CONSULTANCY SERVICES TO PROVIDE TECHNICAL ASSISTANCE ON PROPOSED OBA SEWER EXTENSION PROJECTS FOR NYERI WATER AND SEWERAGE COMPANY (NYEWASCO)

Final Environmental and Social Impact Assessment Project Report

20 April 2017

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Project Title: Environmental and Social Impact Assessment for the Proposed OBA Sewer Extension Projects

Report Title: Environmental and Social Impact Assessment Project Report

This report has been done in compliance with the Environmental Management and Coordination Act, 1999 and the Environmental Impact Assessment and Audit Regulations, 2003. It was conducted and compiled by a team led by:

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ABBREVIATIONS

AIDs	Acquired Immune Deficiency Syndrome
AOD	Aid on Delivery
DOSH	Directorate of Occupation Health and Safety
ECDE	Early Childhood Development Education
EIA	Environmental Impact Assessment
ESAP	Environmental and Social Assessment Procedures
ESIA	Environmental and Social Impact Assessment
EMCA	Environmental Management and Coordination Act
ESMP	Environmental and Social Management Plan
EU	European Union
HIV	Human Immunodeficiency Virus
km	Kilometre
mm	Millimetre
MWI	Ministry of Water and Irrigation
NCGs	Non Condensable Gases
NEMA	National Environmental Management Authority
NGOs	Non-Governmental Organisations
NHIF	National Health Insurance Fund
NSSF	National Social Security Fund
NYEWASCO	Nyeri Water & Sewerage Company Limited
OBA	Output Based Aid
OP	Operational Policy
OSHA	Occupational Safety and Health Act
PAPs	Project Affected Persons
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
RAP	Resettlement Action Plan
RBF	Results Based Financing
SPA	Service Provision Agreement
TWSB	Tana Water Services Board
WASREB	Water Services Regulatory Board
WRMA	Water Resources Management Authority
WSP	Water Service Provider
WSTF	Water Services Trust Fund

EXECUTIVE SUMMARY

Introduction

Nyeri Water & Sewerage Company Limited (NYEWASCO) is a limited liability company by shares owned by the County Government of Nyeri. The Company was incorporated as a private company on 23rd September 1997 under the Kenyan companies act, CAP 486 and became operational in July 1998. The company's broad mandate is to provide water and sewerage services to the residents of Nyeri Sub-county and its environs. NYEWASCO operated as an agent of the municipal council of Nyeri until 4th October 2005 when the company signed Service Provision Agreement (SPA) with Tana Water Services Board as provided for by the Water Act 2002. Upon the transfer of the devolved function of the water and sanitation services to the County Governments, the County Government of Nyeri acquired full ownership of the company through transmission of the shares previously held by the defunct Municipