction of people coming to work for the project and the local residents. The representative of Child protection Mr. Walter Opanda strongly noted that such interactions at times lead to unwanted pregnancies among girls, early marriages, rape and even abduction of children among other social vices.

He suggested that measures for child protection be put into place to ensure that the children are safe and most especially in the police stations.

Environmental Issues

Calvince Arum the Environmental Expert asked the community members to contribute on likely anticipated impacts in regards to Environmental Issues.



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Peterson Juma a teacher, shared that environmental Issues like noise and dust are likely to occur during construction activities. James Muthama added that noise might arise from earth vibrations/ disturbances during excavation and construction works.

Mrs. Michiku Paul, highlighted the anticipated Health and Safety issues involved such as risks of falling objects, risks of falling into the drainages during installations of the pipeline in the way leave and risk of fire explosions from the pipeline.

Mitigation Measures proposed included;

- ✓ Compensation be done by the proponent if such cases occur.
- ✓ The Chief Mr. Kombo Farajala proposed enclosing the construction areas to protect people from falling objects during construction.
- ✓ Developers to notify the community of the noisy activities and undertake in a manner, which is friendly by scheduling the noisy activities at night times.
- ✓ Mr Katana Nyanje proposed the contractors to be sprinkling water for dust suppression during construction to minimize dust exposure.
- ✓ Contraction workers be provided with adequate Health and Safety Personal Protective Equipment.
- ✓ Planting of trees as part of CSR.

OTHER ISSUES

CORPORATE SOCIAL RESPONSIBILITY (CSR)

The community brought up the issue of giving back to the community. A village elder stated that the community has a lot of able men and women and youth that are able to work in the project, and that the community should be the first to benefit from job opportunities that will arise from the project. It was further suggested that at least 100 people from the community should be given job opportunities.



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It was debated that the proponent needed to do something to benefit the community. Mr. George Pondo the Youth leader stated that the project does not only have advantages for the immediate community, but may also generate some negative impacts that directly affect these people. It was for this reason that some CSR activities were recommended:

- ✓ Sponsorship of children for education from primary to college levels
- ✓ Provision of piped fresh water to the community and boreholes as water has been a challenge.
- ✓ Fund the polytechnic that was left unfinished due to lack of funds, renovate it and facilitate its start up.
- ✓ Sponsor local clubs, related to arts, and sports such as (drama, ball games among others), that are already existing and doing sustainable activities.
- ✓ Funding of at least 15 people for LPG related courses among others to empower the youth and educate local communities on LPG.

MIN 4/29/2020:- RECCOMENDATIONS AND QUESTIONS

Mr. Walter Andati stated that children protective sites and strategies should be put into consideration during the project. The sites are for reporting any issues related to children in the community.

The ward Admin Omar Khamisi stated that there should be training on fire drills to the youth and the other community members.

He went on to suggest that a feedback mechanism should be formulated to ensure that the community is not left unattended and unheard as project development commences.

HIV AND AIDS awareness campaign should be done in the community at the time of project implementation to ensure that social decay is mitigated.



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MIN 4/20/2020: AOBs

There being no other business the meeting was closed at 1.00pm

Confirmed By:

Name: KOMBO FARJALA

Title: ASST. CHIEF CHAANI LOCATION

Signature: 

AS CHIEF
CHAANI LOCATION



**PUBLIC CONSULTATION MEETING AND INTERVIEWS AT PORTREITZ CHIEFS CAMP
WITH KEY COMMUNITY REPRESENTATIVES FOR THE PURPOSE OF THE PROPOSED
SEASCAN LPG COMPANY IN CHANGAMWE SUBCOUNTY.**

Date: 27/10/2020

Venue: Port Reitz chief camp

Time 9.00- 10.00 am

MEMBERS PRESENT (ATTACHED LIST)

AGENDA

1. Introduction
2. Project description.
3. Public participation
4. Question and answer
5. AoB's

Minute 1/27/2020: INTRODUCTION

The community members gathered at the tent and chairs provided at the chief's camp at Kwa Bomu primary school at 9.00am. The meeting started with a word of prayer from Mr. Hussein Musa representing people with disability. The village elder Mr. Mohammed Abushir, welcomed the consultants and the community members. He later let by introducing himself and the community members respectively by name and the groups in the community they represent. He then led the meeting to the chief to address the community.

The Chief Bwana Faraji Kibwana took over the meeting, he briefly explained the reason the representatives were called for the meeting and not the whole community. He asked the



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members to listen carefully, ask questions and express their views openly without fear since they have been rusted by the rest of the community members to be their ears. He also advised them to continue spread the word to the groups they represent so the community as a whole is not in the dark of what is happening in their neighborhoods.

The chief then gave the consultants a chance to state their agenda.

MINUTE: 2/27/2020: PROJECT DESCRIPTION

The consultant Environmentalist Mr. Calvince Arum made a brief introduction of the purpose of holding the public consultation meeting. He stated that it was very important that the community views, needs and opinions are put into consideration when decisions involving making the design of the project are met. He stated that the project will touch several village in three locations, where the way leave passes as well as at the site in Changamwe.

The lead research assistant Mr. Elias Fondo explained the project site with the help of a map sketch and the areas touched by the way leave. The community seemed informed about the way leave and the villages adjacent, as well as the proposed project site.

Mr. Calvince from the consultant's team, explained further about the proponent's intention, the proposed LPG Company SeaScan and the consultants Ecoscience role in the project, which is to gather information from the community through public participation and interviews from key representatives that will be incorporated in the report. The Environmental team on the other hand will identify any safety and environmental impacts to the society and the environment and ensure that care is given in all aspects and mitigate on expected negative effects.

MINUTE: 3/27/2020: PUBLIC PARTICIPATION AND ENGAGEMENT.

The consultant sociologist gave a brief overview of the stakeholder's role and the key informant's responsibility as giving information on behalf of the community on the expected effects the project may bring, both negative and positive. Propose mitigation measures to the negative effects, give recommendations that may be of benefit to the society members in form of social, economic and cultural benefits.



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Major concerns from the community were:-

1. **Short term effects** - the members stated that there could be short term as well as long term effects during construction. The short term including, dust emissions, noise, displacement of businesses, relocations, traffic congestion among others that are related to construction. They suggested mitigation measures such as sprinkling of water along the areas with dust, adjustment of working hours to avoid traffic congestion, timely notice to those being displaced and alternative land to be given where necessary. They also stated a good relationship with the contractor.
2. **Safety measures** by the proponent to curb gas leak and possible fires at the project site as well as the way leave. The Environmental team responded by assuring the community that the Consultants are working together with the fire company, DOSH, and NEMA in Mombasa county to ensure proper measures are done to ensure the community is protected from such fatal incidences.
3. **Employment opportunities**- The youth representative Mr. Hamisi S. Mugara noted with much concern that the local manpower should be given first priority when it comes to the project implementation as well as other surveys in between. They also emphasized that employment should not only be for manual labour positions but other positions as well as some youths in the area may be qualified. He went further to give an example by other companies and consultants who have done similar surveys and during implementation ended up bringing their own manpower, others did employ the locals yes, but they were from other communities and not from the community directly affected. He urged that the locals directly involved should be employed.

The community members stated that there was very low rate of employment in the area, this has caused the youth in the community be involved in risky behavior, including drug abuse especially causing social decay. It was noted that there are a few youths with degrees but are just at home due to lack of employment.

The community stated that most some people have been employed by the government, a few more by private companies, especially hotels, most of them are doing local and manual jobs and the larger majority are engaging in drug abuse. The effect of Covid -19 has also caused the



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employment issue as most companies reduced their staff members to be able to catch up with the current state. Other companies were permanently closed.

The community members stated that they have had trouble in the past to access government funds and bursary benefits due to corruption and also few slots provided too. They however stated they get the county relief foods and the Mombasa cement relief foods and are grateful for that they however would like permanent solutions to their problems.

They proposed

The consultant advised that the proponent would be advised on the need to use local manpower as in a way it also helps promote social security since the locals are able to safeguard and protect their own. At the same time bringing employment would bring forth a less dependent community if its youth is empowered.

4. The Nyumbakumi representative Joyce Kigenda also noted that they are losing their youth to drug abuse, early marriages and crime in Port Reitz. This is an issue of concern and worry to parents.

It was noted that this high number of lost youth was attributed to:-

- **School drop outs-** some of the young men and girls were out of school due to lack of school fees. Although there is free education, schools ask for some money to facilitate in different capacities
- **Early marriages-** young girls opt out of school and they choose to get married to partners that prove more financially stable.
- **Early pregnancies-** young girls engage in unprotected sex and risky sexual behavior that leads to early pregnancies and hence dropping out of school.
- **Unemployment-** it was noted that due to lack of employment, the fortunate number of youths that are able to complete their O' levels are at a challenge of getting jobs. The frustrations and idle mindedness leads them to drug and alcohol abuse.



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5. The consultant went further to inquire from the community the main sources of economic in the location. The major economic activities for men being Food business- roasting of meat, hotel industry at the local level, transport industry and jua kali such as shops.

Economic activities women being food business, including: - Fish cooking, mama Pima, vibandavyamboga, and domestic products shops

The youth were involved in bodaboda and tuktuk businesses, and construction labour works.

- It was noted that some of this business activities are done on the way leave.
- Any construction at the way leave would mean disruptions the normal way of lives for those people. The community suggested that those disrupted would probably be compensated for the period of time they are disrupted. Mr. Zablon Juma also suggested that the traders could also be given alternative land to set their businesses and given some compensation to help them move as well as start up.

The community explained that the LPG use is well known but has not been fully embraced by all the members in the village. The major source of energy being firewood, charcoal and kerosene. The members stated that the LPG had his benefits over other sources of energy such as:-

- ✓ Economic value, LPG use is more economical, to use as compared to other sources of energy.
- ✓ LPG use is also more environmental friendly as it preserves trees and has no smoke emission.
- ✓ Health friendly to the users.
- ✓ Time saving as the gas is fast and the community can engage in other economic activities.

Main challenges faced by the community was



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- ✓ Lack of information on gas use and safety measures.
- ✓ The gas runs out without any form of warning at a time there is no money to refill
- ✓ The fear of fatal accidents that come about due to gas related fires is a challenge to many.
- ✓ Poor quality gas that evaporates to the air, or is half way filled.

How can the challenges be overcome?

- ✓ The communities proposed trainings on safety and use of LPG products.
 - ✓ Initial fee to get the gas cylinder to be minimized so many people can be able to access the gas.
 - ✓ Provide gauges that can detect the use of gas to avoid unprecedented finish.
 - ✓ Give quality burners that are well fixed to avoid leakage
-
- **Land ownership** - It was noted that most of the residents live on rented homes with their landlords living in other towns.
 - **Social vices**- the community members spoke on issues of social vices and expected social decadence in their community that could be caused by interactions of the traders and personnel that come to work in the area. Such effects including, breakage of families, increased prostitution, spread of HIV/AIDS and other STIs, early pregnancies among others. They suggested that the community should be given enough education and sensitization on the possible outcome of some interactions.
 - It was however noted that such interactions were also important and could bring positive effects such as intermarriages, cultural exchange, increased business income (i.e. sale of cooked food and raw foodstuff to construction workers) among others. All members should be sensitized on the limits to social interactions.

Suggestions and Opinions

- **Restoration of current state**- The community members suggested that other companies, the county government as well as the National government has been doing



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a major improvement in the areas, they suggested that in case of any construction that the proponent ensures that he restores the previous state as it was found before its work.

- **Grievance redress mechanism**-the community was concerned about having a committee that dealt with grievances in case of implementation. This will make the community members more secure knowing that their own was involved in the process, their rights may be protected.
- **Way leave construction**- it was suggested that should the way leave require expansion to add another pipeline, the proponent to consider another way leave that will not interrupt the people's livelihood. The community was advised that the existing way leave is government owned and any construction works will need to be authorized by the in charges of the way leave. If the way leave is to be altered, it would be done with deep consideration of the society's best interest.
- **The contractor and proponent**- the community suggested that the contractor and proponent's staff should at least attend the community mobilization meetings and get firsthand information and feelings of the members and express their challenges as well in implementing the same.

The community members had some Expectations that the Proponent should consider in case the project goes further and is implemented including:-

- The consultant to hold safety trainings and teach the community on how to protect themselves from gas related accidents.
- To provide a rehabilitation center to help the children and youth in addiction in the area
- Employed the stable and learned/skilled youth and local labor in their company.
- To fund or provide sponsorship for trainings/ education for the youth this will help in empowering the youth.
- To help in creating businesses for the community either directly or indirectly with the use of their gas. E.g. provide gas depots for community members or sponsor/fund use of their gas products in hospitals and small businesses.



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- ✓ Lack of information on gas use and safety measures.
- ✓ The gas runs out without any form of warning at a time there is no money to refill
- ✓ The fear of fatal accidents that come about due to gas related fires is a challenge to many.
- ✓ Poor quality gas that evaporates to the air, or is half way filled.

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Suggestions and Opinions

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- That the price of the Seascan gas be favorable in terms of cost and quality as compared to the other gas products around the area.
- That the Company provide for gauges when buying the cylinders to make it easy for them to detect when the gas is running out.

MIN 4/7/2020: QUESTION AND ANSWER

The community members did not have much questions apart from the clarification of the project site and concerns about safety which were clarified. They however gave us suggestions and opinions to help serve better the community.

Min 5/7/2020: AOBs

There being no other business, stakeholders were given interviews one on one by our research assistants.

The meeting ended at 2.30 pm with prayers from the community health worker Jane Kavesa.

Name: TADAYI LIBYANA

Telephone No: 0713883028

Title: Chief

Sign: [Signature]





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Telephone No: 0713880028

Title: Chief

Sign: [Signature]





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**PUBLIC CONSULTATION MEETING AND INTERVIEWS AT KWA HOLA CHIEFS CAMP
WITH KEY COMMUNITY REPRESENTATIVES FOR THE PURPOSE OF THE PROPOSED
SEASCAN LPG COMPANY IN CHANGAMWE SUBCOUNTY**

Date: 28/10/2020

Venue: Kwa Hola Chief's Camp

Time: 9.00am - 2.00 pm

MEMBERS PRESENT (ATTACHED LIST)

AGENDA

1. Introduction
2. Project description
3. Public participation discussions
4. Question and answer
5. AOB.

MINUTE 1/28/2020: INTRODUCTION

The meeting venue comprised of an open tent and portable chairs. Arrangements were complete and participants seated by 9.00am. The meeting started with a word of prayer from Mr. James Muthama, the youth representative Kwa Hola Village. The Chief Mr Omar Swali welcomed the community members and thanked them for heeding to his call and availing themselves for the meeting. He requested that the members introduce themselves and their subsequent groups. He then requested that the community hear the message the consultants have and ensure they inform the other community members after the meeting. He then handed over the meeting to the consultant's team.

MINUTE: 2/28/2020: PROJECT DESCRIPTION.

The Consultant Environmentalist Mr. Calvince Arum made a brief introduction on the purpose of organizing the consultation meeting with key representatives of the community. He stated that the community was the number one beneficiary of any project or developments done in a community. It is therefore most important that its people are consulted and advised accordingly about a project before its implementation.



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He further explained the intention to bring up an LPG company in the Changamwe Sub-County. The developer being SeascanEnergy Limited has identified a site for development of a loading zone, offices, storage facilities and pipes that would go through the wayleave in their neighborhoods. The Consultant Ecoscience & Engineering is in the area to ensure that all social and environmental related issues are addressed amicably for the benefit of the society.

The research assistant Mr. Elias Fondo with the help of a Sketch map, explained the project location and the alignment of the wayleave to the participants. The members are well aware of the KPRL wayleave and its use as well as the project site. So the Project Area was clear to the participants.

MINUTE: 3/28/2020: PUBLIC PARTICIPATION AND ENGAGEMENT

The consultant Sociologist gave a brief overview of the stakeholders' role and responsibility, as giving information on behalf of the community on the effects the project may bring, both negative and positive. They were also expected to propose mitigation measures for the anticipated negative effects, give recommendations that may be of benefit to the society members in form of social, economic and cultural benefits.

DISCUSSION POINTS

1. UNDERSTANDING LPG

The Consultant enquired from the community whether they understood the meaning of LPG and what it meant. The women representative madameJosphineKenga explained that it was the use of Gaseous cooking energy for commercial and domestic use. Some of theLPG companies existing in the community included Hashi, Total, Seagas, Oilybia among others. Most of the mentioned LPG products are within the community.

a) Use of LPG products

The consultant further enquired to know if the LPG products were being used by the community members, Community members stated that some people from the community use gas cooking energy but not all. The other sources of energy used are paraffin, charcoal, and firewood. Some



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households use a mixture of energy products for different purposes depending on need. Only half of the participants reported being users of LPG products.



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b) Major reasons why LPG products are not fully embraced

The community members gave a number of reasons why the LPG energy was not widely embraced including:-

Financial Constraints- they stated that refilling the gas cylinders was manageable but the initial amount needed to own a cylinder and other requirements was quite expensive.

Insecurity in terms of safety- Most participant's felt that the danger associated with LPG products was too fatal if it happened. RosebellaOjwang the community health worker noted an incident where a lady got burnt after a gas explosion happened at her house which rendered her unable to live her normal life thereafter.

Hindrance in terms of location- some communities live far from the town and therefore it is not easy to access the LPG products. The community members went ahead to state that the LPG companies only provide a sticker on their cylinders explaining the use of their products, which is a challenge to some since they may not be educated enough to read and understand. Lilian Ogot representing the schools in the society stated that the community needed more information on the use of the gas products to eradicate fear and misconceptions which was shared by other participants.

Mr. John Simanya community member stated that those living in far locations can have gas energy brought closer to them by helping in opening of depots close to their homesteads. This being that comparing to other forms of energy, LPG products were more advantageous. This suggestion was backed by other participants.

c) Common Use of LPG products.

The members stated that LPG products were used in their community, other than the common domestic use, the products are also used in businesses including

- Salons - warming water for clients



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- Hotels and other food businesses prefer LPG as it is more economical compared to charcoal and paraffin.
- Welding businesses especially done by men, among others.
- d) **Advantages of LPG products.**

The community stated that, LPG products have more advantages to use over other sources in terms of:-

- **It is environmentally friendly-** Gas unlike the other energy sources does not emit smoke that is harmful to the people, especially respiratory organs. Tree cutting for timber will be minimal meaning more conservation of forests as well.
- **Quick and easy to use-** without having to fetch firewood, community members especially women and girls have more time to engage in other economic and social activities. Less time wasted when using gas.
- **Economic value-** Participants felt that gas is cheaper than firewood and paraffin. Mrs. Lilian Ogot gave a description showing how she used KSH700 more in a month when using charcoal and paraffin as compared to using gas.
- **Controllable-** using gas was easier since it is easy to control the amount of heat used according to need.
- **Clean to use-** Gas does not produce soot and other waste products that causes dirt.

Disadvantages

- **Unprecedented finish-** the community noted that gas can run out in the middle of cooking a meal. They suggested a way to monitor gas use to be formulated. Mrs Mary Karanja the nyumbaKumi representative noted as an example that use of cylinder gauge was common to some people but it is only provided for the 13kg gas cylinder.
- **Leakages and safety issues-** it was noted that most community members were less informed of the safety measures on use of gas. It was agreed that awareness creation programmes for community and business members is needed.
- **Poor Quality product-** they noted that some products are of poor quality and may only last two weeks for the 13kg gas.



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2. EMPLOYMENT AND ECONOMIC ACTIVITIES

The consultant further enquired about the major economic activities of communities in the area. It was noted that the community members engaged themselves in handy work and less professional work. This was because, there was low rate of employment especially among the youth.

It was indicated that though their youth were educated, a majority of them to collage and some degree levels, lack of jobs has relegated them to manual economic activities to give them an income. She stated that unemployment was attributed to:-

- Inadequate job opportunities in the County Government.
- Corruption – the advertised job opportunities are spared for a minority few.
- Closure of most private businesses- especially hotels due to Covid-19
- Closure of the Clearing and forwarding jobs due to development of SGR.

Mr. Martin Muindi a youth representative, backed by others in the meeting explained some of the economic activities done by the youth including: - Garbage collecting, selling of Local brew and Miraa, water vending, transport industry, hawking. He continued to explain that those activities only give a small amount of income to the community youth.

The Community Elder Mr. Raymond Ndoleamong others stated the major economic activities for the men including - Jua Kali industry, local trading, transport industry, local brew distribution among others.

The women on the other hand are involved in:- service jobs such as salons, cleaning jobs, house helps, food businesses and new and second hand cloth businesses.

The community member's further stated that several opportunities for funding and food relief are often provided for the community by the county government and other donors. This relief food and funding include:-

- CDF funding - which has proven to be the most consistent and resourceful.



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- County relief food- At least half of the participant's received relief food.
- Mombasa Cement- that has benefited quite a number in the community.
- Bursary fund.
- World food programme money transfers, and
- Red Cross society of Kenya.

The ward administrator Mr. Omar Khamis advised that people benefit from such funding, however that is not a permanent way of livelihood, the members agreed that the funds were only for relief and other measures are needed to empower the youth and the society as a whole such as:-

- Train courses related to LPG safety and care as well as other professional courses.
- Sponsor the youth to school from secondary level.

3. EXPECTED EFFECTS RELATED TO CONSTRUCTION AT THE WAY LEAVE

The sociologist explained that the KPC pipeline wayleave is targeted for construction of a pipeline to move the LPG products from the Port to the Depot. She stated that construction may lead to positive and negative effects to the community. The community proposed impacts such as:-

- **Eviction of businesses located at the way leave-**

Such businesses related to mama mboga shops and household vending will need to relocate due to interruption.

They suggested that the affected persons needed to be relocated to another location, compensated for time and money lost and also facilitated to move.

- **Disruption of traffic that may cause congestion:-**

The members suggested that the major means of transport was by road. Construction is likely to cause traffic congestion.



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They suggested that diversions should be made to be passable and also should be maintained to be environmentally friendly to users.

➤ Social Interaction and social Vices

- The members noted that there is possible social interaction of people coming to work for the project and the local residents. The Women representative Mrs. Josphine Kenga strongly noted that such interactions at times lead to unwanted pregnancies among girls by fathers who flee to take responsibility of the babies.
- She further stated that the youth especially young men are likely to leave and abandon their young wives for other women once exposed to more income. Consequently, they may also engage in activities that are not beneficial to themselves and their wellness. Mr. Ramadhan Omar, suggested that the youth needed to be engaged to financial literacy trainings, as well as the need to protect their families through public sensitization barazas among others.
- Madam Lilian Ogot representing the teachers stated that students will be disrupted since most of them walk to schools. This might also affect people going to work who might have to walk longer distances. It was agreed that the proponent should come up with ways to ensure the access roads are passable and safe for all users. Children and workers should be guided to ensure none is hurt. Child chaperons should also be involved in educating the teachers and the students on making sure the children safety is given a priority.
- The PWD representative Mr. Katana Kireo stated that the proponent should not be discriminative to people living with disabilities when it comes to consideration for job opportunities and trainings. Ramps should be provided to ensure easy passage of wheel chairs.

Environmental and Social Issues

- Calvince Arum the Environmental Expert asked the community members to contribute on likely anticipated impacts in regards to Environmental Issues.
- Omar Ramadhan stated that Environmental Issues like noise and dust during construction activities. James Muthama added by stating there might be noise from earth vibrations disturbances during excavation and construction works.



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- Martin Muindi stated the anticipated Health and Safety issues involved like risks of falling objects, risks of falling in the drainages during installations of the pipes in the wayleaves and risks of fire from the pipeline.
- Mitigation measures included enclosing the area from falling objects during construction; developer to notify the community of the noisy activities and undertake them in a manner which is friendly by scheduling the noisy activities at night times.
- Omar Ramadhan proposed the contractors to be sprinkling water for dust suppression during construction to minimize dust exposure. He also suggested that the contractors to be provided with adequate Health and Safety Personal Protective Equipment. Omar Hamisi the Ward Representative suggested planting of trees as part of CSR.

MINUTE 4/28/2020: QUESTION AND ANSWER

- Madam Josphine Kenga asked whether there was a way to follow up on the implementation of the issues discussed and a way to know whether or not the issues raised will be addressed.
- The community was advised that during Implementation, a complaints redress system shall be put into place to monitor implementation at the community level also understand the challenges the proponent may face and how to resolve them.
- Mr. Ramadhan a youth representative suggested that a small section be put aside for purposes of health and emergencies at the project site to ensure that injuries are addressed even before going to the major hospitals.
- Madam Bella Ojwang suggested that the community needed to also be useful to the proponent in a way such as help in advertising the product to the societies at grass root level, as well educate the elderly and children about proper use of gas.

MIN 5/28/2020: AOBs

- The consultant rested and the chief took over the meeting, informing the participants about the NYS registration that was happening at the Chief's Camp and advised everyone to come including the PWDs. Girls were also encouraged to apply.



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- The Ward representative advised the community not to ignore messages coming to their phones as that would cause them to miss opportunities to get relief funds and food from World Food Programme.
- There being no other business the meeting ended at 2.00pm.

Signatures: _____

Name Dman Swaleh

KWAHOLA LOCATION
CHANGAMWE SUB-COUNTY

Title: CHIEF - KWAHOLA LOCATION

0722 123112

12.7. LEASE AGREEMENT

C.T.C of Original



Dated this

2nd day of, January 2020

KENYA RAILWAYS CORPORATION
(“LESSOR”)

To

SEASCAN ENERGY LIMITED
(“LESSEE”)

LEASE OF UNSURVEYED KR LAND IN CHANGAMWE YARD
MOMBASA MEASURING APPROXIMATELY TEN (10) ACRES

DRAWN BY:-

Corporation Secretary
Kenya Railways
P.O. Box 30121-00100

NAIROBI

1

A handwritten signature in the bottom right corner of the page.

REPUBLIC OF KENYA
THE REGISTRATION OF TITLES ACT

LEASE

THIS LEASE is made this 2nd day of January ^{ONE} Two Thousand and Twenty between:
PARTIES

- (1) **KENYA RAILWAYS CORPORATION** of P.O. Box 30121-00100, Nairobi (hereinafter referred to as "**the Lessor**") which expression shall where the context so admits include its successors and assigns) of the one part.
- (2) **SEASCAN ENERGY LIMITED** of P.O. Box 21725-00505 , Nairobi (hereinafter referred to as "**the Lessee**") which expression shall where the context so admits include its successors and assigns) of the other part.

WHEREAS:

- a. The Lessor is the beneficial owner by way of a Vesting Order from the Government of Kenya of Unsurveyed Kenya Railways Reserve Land in Changanwe Yard-Mombasa (hereinafter called "**the Property**") as more particularly delineated on the annexed survey plan.
- b. The Lessor has at the request of the Lessee agreed to grant to the Lessee a lease over the said Property for the term herein below and under the terms and conditions hereinafter appearing.

NOW THIS LEASE WITNESSETH that in consideration of the rent hereby reserved and the observance by the Lessee of the terms and conditions and covenants hereinafter contained the Lessor **HEREBY LEASES** unto the Lessee the said property containing by measurement approximately **10.0 acres** or thereabouts to be held by the Lessee as lessee for the term of **Forty Five (45) Years** from the 1st day of **September Two Thousand and Twenty YIELDING AND PAYING** thereof and thereabout at an annual rent of **Kenya Shillings Six Million, Eight Hundred Thousand only (Kshs**

6,800,000.00) for the land payable **annually** in advance and attracting default interest of **Two Per centum (2) %** per month of every overdue month **PROVIDED THAT** the rent will be escalated after every **Five (5) years** at the rate of **Ten per Centum (10%)** over the immediately previous rent during the lease term.

On or before execution of this Lease, the Lessee shall be required to pay Annual Rent amounting to **Kenya Shillings Six Million, Eight Hundred Thousand only (Kshs 6,800,000.00)** for the property, Stand Premium of **Kenya Shillings Twenty Five Million Five Hundred Thousand Only (Kshs. 25,500,000.00)**, Security Deposit of **Kenya Shillings One Million, Seven Hundred Thousand only (Kshs. 1,700,000.00)**, Administrative Charges of **Kenya Shillings Two Hundred Shillings only (Kshs. 100,000.00)**, Application fees of **Kenya Shillings Five Thousand only (Kshs. 5,000.00)** and Pegging/ boundary affirmation fees of **Kenya Shillings Fifty Thousand Only (Kshs. 50, 000.00)** The lettable area for the property is **10 Acres**.

AGREED TERMS

1. INTERPRETATION

- 1.1 The definitions and rules of interpretation set out in this clause apply to this lease. In this Lease words importing corporation shall include persons (whether masculine or feminine as the case may be) and vice versa and words importing the masculine gender only shall include the feminine gender and words importing the singular number shall include the plural number and vice versa and where there are two or more individuals included in the expression 'the Lessee' covenants expressed to be made by it or them shall be deemed to be made by such persons jointly and severally.

Insured Risks: means fire, explosion, lightning, earthquake, storm, flood, bursting and overflowing of water tanks, apparatus or pipes, impact by aircraft and articles dropped from them, impact by vehicles and any other risks against which the Lessor decides to insure against from time to time and **Insured Risk** means any one of the Insured Risks.

Permitted Use: That neither the Property nor any part thereof shall be used for any purpose other than as property for commercial use without written consent of the Lessor first had and obtained.

Services: all media for the supply or removal of heat, electricity, gas, water, sewage, air conditioning, energy, telecommunications, data and all other services and utilities and all structures, machinery and equipment ancillary to those media.

- 1.2 A reference to this **lease**, except a reference to the date of this lease or to the grant of the lease, is a reference to this agreement and any deed, licence, consent, approval or other instrument supplemental to it.
- 1.3 Unless the context otherwise requires, a reference to the **Property** is to the whole and any part of it together with the improvements being thereon (if any).
- 1.4 A reference to the **term** is to the Contractual Term and any agreed or statutory continuation of this lease.
- 1.5 A reference to the **end of the term** is to the end of the term however it ends.
- 1.6 A **working day** is any day which is not a Sunday, or a public holiday in Kenya
- 1.7 References to **writing** or **written** do not include email.
- 1.8 Except where a contrary intention appears, a reference to a clause or Schedule, is a reference to a clause of, or Schedule to, this lease and a reference in a Schedule to a paragraph is to a paragraph of that Schedule.
- 1.9 Clause, Schedule and paragraph headings do not form part of the lease and do not affect the interpretation of the same.

2. **LEASE OF PROPERTY**

The Lessor as beneficial owner **HEREBY** lets the Property to the Lessee for the Contractual Term.

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ally

3. **THE RENT**

The Lessee shall pay the Rent in respect of the property annually in advance. The payments shall be made by Bankers cheque or by any other method that the Lessor requires at any time by giving notice to the Lessee.

4. **REVIEW OF THE RENT**

The amount of Annual Rent shall be reviewed as agreed and payments will be as provided this lease

5. **OPTION TO RENEW**

If the Lessee shall be desirous of obtaining a further lease of the property, the same shall be signified by notice in writing delivered to the Lessor **Three (3) months** before the expiry of the current lease. If the lessee shall at all times during the term of the lease have duly performed and observed all covenants, agreements, conditions, restriction, stipulations and provisions herein contained or implied then the Lessor at or before the expiration of the term of this lease at the request of the Lessee and at the full discretion of the Lessor may grant to the Lessee a lease of the property for a further term to commence at the expiration of the term of this lease upon such terms as the Lessor and Lessee may agree.

6. **UTILITIES**

6.1 The Lessee shall pay all costs in connection with the supply and removal of electricity, gas, water, telecommunications, data to or from the Property.

6.2 If any of those costs are payable in relation to the Property together with other property, the Lessee shall pay a fair proportion of all those costs.

6.3 The Lessee shall comply with all laws and with any recommendations of the relevant suppliers relating to the use of those services and utilities.

7. **COSTS**

The lessee shall pay all costs in relation to drafting, execution and registration (if at all) of this lease.

*ally*⁵

8. COUNCIL RATES, LAND RENT AND OTHER IMPOSITIONS

The Lessee shall pay all present and future Rates, Land Rent, Taxes and other impositions payable in respect of the Property over and above the Rent herein reserved.

9. REGISTRATION OF THIS LEASE

Promptly following the grant of this Lease, the Lessor's Advocates shall at the Lessee's cost stamp and apply to register this Lease at the respective Lands Registry.

10. CESSION, ASSIGNMENT AND SUBLETTING

The Lessee shall not cede, assign or sublet or share possession or occupation of the whole or part of the property without the written consent first had and obtained of the Lessor (which consent shall not be unreasonably withheld) **AND IT IS HEREBY AGREED AND DECLARED** that upon any breach by the Lessee of this clause it shall be lawful for the Lessor to re-enter upon the property without notice and thereupon the term hereby shall cease and determine **PROVIDED ALWAYS** if the Lessor shall share occupation with its employees or agents that shall not operate as a breach of the terms of this clause or lease.

11. SIGNS

11.1 In this clause Signs include signs, fascia, placards, boards, posters and advertisements.

11.2 That no sign or name plate shall be exhibited on the exterior of the Property (or the interior thereof so as to be visible from the outside) without prior approval from the Lessor (which consent shall not be unduly withheld by the Lessor) and relevant Local Authority (which copies shall be supplied to the Lessor).

ally⁶

11.3 The Lessee shall place on the property such signs as may be necessary to promote its business.

11.4 Before the end of the term, the Lessee shall remove any Signs placed by it at the Property and shall make good any damage caused to the Property by that removal.

12. RETURNING THE PROPERTY TO THE LESSOR

At the end of the term the Lessee shall return the Property to the Lessor with vacant possession of every part of it in the repair and condition required by this lease. The Lessee shall be entitled to remove any temporary structures erected on the Property.

13. USE

13.1 The Lessee shall not use the Property for any purpose other than the Permitted User (the user is commercial). The Lessee shall seek the consent from the Lessor for the Change of User (if necessary).

13.2 The Lessee shall take all reasonable and practicable steps not to destroy or interfere in any way whatsoever with the perimeter fence (if any).

14. NUISANCE

The Lessee will not to do or suffer to be done on the property anything which may be or become a nuisance or annoyance to the Lessor or the owners or occupiers of any adjoining land and to indemnify the Lessor against claims by third parties in respect of any breach of this clause.

15. COMPLIANCE WITH LAWS

15.1 The Lessee shall comply with all laws relating to:

- (a) the Property and the occupation and use of the Property by the Lessee;

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- (b) the use of all Services and machinery and equipment at or serving the Property;
- (c) any works carried out at the Property; and
- (d) all materials kept at or disposed from the Property.

15.2 Within Seven (7) working days after receipt of any notice or other communication affecting the Property (and whether or not served pursuant to any law) the Lessee shall:

- (a) send a copy of the relevant document to the Lessor; and
- (b) take all steps necessary to comply with the notice or other communication and give sufficient effect to every direction duly made and served upon it by a competent authority and to keep the Lessor effectually indemnified against all relative proceedings damages penalties costs and claims in respect thereof where the said damage, proceedings, penalties, costs and claims are as a direct commission or omission by the lessee and take any other action in connection with it as the Lessor may require.

15.3 The Lessee shall not apply for any planning permission for the Property without the Lessor's consent which shall not be unreasonably withheld. The Lessor must approve all drawings / plans etc.

15.4 As soon as the Lessee becomes aware of any defect in the Property, it shall give the Lessor notice of it.

15.5 The Lessee shall in the last three (3) months of the tenancy and whether it shall be terminated by the Lessor or the Lessee take all necessary steps reasonably required by the Lessor in or towards obtaining vacant possession of the property.

only ⁸

16. ENCROACHMENTS, OBSTRUCTIONS AND ACQUISITION OF RIGHTS

16.1 The Lessee shall not grant any right or licence over the Property to a third party without the written consent first had and obtained of the Lessor (which consent shall not be unreasonably withheld).

16.2 If a third party makes or attempts to make any encroachment over the Property or takes any action by which a right may be acquired over the Property, the Lessee shall:

- (a) Immediately give notice to the Lessor; and
- (b) take all steps (including any proceedings) the Lessor reasonably requires to prevent or license the continuation of that encroachment or action.

17. LESSOR'S OBLIGATIONS

The Lessor warrants that as long as the Lessee pays the rent and complies with its obligations in this lease, the Lessee shall have quiet enjoyment of the Property without any lawful interruption by the Lessor or any person claiming under the Lessor.

18. FURTHER COVENANTS AND AGREEMENTS

18.1 If the said rent or any part thereof shall be in arrears for a period of **Seven (7) days** next after any of the days whereon the same ought to have been paid as aforesaid whether formally demanded or not **OR** if there shall be any breach or non-performance or non-observance by the Tenant of any of the covenants agreements conditions restrictions stipulations or provisions herein contained and on their part to be performed and repossesses the property and take any action necessary to recover the arrears of rent provided also that such late payment shall attract penalty charges at the rate of **2% per month** on every overdue month. Any bounced cheque shall attract a re-collection charges of **5%** of the rent due plus bank charges and other incidental costs occasioned thereof.

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18.2 If the Lessee shall not within **three (3) calendar months** after the termination of the tenancy have removed from the property any fixtures and fittings belonging to it and which the Lessor has not given notice of its intention to purchase such fixtures and fittings shall on the expiration of that period immediately become the property of the Lessor without payment unless the Lessor elects and the Lessee shall remove any or all of such fixtures and fittings in which case the Lessee shall remove such fixtures and fittings from the property and make good any damage occasioned to the property as a result.

18.3 Any right or power under this Lease granted to the Lessor shall be exercisable by the Lessor or the Lessor's duly authorised agents or servants and any notice required to be given to or by the Lessor shall be deemed to have been properly served if served on or by the Lessor's agents.

18.4 All notices required under this lease shall be in writing and shall in all cases of notices to the Lessee be sufficiently served if addressed to the Lessee at the Lessee's registered office or hand delivered to such office or the property or posted thereto by registered post and in the case of notices to the Lessor be sufficiently served if addressed to the Lessor and posted by registered post to the Lessor's address above and so that any notice so posted shall be deemed to have been served within four (4) days following the date of posting.

19. ENTIRE AGREEMENT AND EXCLUSION OF REPRESENTATION

This lease constitutes the entire agreement and understanding of the parties relating to the transaction contemplated by the grant of this lease and supersedes any previous agreement between the parties relating to the transaction. Nothing in this clause shall, however, operate to limit or exclude any liability for fraud.

20. TERMINATION OF THE LEASE

- 20.1 The Lease Agreement shall AUTOMATICALLY TERMINATE if the rent or part thereof shall be in arrears for a period of **Ninety (90) days** from the due date whether formally demanded or not.
- 20.2 The Lessor may terminate the Lease Agreement where the land is required for railway purposes by giving the Lessee at least **Twelve (12) calendar months** written notice to that effect.
- 20.3 Development on the premises without the Lessor's and appropriate statutory approvals shall lead to termination of the lease.

21. GOVERNING LAW AND JURISDICTION

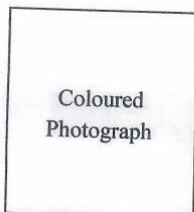
- 21.1 This lease shall be governed by and construed in accordance with the laws of Kenya
- 21.2 Reference in this agreement to any Act or statutory instrument shall include any re-enactment or modification of such Act or statutory instrument.
- 21.3 The Lessor and the Lessee irrevocably agree to submit any dispute over any claim or matter arising under or in connection with this lease or the legal relationships established by it that cannot be resolved amicably for final resolution by arbitration under a single arbitrator in accordance with the provisions of the Arbitration Act (1995) or such arbitrator to be appointed in default of agreement by the Chairman for the time being of the Law Society of Kenya.
- 21.4 Referring disputes to arbitration does not affect a party's right, where appropriate, to seek an immediate remedy for an injunction, specific performance or similar court order to enforce the obligations of the other party.

 11

IN WITNESS WHEREOF the Lessor and the Lessee have executed this Lease the
day and the year first hereinbefore written.

SEALED with the Common Seal
of the Lessor **KENYA RAILWAYS
CORPORATION**

in the presence of:

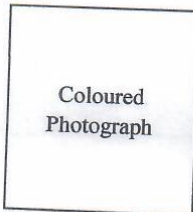


DIRECTOR

I.D./P.P. No. 10088126

P.I.N. No. A002674064Y

SIGNATURE: [Signature]



DIRECTOR/SECRETARY

I.D./P.P. No. 21721206

P.I.N. No. A003609880M

SIGNATURE: [Signature]

I Christine Macharia an Advocate of the High Court **CERTIFY THAT** I was
present and I saw (1) Philip Maunga **(DIRECTOR)** and (2)
David Njogu **(DIRECTOR/SECRETARY)** (the Director and
Director/Secretary of the Lessor) execute this Lease.

Signature [Signature]
Name
Address
Occupation
CHRISTINE N. MACHARIA
ADVOCATE
P.O. Box 10026-00400
NAIROBI - KENYA



[Signature] 12

SEALED with the Common Seal
of the Lessee SEASCAN ENERGY LIMITED)

in the presence of:)



I.D./P.P. No. 9987363)

P.I.N. No. A002229287 E)

SIGNATURE: Alb...)



REARY)

I.D./P.P. No. 10027077)

P.I.N. No. A002562214 E)

SIGNATURE: [Signature])

I Munene mberia an Advocate of the High Court CERTIFY THAT I was
present and I saw (1) (DIRECTOR/SECRETARY) (DIRECTOR) and (2)
Director/Secretary of the Lessee) execute this Lease. (the Director and

Signature [Signature]
Name
Address
Occupation



Drawn by:

Corporation Secretary

Kenya Railways

P.O. Box 30121-00100

NAIROBI

12.8. FIRM OF EXPERTS NEMA REGISTRATION LICENSE

FORM 7

(r.15(2))



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

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

License No : NEMA/EIA/ERPL/14151

Application Reference No: NEMA/EIA/EL/18487

M/S **ECOSCIENCE AND ENGINEERING**
(individual or firm) of address

P.O. Box 55533-00200, Nairobi

is licensed to practice in the

capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Firm of Experts**
registration number **11492**

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

Issued Date: **2/18/2021**

Expiry Date: **12/31/2021**

Signature.....

(Seal)

Director General
The National Environment Management
Authority



12.9. EXPERT NEMA REGISTRATION LICENSE

FORM 7

(r.15(2))



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

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

License No : NEMA/EIA/ERPL/14152

Application Reference No: NEMA/EIA/EL/18486

M/S **PHILIP OTIENO ABUOR**
(individual or firm) of address

P.O. Box 55533 - 00200, NAIROBI

is licensed to practice in the

capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Lead Expert**
registration number **1710**

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

Issued Date: **2/18/2021**

Expiry Date: **12/31/2021**

Signature.....

(Seal)

Director General
The National Environment Management
Authority



FORM 7

(r.15(2))



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

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

License No : NEMA/EIA/ERPL/14254

Application Reference No: NEMA/EIA/EL/18484

M/S **CALVINCE ODHIAMBO**
(individual or firm) of address

P.O. Box 118 SUNA, MIGORI

is licensed to practice in the

capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Associate Expert**
registration number **11047**

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

Issued Date: **2/25/2021**

Expiry Date: **12/31/2021**

Signature.....

(Seal)

Director General

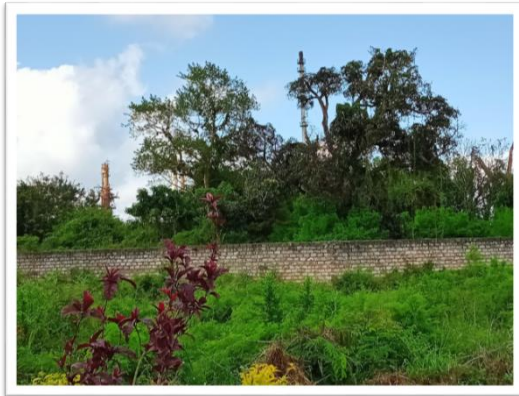
**The National Environment Management
Authority**



12.10. Project Plans/Drawings

SEASCAN ENERGY LIMITED

BASELINE AMBIENT AIR QUALITY MEASUREMENT REPORT



Prepared by: -



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Mobile: +254713566825
Telephone: +254(020)2000582
Email: info@ecoscience.co.ke

2021

CERTIFICATION

JOB REFERENCE NO:	2008001
REPORT TITLE:	Ambient Air Quality Measurement Report
MEASUREMENT DATE:	26 th to 30 th October 2020
PURPOSE	Regulatory Compliance
CLIENT:	SEASCAN Energy Limited P.O BOX 21275-00505 Nairobi
CONTACT PERSON	Mr. Bernard Waore SEASCAN Energy Limited
NAME AND SIGNATURE: (Client Representative)	Mr. Bernard Waore SEASCAN Energy Limited
PREPARED BY: -	Philip Abuor Approved Air Quality Monitor Certificate Number: OSH/AQM/003 NEMA Reg. No: 1710
STATUS	FINAL REPORT

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ABBREVIATIONS

µg/m³	Micro gram per cubic meter
AAQG	Ambient Air Quality Guidelines
BDL	Below Detection Limit
dB	Decibels
EMC	Environment Management Coordination
GPS	Global Positioning System
KRC	Kenya Railways Corporation
Mg/m³	Milligram per cubic meter
MP	Measurement Point
NO₂	Nitrogen Dioxide
NR	Not Regulated
PM₁₀	Particulate matter (<10 microns)
PM_{2.5}	Particulate matter (<2.5 microns)
SO₂	Sulphur Dioxide
TVOC	Total Volatile Organic Compounds

EXECUTIVE SUMMARY

Ecoscience and Engineering Limited was contracted by SeaScan Energy Limited to undertake baseline ambient air quality measurement at the pre-identified sensitive receptors locations along the proposed project area and the project wayleave. The measurements were done from 26th to 30th October 2020.

The pre-identified measurement locations were Kenya Railways Corporation (proposed project location), Mega Garment, nearest sensitive receptors i.e. Migadini, Magongo Kwahola and Port Reitz residential areas along (project wayleave).

The main Air Quality measurement objective was to obtain baseline ambient air quality concentrations of Sulphur Dioxide (SO₂), Nitrogen Dioxide (NO₂), Total Volatile Organic Compounds (VOCs), Inhalable and Respirable Particulate Matter (PM₁₀ and PM_{2.5}) respectively to ensure compliance with the Local and International Guidelines Environment Management and Coordination (Air Quality) Regulations, 2014 and World Health Organization Air Quality Guidelines respectively.

Measurement of VOCS and Particulate Matter were done using an ambient air quality monitor, which allows for real-time data collection by attaching the Interchangeable cartridge sensor heads whereas sampling of Sulphur Dioxide and Nitrogen Dioxide were done passively and the samples analyzed by use of U.K.A.S. Accredited Methods.

The measured locations had their gases and Particulate Matter values within the Kenyan and International Finance Corporation Air Quality Guidelines.

The significant particulate matter data results may have been influenced by vehicular movement and motorcycle cycling along the Magongo Kwahola Road, Mombasa-Nairobi Highway and local roads giving access to the Informal Settlement by dispersing particulate into the atmosphere depending on the size of particle and speed of wind.

Similarly, the sources of Nitrogen Dioxide and Sulphur Dioxide could have been the emissions from vehicular movement and motorcycle cycling along the Magongo Kwahola Road, Mombasa-Nairobi Highway and local roads giving access to the Informal Settlements.

SeaScan Energy Limited is therefore recommended to undertake the following measures to minimise potential air quality impacts during the Mobilization and Construction phase; Apply good working practices to minimise potential generation and propagation of particulate matter through

a range of suitable mitigation techniques such as water suppression (if required), covering or enclosed storage of aggregates (including topsoil and sand) where practical, and limiting dust generation activities in high winds or specific wind directions, if required; Undertake routine maintenance checks on construction equipment to ensure they are maintained in a good working condition and consult local residents particularly prior to carrying out high PM generation activities to inform them of potential odour emissions and the expected duration of such activities.

1.0 INTRODUCTION

SeaScan Energy Limited contracted Ecoscience and Engineering Limited to undertake Ambient Air Quality and Noise measurement at the pre-identified sensitive receptors points within the project scope in compliance with the Local and International Regulations. The measurement was carried out from 26th to 30th October 2020.

This report details a general description of the site, the measurement points, the measurement methodology, regulatory requirements, summary of the onsite observations made during the measurement period and a quantitative analysis of SO₂, NO₂, VOCs and PM₁₀ and PM_{2.5} of the measurement results.

1.1 Measurement Objectives

The main objective for undertaking Air Quality Measurement was to obtain baseline ambient air quality concentrations of Sulphur Dioxide (SO₂), Nitrogen Dioxide (NO₂), Total Volatile Organic Compounds (VOCs), Inhalable and Respirable Particulate Matter (PM₁₀ and PM_{2.5}) respectively to ensure compliance with the Local and International Guidelines Environment Management and Coordination (Air Quality) Regulations, 2014 and World Health Organization Air Quality Guidelines respectively.

1.2 Scope of Work

The scope of work was limited to:

- Sampling of Ambient Air Quality for Particulate Matter (PM₁₀&PM_{2.5}), Volatile Organic Compounds, Sulphur Dioxide (SO₂), Nitrogen Dioxide (NO₂),
- Compare achieved results to the national and international guidelines and
- Compile progressive air quality measurement report for the duration of the measurement.

1.3 Health and Safety Induction

Prior to commencement of work the following health and safety measures were implemented to prevent any incidents while on site:

- Identification and assessment of all risks associated with the work.

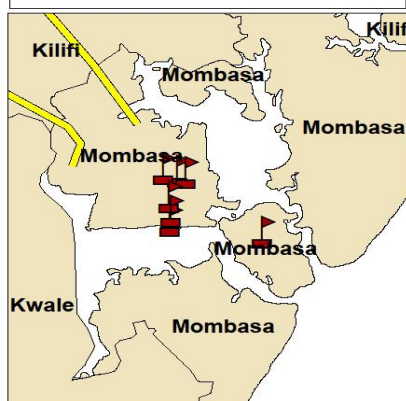
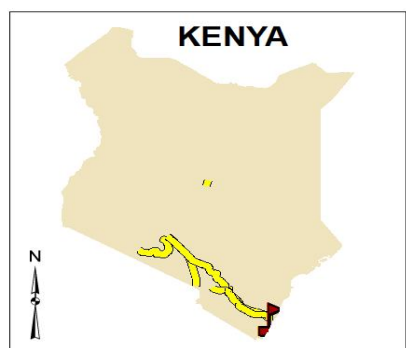
- Use of proper PPEs while on site;
- Setting up of air sampling media and equipment and the removal

1.4 Project location and description







The proposed project location is under Industrial Zoning. The sensitive receptor points i.e. Migadini, Portreiz and Magongo Kwahola residential areas were selected within the project way leaf. The table 1 below presents detailed description of the sampling points.

Table 1: Measurement Points Description

Sampling location	GPS Coordinates	Rationale for the measurement points	Pollutants of concern
MP01-KRC along the lines next to combined warehouses	S 04°02'36.9" E 039°39'34.8"	Establishment of Baseline ambient air quality measurement report at the proposed project site and the project way leaf.	SO ₂ , NO ₂ , VOCs and PM ₁₀ and PM _{2.5}
MP02-KRC middle of the proposed project location	S 04°00'44.0" E 039°37'22.4"		SO ₂ , NO ₂ , VOCs and PM ₁₀ and PM _{2.5}
MP03-KRC opposite the main gate	S 04°00'40.3" E 039°37'00.7"		SO ₂ , NO ₂ , VOCs and PM ₁₀ and PM _{2.5}
MP04-Mega Garment next to combined warehouses	S 04°00'47.0" E 039°37'35.2"		SO ₂ , NO ₂ , VOCs and PM ₁₀ and PM _{2.5}
MP05-Mazunguka Area in Portreiz	S 4°02'15.024" E 39°37'11.16"		SO ₂ , NO ₂ , VOCs and PM ₁₀ and PM _{2.5}
MP06-Lilongwe in Portreiz Area	S 4°01'32.268" E 39°37'10.032"	Establishment of Baseline ambient air quality measurement report at the proposed project site and the project way leaf.	SO ₂ , NO ₂ , VOCs and PM ₁₀ and PM _{2.5}
MP07-Magongo Kwahola Area	S 4°01'57.702" E 39°37'12.162"		SO ₂ , NO ₂ , VOCs and PM ₁₀ and PM _{2.5}
MP08-Migadini Area	S 4°02'15.024" E 39°37'11.16"		SO ₂ , NO ₂ , VOCs and PM ₁₀ and PM _{2.5}



Legend

-  Monitoring points
-  GPS_Mombasa_REV.csv Events
-  Kenya pipeline
-  Rivers
-  Major Roads
-  County boundary

Monitoring points in Mombasa County



Figure 1: Air Quality Sampling points

Source: Google earth

2.0 METHODOLOGY

2.1 Air Quality Methodology

2.1.1 Sampling of Particulate Matter

Sampling of Particulate matter was done using portable air quality monitor for ambient environmental monitoring (See figure 1 below). The monitor allows for real-time data collection by attaching the Interchangeable cartridge sensor head for (PM_{10} and $PM_{2.5}$) to the monitor base. The sensor head features active fan sampling which ensures a representative sample is taken and therefore increases measurement accuracy.



Figure 2: *Particulate matter measurement in progress*

2.1.2 Sampling of Nitrogen Dioxide

Acrylic tube fitted with coloured and white thermoplastic rubber caps containing absorbents was used to collect the NO_2 samples. The concentrations of Nitrite ions are chemically adsorbed into the tubes and sent for analysis. The tubes are analysed quantitatively by UV/ Visible Spectrophotometry with reference to a calibration curve derived from the analysis of standard nitrite solutions (UKAS Accredited Methods).



Figure 3: *Nitrogen Dioxide measurement in progress*

2.1.3 Sampling of Sulphur Dioxide

Fluorinated ethylene polymer tube fitted with purple and white thermoplastic rubber caps are used to collect the samples. The coloured cap contains the absorbent in which, a one-micron porosity filter is fitted to prevent the ingress of particulates loaded with sulphur. The concentrations of sulphate ions which are chemically adsorbed are quantitatively determined by Ion Chromatography with reference to a calibration curve derived from the analysis of standard sulphate solutions (U.K.A.S. Accredited Methods).



Figure 4: *Sulphur Dioxide measurement in progress*

2.1.4 Sampling of Volatile Organic Compounds

Sampling of Volatile Organic Compounds was done using portable air quality monitor for ambient environmental monitoring (See figure 4 below). The monitor allows for real-time data collection by attaching the Interchangeable cartridge sensor for head VOCs to the monitor base. The sensor head features active fan sampling which ensures a representative sample is taken and therefore increases measurement accuracy.



Figure 5: Total Volatile Organic Compounds measurement in progress

3.0 APPLICABLE REGULATIONS AND GUIDELINES

The proposed project location falls under Industrial Area, whereas the project wayleave is under the residential, rural and other area zoning. Thus the standards used to evaluate the measured values are derived from the EMC (Air Quality) Regulations 2014 and WHO Ambient Air Quality Guidelines.

3.1 EMC (Air Quality) Regulations 2014

The objective of the Regulations is to provide for prevention, control and abatement of air pollution to ensure clean and healthy ambient air. It provides for the establishment of emission standards for various sources such as mobile sources (e.g. motor vehicles) and stationary sources (e.g. industries) as outlined in the Environmental Management and Coordination Act. It also covers any other air pollution source as may be determined by the Minister in consultation with the Authority. Emission limits for various areas and facilities have been set. The regulations provide the procedure for designating controlled areas, and the objectives of air quality management plans for these areas.

These rules under the property boundary states that No person, operator or owner of any facility shall cause or allow fugitive emissions to cause the ambient air quality at its property boundary to exceed the limits prescribed under the First Schedule. It further states that, No person, owner or operator of a facility shall cause or allow the emission of air pollutants in excess of the limits stipulated under the Third Schedule.

(The table below is an excerpt from EMC, Air Quality Regulations, 2014)

Table 2: EMC (Air Quality) Regulations 2014: Ambient Air Quality Tolerance Limits

Pollutant	Time Weighted Average	Industrial area	Residential, Rural & Other Areas	Controlled areas
Respirable Particulate Matter (<10µm)(RPM)	Annual Average	70 µg/m ³	50 µg/m ³	50 µg/m ³
	24 hours	150 µg/m ³	100 µg/m ³	75 µg/m ³
PM_{2.5}	Annual Average	35 µg/m ³	NR	NR
	24 hours	75 µg/m ³		
Sulphur Dioxide (SO₂)	Annual Average	80 µg/m ³	60 µg/m ³	15 µg/m ³
	24 hours	125 µg/m ³	80 µg/m ³	30 µg/m ³
	Annual Average	NR	0.019ppm/50 µg/m ³	NR
	Monthly Average	NR		NR
	24 hours	NR	0.048ppm/125 µg/m ³	NR
	One hour	NR		NR
	Instant Peak	NR	500 µg/m ³	NR
	Instant Peak(10 Min)	NR	0.191ppm	NR
Nitrogen Dioxide (NO₂)	Annual Average	150 µg/m ³	103 µg/m ³	NR
	Monthly Average	NR	164 µg/m ³	NR
	24 hours	100 µg/m ³	205 µg/m ³	NR
	One hour	NR	411 µg/m ³	NR
	Instant Peak	NR	1027 µg/m ³	NR
Total VOCs	24 hours	600 µg/m ³	NR	NR

3.2 WHO Ambient Air Quality Guidelines

This guideline applies to facilities or projects that generate emissions to air at any stage of the project life cycle. It complements the industry-specific emissions guidance presented in the Industry Sector Environmental, Health, and Safety (EHS) Guidelines by providing information about common techniques for emissions management that may be applied to a range of industry sectors. This guideline provides an approach to the management of significant sources of emissions, including specific guidance for assessment and monitoring of impacts. It is also intended to provide additional information on approaches to emissions management in projects located in areas of poor air quality, where it may be necessary to establish project-specific emissions standards.

Table 3: WHO (Air Quality) Regulations

Pollutant	Averaging Period	Guideline value in $\mu\text{g}/\text{m}^3$	
Sulphur Dioxide	24Hr	125	Interim Target 1
		50	Interim Target 2
	10 Minute	20	Guideline
		500	Guideline
Nitrogen Dioxide	1 Year	40	Guideline
	1 Hour	200	Guideline
PM₁₀	1 Year	70	Interim Target 1
		50	Interim Target 2
		30	Interim Target 3
		20	Guideline
	24 Hour	150	Interim Target 1
		100	Interim Target 2
		75	Interim Target 3
		50	Guideline
PM_{2.5}	1 Year	35	Interim Target 1
		25	Interim Target 2
		15	Interim Target 3
		10	Guideline
	24 Hour	75	Interim Target 1
		50	Interim Target 2
		37.5	Interim Target 3
		25	Guideline

4.0 MEASUREMENT RESULTS

Results for the air quality measurements are summarized in the tables below.

4.1 Air Quality Measurement Results

This section provides the analysis results for parameters sampled. Results for the air quality measurements are summarized in the tables 7 and 8 below.

Table 4: Summary of gases results

Measurement Point	SO ₂ µg/m ³	EMC, Air Quality 2014 µg/m ³	WHO Air Quality Guidelines µg/m ³	NO ₂ µg/m ³	EMC, Air Quality 2014 µg/m ³ One hour	WHO Air Quality Guidelines µg/m ³	TVOCs µg/m ³	EMC, Air Quality 2014 µg/m ³
MP01-KRC along the siding lines next to combined warehouses	3.07	125	125	11.0	411	200	BDL	600
MP02-KRC middle of the proposed project location	2.60	125	125	9.1	411	200	BDL	600
MP03-KRC opposite the main gate	2.41	125	125	11.1	411	200	BDL	600
MP04-Mega Garment next to combined warehouses	14.56	125	125	12.3	411	200	BDL	600
MP05-Mazingira Area In Portreiz	1.85	125	125	13.8	411	200	BDL	600

Measurement Point	SO ₂ µg/m ³	EMC, Air Quality 2014 µg/m ³	WHO Air Quality Guidelines µg/m ³	NO ₂ µg/m ³	EMC, Air Quality 2014 µg/m ³ One hour	WHO Air Quality Guidelines µg/m ³	TVOCs µg/m ³	EMC, Air Quality 2014 µg/m ³
MP06-Lilongwe in Portreiz Area	BDL	125	125	11.1	411	200	BDL	600
MP07-Magongo Area	1.94	125	125	14.0	411	200	BDL	600
MP08-Migadini Area	---	125	125	14.4	411	200	BDL	600

*** BDL –Below Detection Limit

The results from the table above depict that the Total Volatile Organic Compounds Concentrations were below the detection limit. The Nitrogen Dioxide and Sulphur Dioxide had their concentrations within the stipulated limit EMC, Air Quality 2014.

The sources of Nitrogen Dioxide and Sulphur Dioxide could have been the emissions from vehicular movement and motorcycle cycling along the Magongo Kwahola Road, Mombasa-Nairobi Highway and local roads giving access to the Informal Settlements.

Table 5: Summary of Particulate Matter results

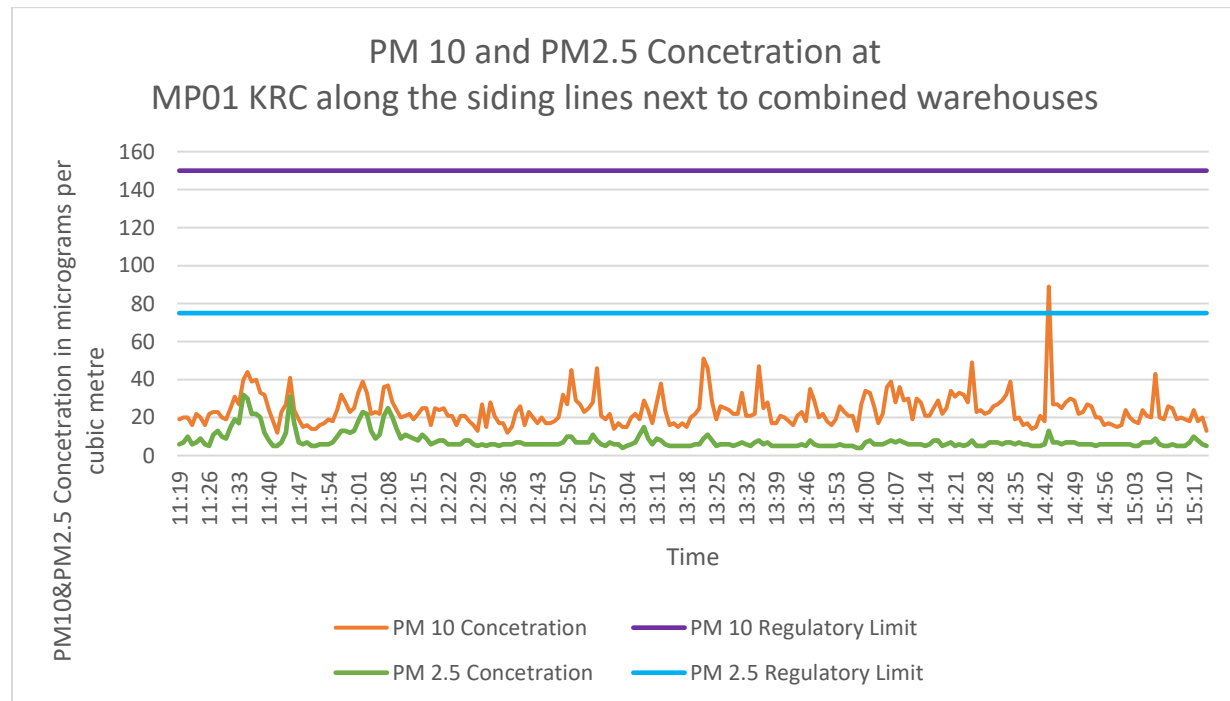
Measurement Points	PM ₁₀ µg/m ³	EMC, Air Quality 2014 µg/m ³	WHO Air Quality Guidelines µg/m ³	PM _{2.5} µg/m ³	EMC, Air Quality 2014 µg/m ³ One hour	WHO Air Quality Guidelines µg/m ³
MP01-KRC along the siding lines next to combined warehouses	23.94	150	150	7.83	75	75
MP02-KRC middle of the proposed project location	15.34	150	150	4.59	75	75
MP03-KRC opposite the main gate	16.39	150	150	5.48	75	75
MP04-Mega Garment next to combined warehouses	77.91	150	150	25.22	75	75
MP05-Mazingira Area In Portreiz	13.38	150	150	5.04	75	75
MP06-Lilongwe in Portreiz Area	24.35	150	150	6.26	75	75
MP07-Magongo Area	69.03	150	150	15.68	75	75
MP08-Migadini Area	25.00	150	150	6.30	75	75

The results of the Particulate Matter in the table above indicate that the values obtained at all measured locations were within the stipulated limits EMC, Air Quality 2014.

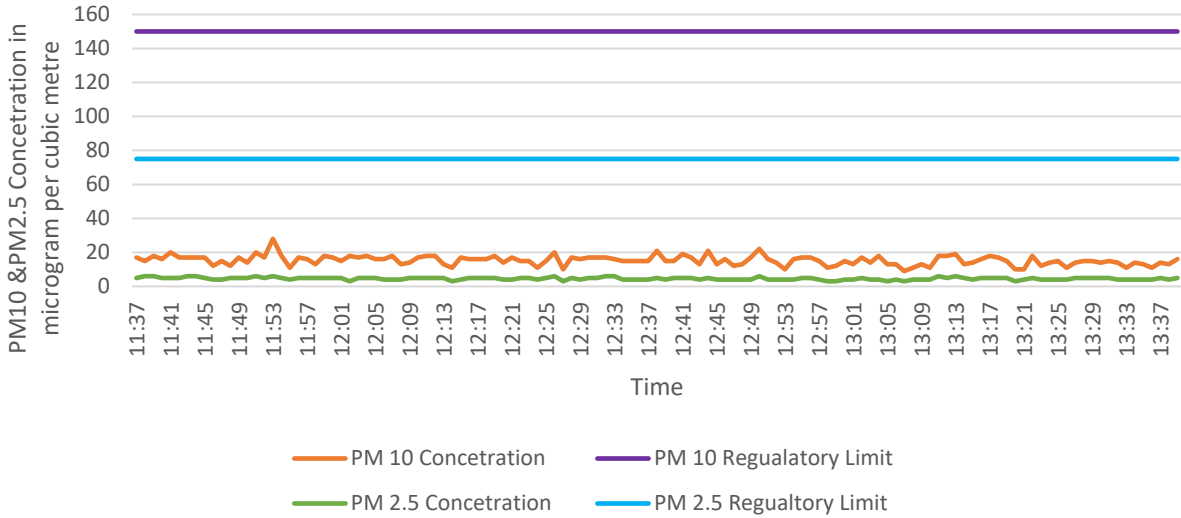
As observed, the significant particulate matter data results may have been influenced by vehicular movement and motorcycle cycling along the Magongo Kwahola Road, Mombasa-Nairobi Highway and local roads giving access to the Informal Settlement by dispersing particulate into the atmosphere depending on the size of particle and speed of wind.

Graphical Presentations

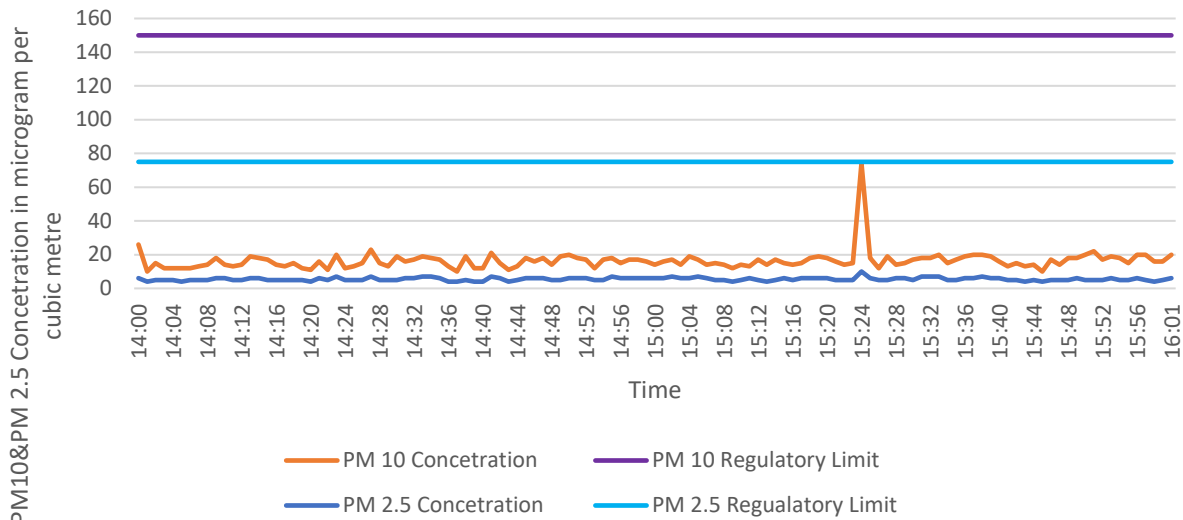
Particulate Matter



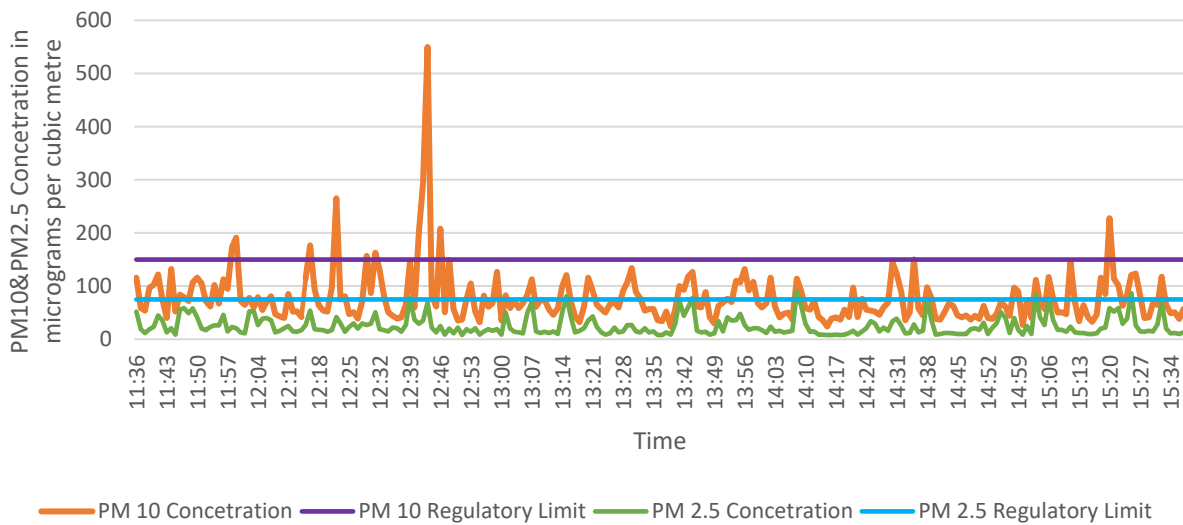
PM 10 and PM2.5 Concetration at
MP02 KRC Centre of the Proposed Project Location

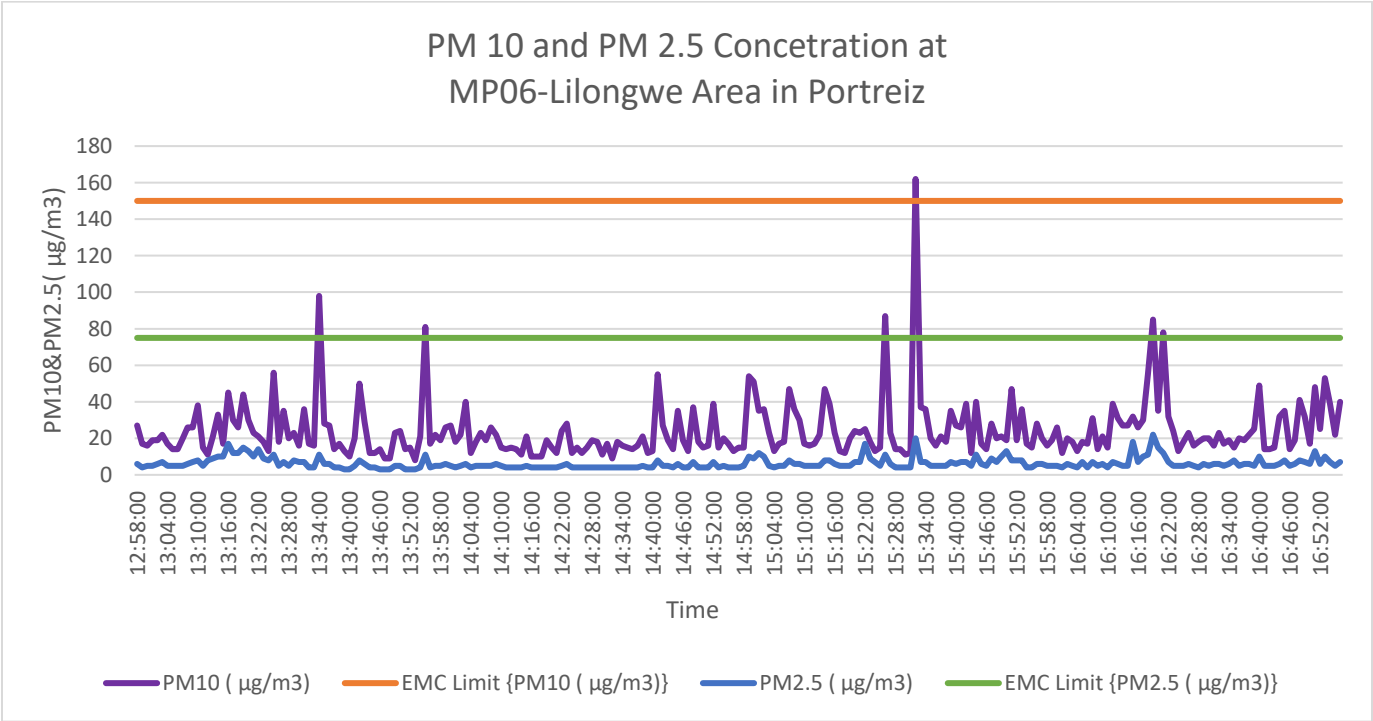
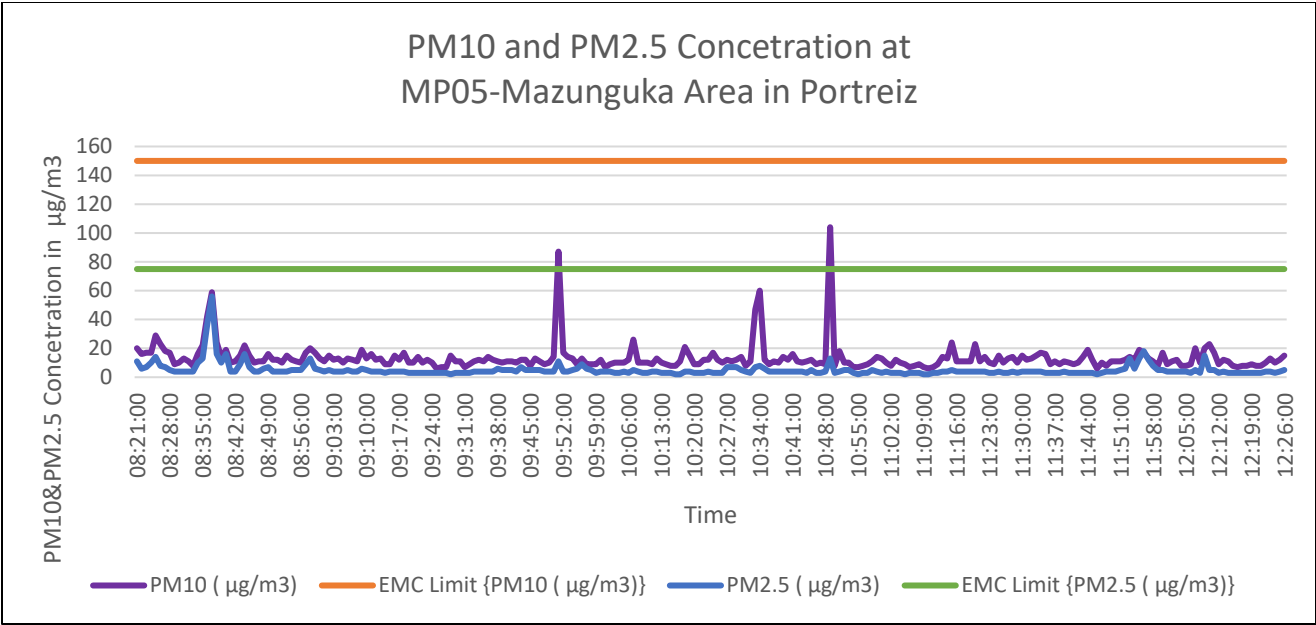


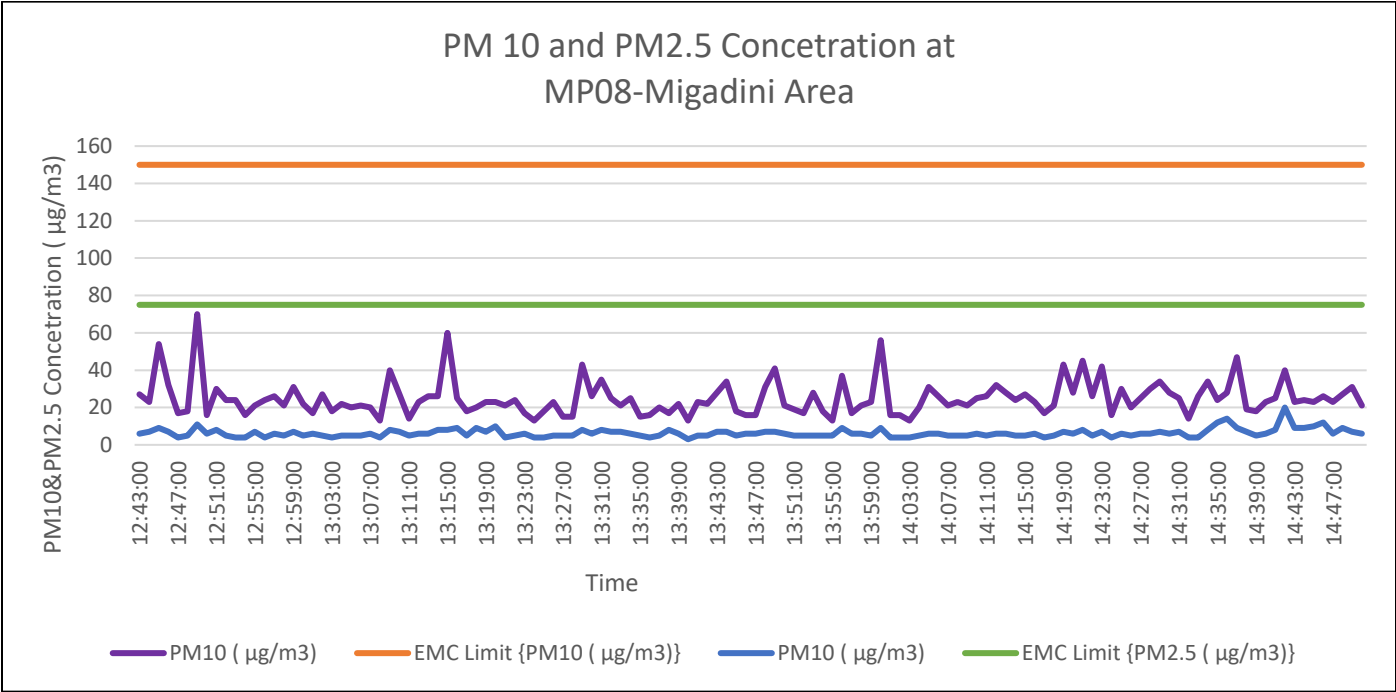
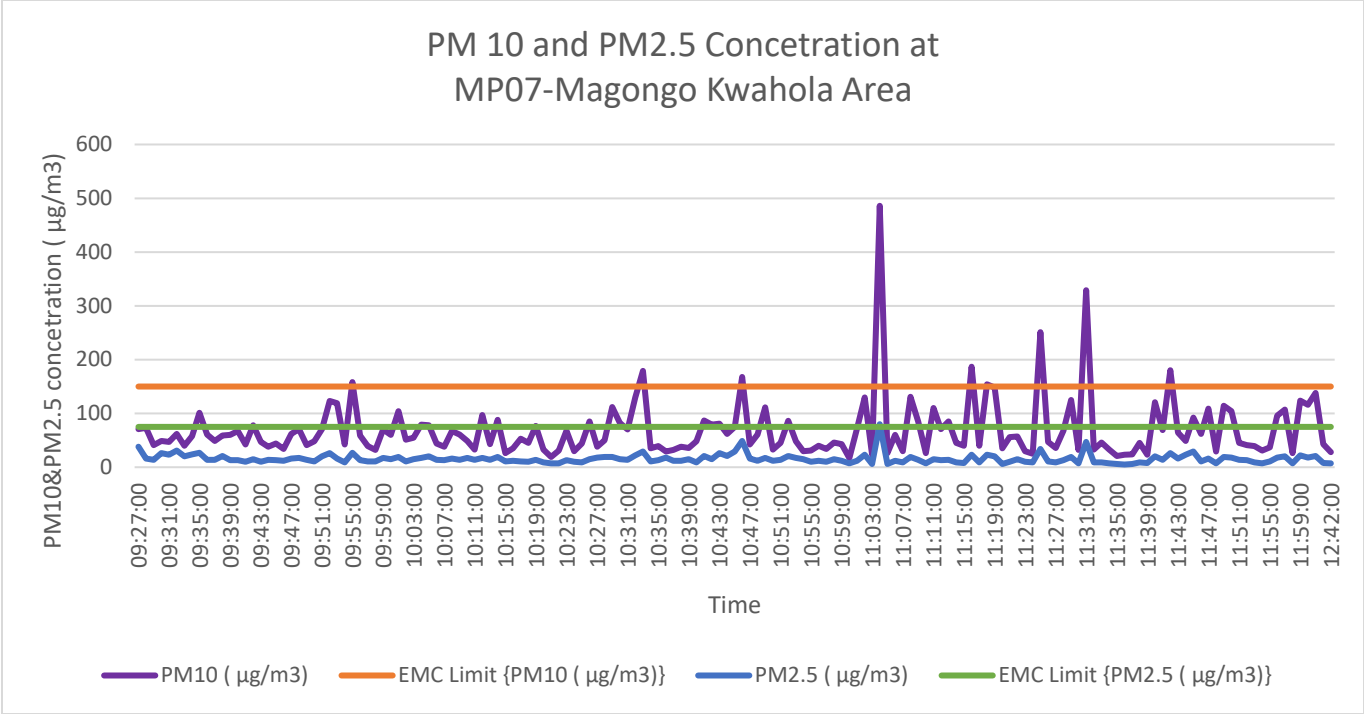
PM 10 and PM 2.5 Concentration at
MP03 KRC Opposite the Main Gate



PM10 and PM 2.5 Concentration at
MP 04-Mega Garment







5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The measured locations had their gases and Particulate Matter values within the Kenyan and International Finance Corporation Air Quality Guidelines.

The significant particulate matter data results may have been influenced by vehicular movement and motorcycle cycling along the Magongo Kwahola Road, Mombasa-Nairobi Highway and local roads giving access to the Informal Settlement by dispersing particulate into the atmosphere depending on the size of particle and speed of wind.

Similarly, the sources of Nitrogen Dioxide and Sulphur Dioxide could have been the emissions from vehicular movement and motorcycle cycling along the Magongo Kwahola Road, Mombasa-Nairobi Highway and local roads giving access to the informal settlements.

5.2 Recommendations

SeaScan Energy Limited is recommended to undertake the following measures to minimise potential air quality impacts during the Mobilization and Construction phase

- Apply good working practices to minimise potential generation and propagation of particulate matter through a range of suitable mitigation techniques such as water suppression (if required), covering or enclosed storage of aggregates (including topsoil and sand) where practical, and limiting dust generation activities in high winds or specific wind directions, if required;
- Undertake routine maintenance checks on construction equipment to ensure they are maintained in a good working condition and
- Consult local residents particularly prior to carrying out high PM generation activities to inform them of potential odour emissions and the expected duration of such activities.

Appendix 1: Photographic Report



Ongoing assessment at Migadini



KPRL and KPC Pipeline
bacons

	<p>Ongoing assessment at Magongo Kwahola</p>
	<p>Ongoing gases assessment at Mazunguka Area in Portreiz</p>
	<p>Ongoing assessment at Maunguka in Portreiz</p>



Ongoing gases
assessment at
Lilongwe in Migadini





Ongoing gases
assessment at Mega
Garment
next to combined
warehouses



Ongoing gases
assessment at KRC
along the lines next to
combined warehouses




Ongoing gasses assessment at KRC middle of the proposed project location



Ongoing gasses assessment KRC opposite the main gate

Appendix 2: Calibration Certificates


Aeroqual Limited
460 Rosebank Road, Avondale, Auckland 1026, New Zealand
Phone: +64-9-623 3013 Fax: +64-9-623 3012
www.aeroqual.com

SCIENCE & ENGINEERING LTD.
Box 55533 - 00200,
NEW ZEALAND

Calibration Certificate No. 41403

Calibration Date: 11 Mar 2020 15:58

Model: VOC PID 0-20 ppm

Serial No: PDL-1103201-004

Environmental Conditions

Temperature 38.2 °C

Relative Humidity 12.5 %

Measurements

Calibration Standard /ppm	0.00	20.00	0.00	0.00
AQL Sensor (Mean) /ppm	0.00	20.00	0.00	0.00
AQL Sensor (Std. Dev) /ppm	0.000	0.000	0.000	0.000

*The Mean and Standard Deviation are calculated from three consecutive readings.

Calibration Standard

This sensor was calibrated against a certified mixture of isobutene in synthetic air diluted with zero air using mass flow controllers with calibrations traceable to the National Institute of Standards and Technology (NIST).

QC Approval: Takao Yamasaki

Date: 11 Mar 2020



Aeroqual Limited
450 Rosebank Road, Auckland 1028, New Zealand.
Phone: +649-823 3010 Fax: +64-9-823 3012
www.aeroqual.com

Calibration Certificate

Calibration Date: 10 February 2020

Model: PM2.5 PM10 0-1.000 mg/m³

Serial No: 5002-B975-001

Measurements

	PM2.5 mg/m ³	PM10 mg/m ³
Reference Zero	0.000	0.000
AQL Sensor Zero	0.000	0.000
Reference Span	0.093	0.129
AQL Sensor Span	0.094	0.126

Calibration Standard

Standard	Manufacturer	Model	Serial number
Optical Particle Counter	Met One Instruments	9772-1	U11996
Test aerosol	ATI	0.54 µm latex microspheres	n/a

Parameters

PM2.5 Gain	PM2.5 Offset	PM10 Gain	PM10 Offset
1.453	0.000	1.335	0.000

QC Approval: TY

Date: 10-Feb-20

Appendix 3: Lab Analysis Reports



(A division of Gradko International Ltd.)

St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH
tel: 01962 860331 fax: 01962 841339 e-mail: diffusion@gradko.co.uk



LABORATORY ANALYSIS REPORT

DETERMINATION OF SULPHUR DIOXIDE IN DIFFUSION TUBES BY ION CHROMATOGRAPHY

REPORT NUMBER O05721R
BOOKING IN REFERENCE No O05721
DESPATCH NOTE No 80121
CUSTOMER Ecoscience & Engineering Ltd Attn: Eva Illa
P.O. Box 55533-00200
Nairobi
Kenya
DATE SAMPLES RECEIVED 09/10/2020
JOB NUMBER 208001

Location	Sample Number	Date Exposed*	Date Finished*	Exposure Hours*	SO ₄ ²⁻ µg/ml	µgSO ₄ ²⁻ - Blank	SO ₂ µg/m ³ *	SO ₂ ppb*
SP1	1598540	27/08/2020	06/10/2020	960.45	0.26	0.24	3.07	1.15
SP2	1598541	27/08/2020	06/10/2020	960.40	0.22	0.20	2.60	0.97
SP3	1598542	27/08/2020	06/10/2020	960.18	0.21	0.19	2.41	0.90
SP4	1598543	27/08/2020	06/10/2020	961.50	1.17	1.15	14.56	5.46

Laboratory Blank

0.02

Comment: Results are blank subtracted

Tubes have exceeded shelf-life. Results may be compromised.

Overall M.U. ±9.6%

Reporting Limit 0.09µg SO₄²⁻

The reported expanded uncertainty is based on a standard uncertainty multiplied by a factor of *k*=2, providing a level of confidence of approximately 95%. Uncertainty of measurement has not been applied to the reported results.

Analysed on Dionex ICS1100 ICU11

Analyst Name Alison Wright

Report Checked By Nick Chandler

Date of Analysis 21/10/2020

Date of Report 04/11/2020

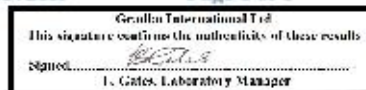
Analysis has been carried out in accordance with in-house method GLM1

Samples have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures. Results within this report relate only to samples as received. Data provided by the client and any subsequent calculations shall be indicated by an asterisk (*), these calculations and results are not within the scope of our UKAS accreditation. Any queries concerning data in this report should be directed to the Laboratory Manager Gradko International Ltd. This report is not to be reproduced, except in full, without the written permission of Gradko International Ltd.

Form LQF32b Issue 9 – August 2019

Report Number O05721R

Page 1 of 1



LABORATORY ANALYSIS REPORT

DETERMINATION OF SULPHUR DIOXIDE IN DIFFUSION TUBES BY ION CHROMATOGRAPHY

REPORT NUMBER O06512R
BOOKING IN REFERENCE No O06512
DESPATCH NOTE No 80121
CUSTOMER Ecoscience & Engineering Ltd Attn: Eva Illa
11th Floor Mitsumi Business Park, Muthithi Road, Westlands,
Nairobi
Kenya
DATE SAMPLES RECEIVED 09/11/2020

Location	Sample Number	Date Exposed*	Date Finished*	Exposure Hours*	SO ₂ *	µgSO ₂ *	SO ₂	SO ₂
					µg/ml	- Blank	µg/m ³ *	ppb*
SP5	1521160	07/10/2020	30/10/2020	547.95	0.10	0.08	1.85	0.70
SP6	1521161	07/10/2020	30/10/2020	546.57	<0.09	<0.07	<1.66	<0.62
SP7	1521162	08/10/2020	30/10/2020	524.32	0.10	0.08	1.94	0.73
Laboratory Blank					0.01			

Comment: Results are blank subtracted

Result reported as < 0.09 µg SO₂ is below the reporting limit.

Tube "1521163" could not be analysed as it did not contain any grids. A white filter was found instead.

Tubes have exceeded shelf-life. Results may be compromised.

Overall M.U. ±9.6% **Reporting Limit** 0.09µg SO₂
The reported expanded uncertainty is based on a standard uncertainty multiplied by a factor of k=2, providing a level of confidence of approximately 95%. Uncertainty of measurement has not been applied to the reported results.

Analysed on Dionex ICS1100 ICU11

Analyst Name Alison Wright **Report Checked By** Michael Battram

Date of Analysis 20/11/2020 **Date of Report** 23/11/2020


Analysis has been carried out in accordance with in-house method GLM1

Samples have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures. Results within this report relate only to samples as received. Data provided by the client and any subsequent calculations shall be indicated by an asterisk (*), these calculations and results are not within the scope of our UKAS accreditation. Any queries concerning data in this report should be directed to the Laboratory Manager Gradko International Ltd. This report is not to be reproduced, except in full, without the written permission of Gradko International Ltd.
Form LQF32b Issue 9 – August 2019

Report Number O06512R

Page 1 of 1

REPORT OFFICIALLY CHECKED

Gradko International Ltd
This signature confirms the authenticity of these results
Signed: 
I. Gates, Laboratory Manager

Test Report Air Pollution Measurement

NOx (NO+NO2) Nitrogen oxides measurement by means of passive sampler

customer information

customer: Gradko
customer ID: GDK
contact person: Andy Poole
project:
reference: 80121 / S1066

passive samplers

date received: 19.10.2020
type: tube (Palms)
pollutant: NOx (NO+NO2)
protective filter: yes

analysis

method: SP12-S photometer, Salzmann
analyte: [NO]-
date: 26.10.2020
place: passam ag

test report

created on: 29.10.2020
checked on: 30.10.2020
checked by: S. Huber
file name: GDK12-S-2024-1
pages: 1



note: applies to the sample as received; for information on measurement uncertainty, detection limit and sampling rates, see data sheet: www.passam.ch
concentration calculated assuming: T = 20°C; p = 1013 hPa; this method is accredited to ISO 17025

measuring site	passive sampler				measuring period			result						Comment on the analysis
	label		lot no.		start		exp. time	m / sampler			Conc			
	NO2	NOx	NO2	NOx	date	time		h	NO ug	NO2 ug	NOx ug	NO ug/m3	NO2 ug/m3	NOx ug/m3
SP 1	305	322	43964	43957	27/08/2020	08:00	960.5	< 0.04	0.46	0.46	< 0.7	11.0	11.0	specs not met: exp. time;
SP 2	360	349	43964	43957	27/08/2020	08:22	960.4	< 0.04	0.39	0.39	< 0.7	9.1	9.1	specs not met: exp. time;
SP 3	373	355	43964	43957	27/08/2020	08:51	960.2	< 0.04	0.47	0.47	< 0.7	11.1	11.1	specs not met: exp. time;
SP 4	335	334	43964	43957	27/08/2020	09:30	961.5	< 0.04	0.52	0.52	< 0.7	12.3	12.3	specs not met: exp. time;

Test Report Air Pollution Measurement

passam ag

NOx (NO+NO2) Nitrogen oxides measurement by means of passive sampler

air quality monitoring

customer information

customer: Gradko
customer ID: GDK
contact person: Andy Poole
project:
reference: 80121 / S1194

passive samplers

date received: 18.11.2020
type: tube (Palms)
pollutant: NOx (NO+NO2)
protective filter: yes

analysis

method: SP12-S photometer, Salzmänn
analyte: [NO]-
date: 20.11.2020
place: passam ag

test report

created on: 23.11.2020
created by: U. Kunz
checked on: 25.11.2020
checked by: S. Huber
file name: GDK12-S-2027-2
pages: 1



*note: applies to the sample as received; for information on measurement uncertainty, detection limit and sampling rates, see data sheet: www.passam.ch
concentration calculated assuming: $T = 20^{\circ}\text{C}$; $p = 1013 \text{ hPa}$; this method is accredited to ISO 17025*

measuring site	passive sampler				measuring period			result						Comment on the analysis Comment on sampling
	label		lot no.		start		exp. time h	m / sampler			Conc			
	NO2	NOx	NO2	NOx	date	time		NO ug	NO2 ug	NOx ug	NO ug/m3	NO2 ug/m3	NOx ug/m3	
SP 5	371	351	43964	43941	07/10/2020	12:26	548.0	< 0.04	0.33	0.33	< 1.2	13.8	13.8	
SP 6	259	324	43964	43957	07/10/2020	13:55	546.6	< 0.04	0.27	0.27	< 1.2	11.1	11.1	
SP 7	289	356	43964	43941	08/10/2020	12:17	524.3	< 0.04	0.32	0.32	< 1.3	14.0	14.0	
SP 8	288	318	43964	43957	09/10/2020	14:49	498.1	< 0.04	0.32	0.32	< 1.3	14.4	14.4	

SEASCAN ENERGY LIMITED
BASELINE AMBIENT NOISE MEASUREMENT REPORT



Prepared by: -



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Muthithi Road, Westlands, Nairobi, Kenya
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Email: info@ecoscience.co.ke

2021

CERTIFICATION

JOB REFERENCE NO:	2008001
REPORT TITLE:	Baseline Ambient Noise Measurement Report
MEASUREMENT DATE:	26 th to 30 th October 2020
PURPOSE	Regulatory Compliance
CLIENT:	SEASCAN ENERGY LIMITED P.O BOX 21275-00505 Nairobi
CONTACT PERSON	Mr. Bernad Waore SEASCAN Energy Limited
NAME AND SIGNATURE: (Client Representative)	Mr. Bernard Waore SEASCAN Energy Limited
PREPARED BY: -	Philip Abuor Approved Air Quality Monitor Certificate Number: OSH/AQM/003 NEMA REG. NO: 1710
STATUS	FINAL REPORT

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ABBREVIATIONS

WHO	World Health Organization
IFC	International Finance Corporation
GPS	Global Positioning System
Decibel (dB)	Unit of measuring for sound levels, based on a logarithmic scale.
dBA	Unit representing the sound level measured with the A weighting network of a sound level meter. A- Weighted filter is an electronic circuit whose sensitivity to sound pressure levels varies in the same way as the human ear.
L_{Amax}	Maximum sound pressure level obtained during the measurement period.
L_{Amin}	Minimum sound pressure level obtained during the measurement period.
L_{Aeq}	Value of A-weighted sound pressure level of a continuous steady sound that, within a specified interval, has the same mean square sound pressure as a sound under consideration whose level varies with time.
$L_{Aeq, 10}$	Value of A-weighted sound pressure level of a continuous steady sound measured in 10 minutes run time.
L_{A90}	Noise levels are those noise levels that are exceeded for 90% of each sample period

EXECUTIVE SUMMARY

Ecoscience and Engineering Limited was contracted by Seascan Energy Limited to undertake baseline ambient noise measurement at the pre-identified sensitive receptors locations along the proposed project area and the project wayleave. The measurements were done from 26th to 30th October 2020.

The pre-identified measurement locations were Kenya Railways Corporation (proposed project location), Mega Garment, sensitive receptors; Migadini, Magongo Kwahola and Port Reitz residential areas (project wayleave).

The objective of undertaking the Noise measurement was to establish the baseline ambient noise levels at the selected sensitive receptor points, compile achieved noise results and compare them with the Local and International Noise Regulations, Environment Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009 and International Finance Corporation Guidelines respectively.

Noise measurement was undertaken using a type 1 noise meter complying with international standards for sound level meter specifications IEC 61672:1999, IEC 61260:1995, and IEC 60651, as well as ISO 19961:2003 and ISO 3095:2001 for the measurement and assessment of environmental noise.

The average noise levels ranged between **(48.2-68.2 dB)** some of these measured locations had their noise values above the stipulated limit **(55dB)** EMC (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 and the IFC Guidelines for the diurnal schedule **(55dB)**.

The noise data were influenced by vehicular, motorcycle cycling along the Magongo Kwahola Road, Mombasa-Nairobi Highway and local roads giving access to the Informal Settlement (Mazunguka & Lilongwe in Portreiz, Magongo Kwahola and Migadini Area) as depicted by the percentile and the 1/3rd Octave Band frequency data.

Noise impacts are expected to slightly increase during construction at the (proposed project location) due to the use of construction machinery and earth moving equipment. The slight increase is due to the fact that the construction will interact with a live road use characterized with heavy goods trucks and hence elevating existing noise at site.

Noise reduction and control strategies should be applied during the construction activities. These strategies include and are not limited to undertaking noisy activities during the day to ensure that neighbours/sensitive receptors are not disturbed during the night; undertake demolition activities in accordance with legal requirements as described in the Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, this includes minimising unnecessary revving of engines, turning off machines when not required and routine maintenance of equipment; no potentially significant external working outside of normal working hours without prior agreement with the local authority; using equipment fitted with effective silencers where practicable; appointment of a site contact to whom complaints/queries about demolition activity can be directed – any complaints to be investigated and action taken where appropriate and local residents informed of exceptional activities.

1.0 INTRODUCTION

Seascan Energy Limited contracted Ecoscience and Engineering Limited to undertake baseline Ambient Noise measurement at the pre-identified sensitive receptors points within the project locations in compliance with the Local and International Regulations. The measurement was carried out from 26th to 30th October 2020.

This report details a general description of the site, the measurement points, the measurement methodology, regulatory requirements, summary of the onsite observations made during the measurement period and a qualitative analysis of the measurement results.

1.1 Measurement Objectives

The main objective for undertaking the Noise measurement was to establish the baseline ambient noise levels at the selected sensitive receptor points, compile achieved noise results and compare them with the Local and International Noise Regulations, Environment Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009 and International Finance Corporation Guidelines respectively.

1.2 Terms of Reference

The terms of reference for baseline noise survey were:

- ✓ To establish baseline noise levels at the proposed project site and way leave as well as identify the health risks posed by the project activities as per the Environmental Management and Coordination (Noise and Excessive Vibration Pollution (control), Regulations 2009;
- ✓ Compile Noise Quality Impact report and provide digital map;

1.3 Health and Safety Induction

Prior to commencement of work the following health and safety measures were implemented to prevent any incidents while on site:

- Identification and assessment of all risks associated with the work.

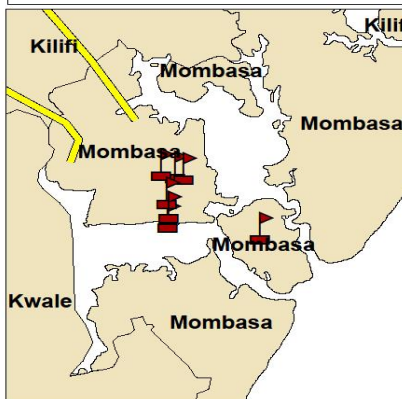
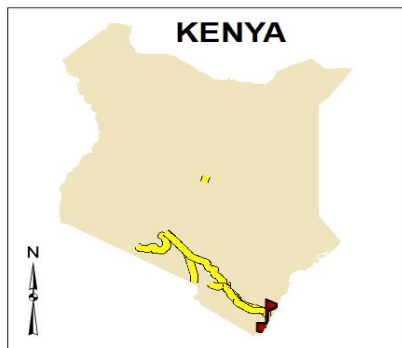
- Use of proper PPEs while on site;
- Setting up of air sampling media and equipment and the removal

1.4 Project location and description







The proposed project location is under Industrial Zoning. The sensitive receptor points i.e. Migadini, Portreiz and Magongo Kwahola residential areas were selected within the project way leaf. The table 1 below presents detailed description of the sampling points.

Table 1: Sampling Points Description

Sampling location	GPS Coordinates	Rationale for the measurement points
MP01-KRC along the lines next to combined warehouses	S 04°02'36.9" E 039°39'34.8"	Establishment of baseline ambient noise levels at sensitive receptor points along the proposed project location and way leave.
MP02-KRC middle of the proposed project location	S 04°00'44.0" E 039°37'22.4"	
MP03-KRC opposite the main gate	S 04°00'40.3" E 039°37'00.7"	
MP04-Mega Garment next to combined warehouses	S 04°00'47.0" E 039°37'35.2"	
MP05-Mazunguka Area in Portreiz	S 4°2'15.024" E 39°37'11.16"	
MP06-Lilongwe in Portreiz Area	S 4°1'32.268" E 39°37'10.032"	Establishment of baseline ambient noise levels at sensitive receptor points along the proposed project location and way leave
MP07-Magongo Kwahola Area	S 4°1'57.702" E 39°37'12.162"	
MP08-Migadini Area	S 4°2'15.024" E 39°37'11.16"	



Legend

-  Monitoring points
-  GPS_Mombasa_REV.csv Events
-  Kenya pipeline
-  Rivers
-  Major Roads
-  County boundary

Monitoring points in Mombasa County



Figure 1: Ambient Noise Sampling Points

Source: Google Earth

2.0 METHODOLOGY

2.1 Noise Measurement Methodology

The Environmental Noise level measurements was carried out with respect to the ISO 1996, Acoustics – Description and Measurement of Environmental Noise, comprising the following:

- Part 1: Basic quantities and procedures;
- Part 2: Acquisition of data pertinent to land use and
- Part 3: Application to noise limits.

A duly calibrated Type 1 Precision impulse integrating Sound level meter set at fast response was used. The Measurement points were identified for measurements to determine the Environmental Noise. Field calibration checks were done before and after each measurement schedule. Measurements was done for the diurnal (daytime) schedule.

The measurements were done for a period of 4 hours at each of the Measurement locations and sessions logs done after every ten seconds. For each session, the L_n , L_{eq} , L_{Max} , L_{Min} and sources of noise were recorded.

2.1.1 Instrumentation

The equipment used for the measurements are as detailed below:

- A Type 1, Data logging, precision impulse, integrating sound level meter, with a microphone (and windshield) mounted on a tripod stand at 1.5m above the ground level and >3m from any façade.
- Field Calibrator: An acoustic calibrator to field check the meter before and after each of the Measurement sessions.



Figure 2: Ongoing noise measurement at Portreiz

3.0 APPLICABLE REGULATIONS AND GUIDELINES

The sampling points for the pre-identified locations fall under Industrial, Residential, Rural and Other area zoning, thus the standards used to evaluate the measured values are derived from the EMC (Noise and Excessive Vibration Pollution) (Control) Regulations 2009 and International Finance Corporation Guidelines for Noise Standards.

3.1 EMC (Noise and Excessive Vibration Pollution) (Control) Regulations 2009

The EMCA, 1999 part 101 provides for NEMA-Kenya to recommend guidelines for the abatement of unreasonable noise and vibration pollution emitted into the environment from any source. Pursuant to this, the Noise and Excessive Vibration Pollution Control Regulations, 2009 (Legal Notice No. 61) were developed.

The Environmental Management and Coordination (Noise and Excessive Vibration Pollution Control) Regulations, 2009 sets out maximum permissible noise levels in the First Schedule of the Regulation for various zones. Part IV of the regulations state that where a sound source emits noise which fail to comply with provisions of the Regulations, such person shall apply for a license to the Authority. Table 2 below shows the different guideline values for different zones.

Table 2: Noise and Excessive Vibrations Pollution Regulations

Zone		Sound Level Limit dB(A) (Leq, 14h)		Noise Rating levels (NR) (Leq, 14h)	
Time Frame Day: 6:01am- 8:00 pm (Leq. 14h) Night: 8:01pm-6:00 am (Leq. 10h)		Day	Night	Day	Night
A	Residential:Outdoor	50	35	40	25
B	Mixed Residential (with some commercial and places of entertainment)	55	35	50	25
C	Commercial	60	35	55	25

3.2 International Finance Corporation Guidelines Noise Level

This section addresses impacts of noise beyond the property boundary of the facilities. Noise impacts should not exceed the levels presented in Table 3, or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site.

Highly intrusive noises, such as noise from aircraft flyovers and passing trains, should not be included when establishing background noise levels.

Table 3: *Noise Level Guidelines*

Receptor	Daytime 07:00 - 22:00	Nighttime 22:00 - 07:00
Residential, Institutional, Educational	55	45
Industrial, Commercial	70	70

4.0 MEASUREMENT RESULTS

This section presents the results obtained during monitoring. The noise levels (L_{eq}) for each monitoring location are as indicated in the table 4 below. Correspondingly, the noise monitoring results for the noise percentiles and 1/3rd octave frequency band analysis has been appended to this report.

4.1 Noise Percentile Data

The Noise Percentile data has been presented in table 5 below.

The measurement results are expressed as follows:

- L_{max} , Maximum sound pressure level obtained during the monitoring period
- L_{min} , Minimum sound pressure level obtained during the period of monitoring
- L_{eq} , Value of A-weighted sound pressure level of a continuous steady sound that, within a specified interval, has the same mean square sound pressure as a sound under consideration whose level varies with time.
- L_{10} value is the level just exceeded for 10% of the time.
- L_{50} value is the level just exceeded for 50% of the time.
- L_{90} value is the level just exceeded for 90% of the time

Table 4: Summary of the noise measurement

Sampling location	L _{eq}	L _{min}	L _{max}	L ₁₀	L ₅₀	L ₉₀	EMC, (Noise and Excessive Vibration Pollution) (Control) Regulations 2009	IFC Guidelines
MP01-KRC along the lines next to combined warehouses	55.1	38.8	88.5	53.3	46.9	45.3	55 dB	55 dB
MP02-KRC middle of the proposed project location	48.2	39.9	75.4	51.4	46.0	43.2	55 dB	55 dB
MP03-KRC opposite the main gate	54.7	38.6	84.3	52.7	45.0	40.6	55 dB	55 dB
MP04-Mega Garment next to combined warehouses	57.8	46.8	97.6	59.3	54.1	51.2	55 dB	55 dB
MP05-Mazunguka Area In Portreiz	59.9	43.6	95.2	63.7	55.4	50.8	55 dB	55 dB
MP06-Lilongwe in Portreiz Area	57.7	43.3	92.5	63.7	55.5	50.1		
MP07-Magongo Area	68.2	47.6	89.6	69.6	61.7	56.3		
MP08-Migadini Area	65.9	46.9	102.0	70.4	59.3	52.1		

**** Values above the stipulated limit

The results obtained from the measurement exercise in the table above ranged between **(48.2-68.2 dB)** some of these measured locations had their noise values above the stipulated limit **(55dB)** EMC (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 and IFC Guidelines for the diurnal schedule **(55dB)**.

Discussion of Noise Results

As noted during the measurement, the noise data were influenced by vehicular, motorcycle cycling along the Magongo Kwahola Road, Mombasa-Nairobi Highway and local roads giving access to the informal settlement (Mazunguka, Lilongwe in Portreiz , Magongo Kwahola and Migadini Area) as depicted by the percentile and the 1/3rd Octave Band frequency data

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The average noise levels ranged between **(48.2-68.2 dB)** some of these measured locations had their noise values above the stipulated limit **(55dB)** EMC (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009. Similarly, the values were within the IFC Guidelines for the diurnal schedule **(70dB)**.

The noise data were influenced by vehicular, motorcycle cycling along the Magongo Kwahola Road, Mombasa-Nairobi Highway and local roads giving access to the informal settlement (Mazunguka, Lilongwe in Porteiz, Magongo Kwahola and Migadini Area) as depicted by the percentile and the 1/3rd Octave Band frequency data.

5.2 Recommendations

It is therefore recommended that the following noise reduction and control strategy to applied during the construction activities:

- Undertake noisy activities during the day to ensure that neighbours are not disturbed during the night;
- All demolition activities to be undertaken in accordance with legal requirements as described in The Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, This includes minimising unnecessary revving of engines, turning off machines when not required and routine maintenance of equipment.
- No potentially significant external working outside of normal working hours without prior agreement with the local authority;
- Use of equipment fitted with effective silencers where practicable;
- Appointment of a site contact to whom complaints/queries about demolition activity can be directed – any complaints to be investigated and action taken where appropriate and
- Local residents informed of exceptional activities.

Appendix 1: Photographic Report

	Ongoing assessment at Migadini
	KPRL and KPC Pipeline
	Ongoing assessment at Magongo
	Ongoing assessment at Mazunguka Area in Portreiz

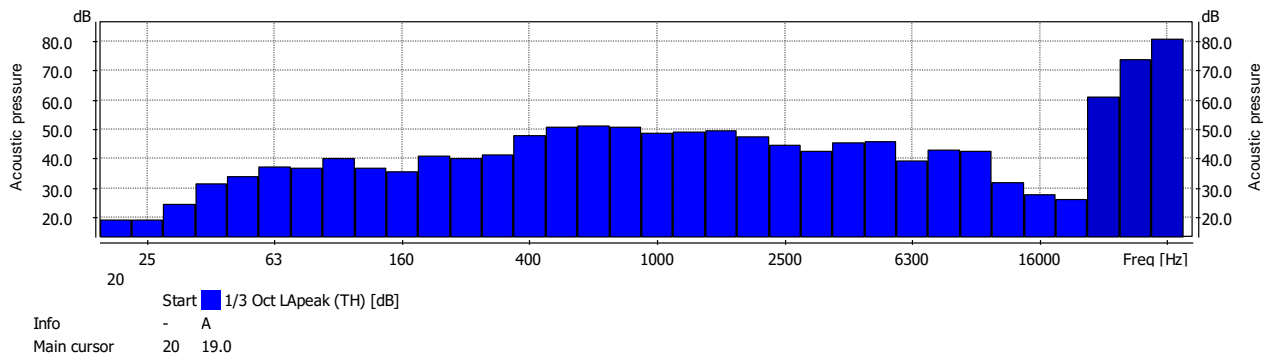


Ongoing assessment at Lilongwe
Porteiz
Area

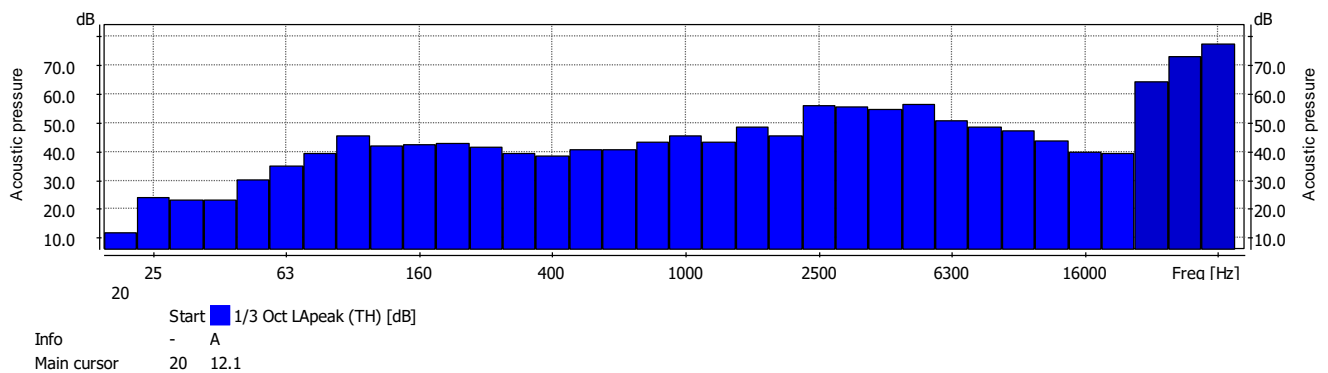


APPENDIX 2: Octave Band Frequency Data

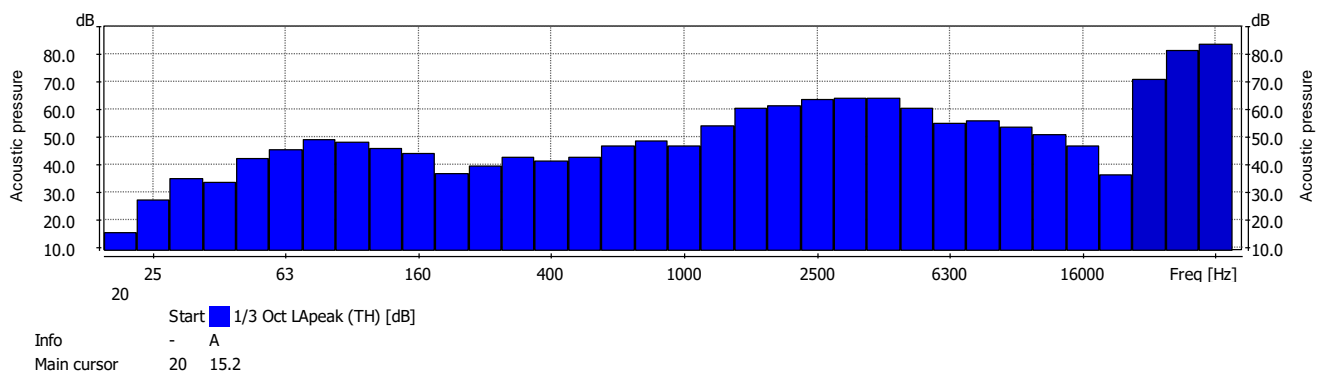
MP01-KRC along the Siding Lines Next To Combined Warehouses



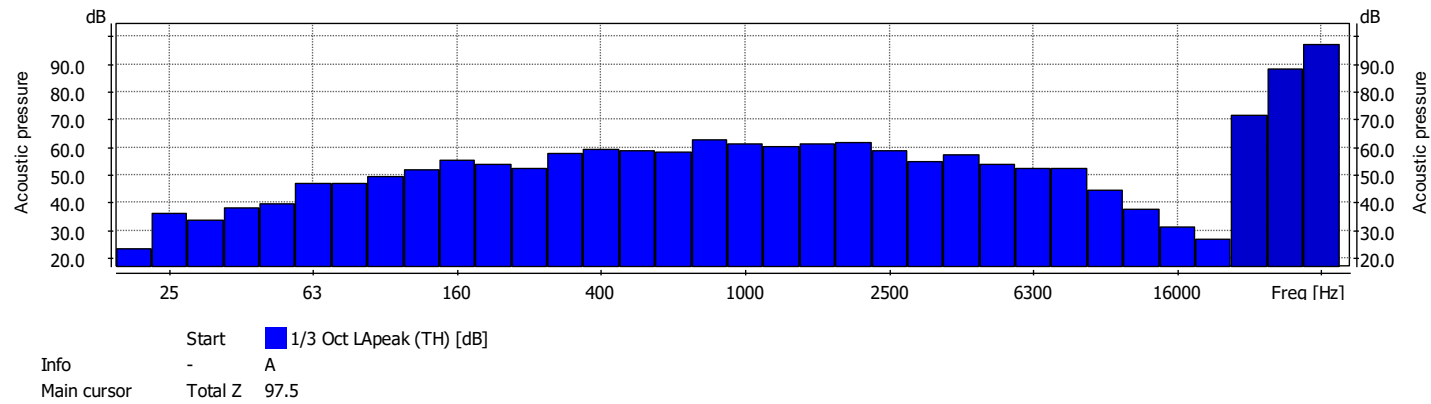
MP02-KRC Middle of the Proposed Project Location



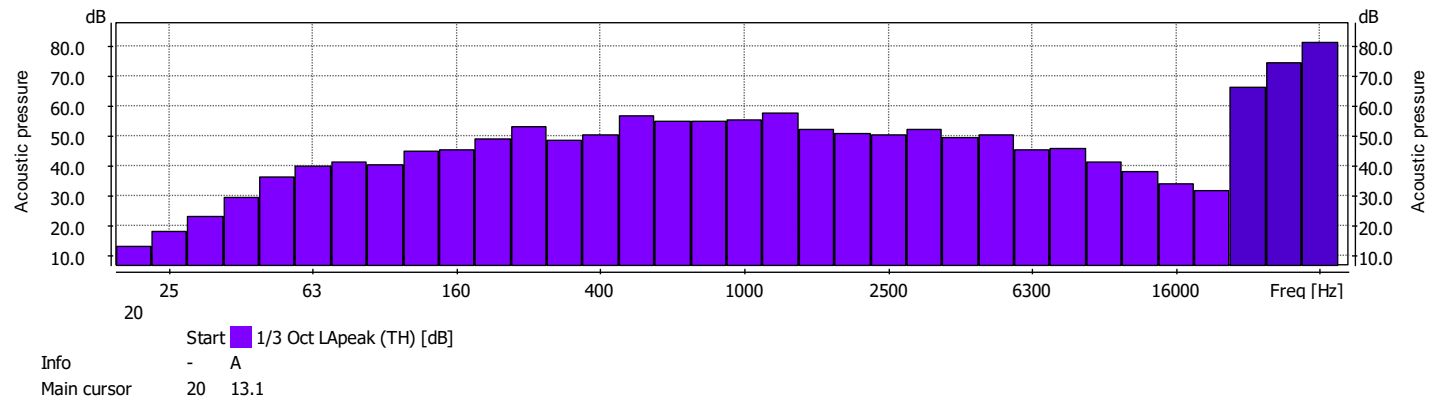
MP03-KRC opposite the Main Gate



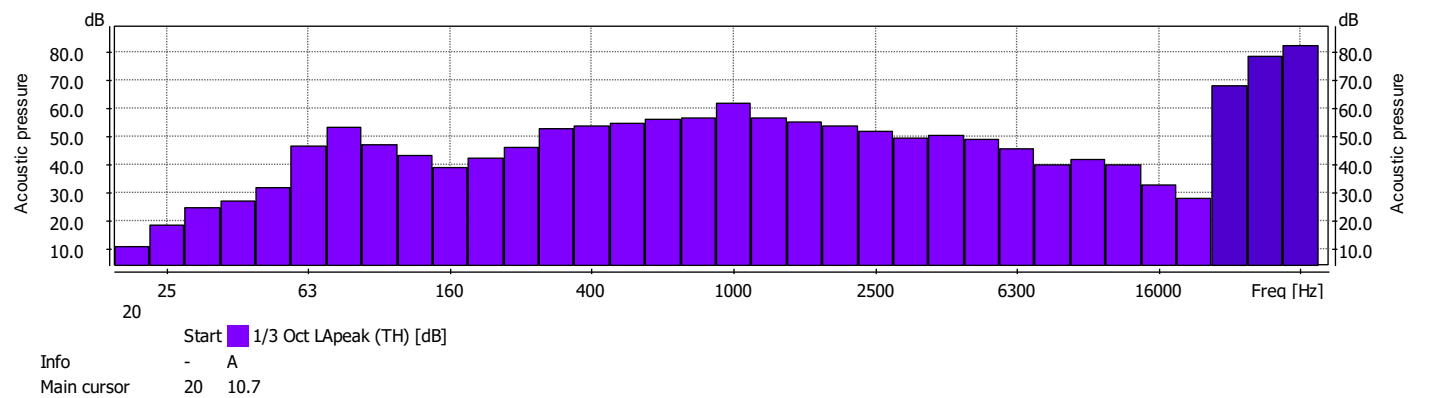
MP04-Mega Garment Next to Combined Warehouses



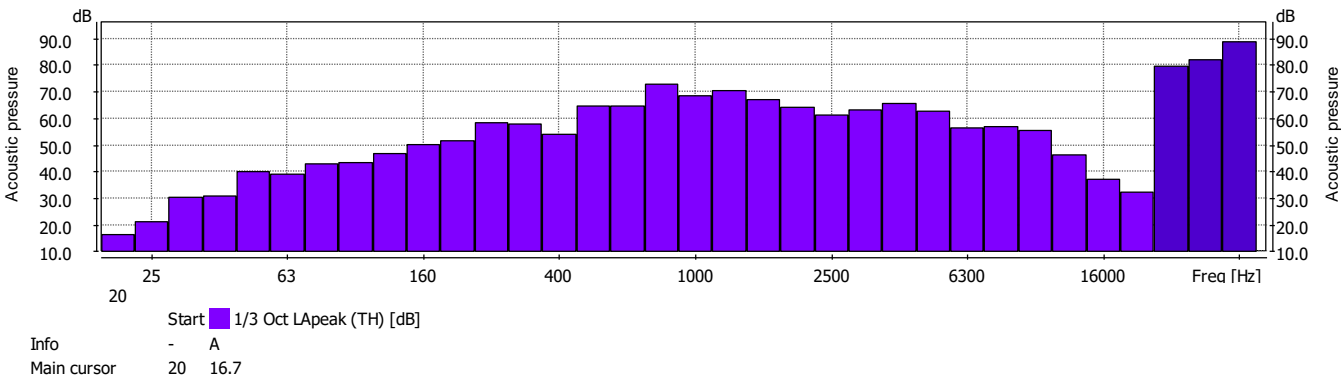
MP 05-Mazunguka in Portreiz Area



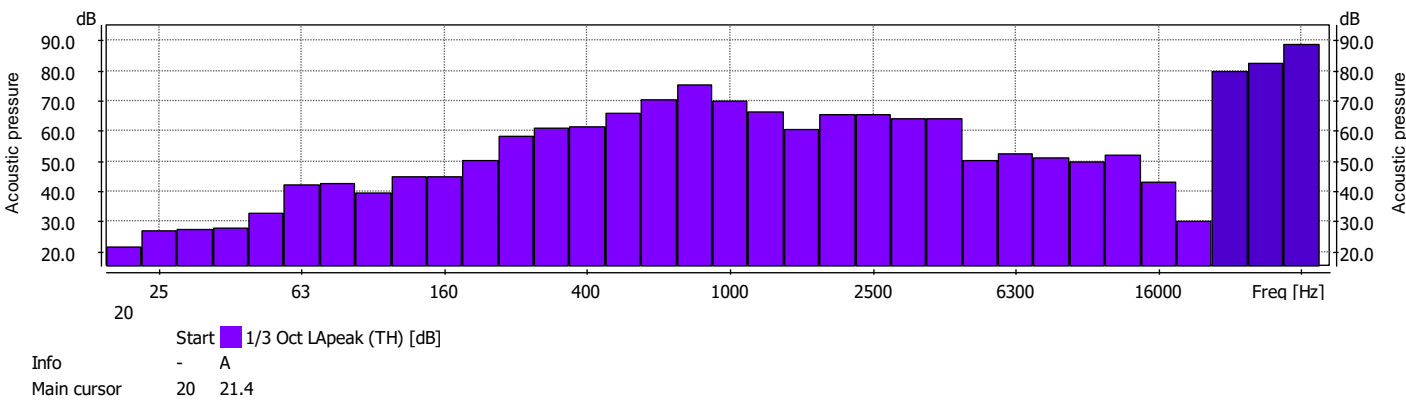
MP 06-Lilongwe Area in Portreiz




MP 07-Magongo Area




MP 08-Migadini Area



APPENDIX 3: Calibration Certificate

ORIGINAL	
<p>Kenya Bureau of Standards P.O Box 54974-00200 NAIROBI Tel: (+254 020) 6948000 info.metrology@kebs.org Website: www.kebs.org</p>	<p>ECOSCIENCE & ENGINEERING LTD. P.O. Box 55533 - 00200, NAIROBI</p>
	Page 1 of 3 pages
Calibration Certificate	
REQUESTED BY	: Ecoscience and Engineering Limited
ADDRESS	: P.O Box 55533 - 00100 Nairobi
EQUIPMENT	: Analytical Electronic Balance
MODEL	: AS 220.R2
SERIAL NO.	: 526388
EQUIPMENT RANGE	: Single range instrument
MANUFACTURER	: Radwag of Poland
LAB NO.	: Mass (Site)
DATE	: 2020-04-14
CERTIFICATE NO.	: BS/MET/2/3/92/502
STICKER NO.	: 58537



1.0 REFERENCE STANDARDS AND EQUIPMENT USED

(a) The weighing instrument was calibrated in accordance to EURAMET cg-18; 2015

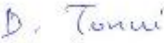

(b) Standard masses of class E2 were used in calibration of the test instrument.

(c) Serial No. of standard weights used : 1790708

(d) These standards are traceable to the National standards Serial Nos. E1 KS 1 and E1 KS 2.

2.0 CALIBRATION PROCEDURE

The calibration was done in accordance to Guideline in EURAMET cg-18; 2015 and as documented in calibration procedure No. MET/OP/02 "Measurement procedure for non automatic weighing instruments". The tests included: Repeatability, Recentrality and Error of indications

Calibrated by :	D. Githua	Date: 2020-04-14
Checked by:		Date: 2020-04-23
Signed:		Date: 2020-04-23

For: MANAGING DIRECTOR:

Calibration certificate without signature and official stamp is not valid. This certificate has been issued without any alteration and may not be reproduced other than in full except with the approval of the Managing Director KEBS.
If undelivered please return to the above address.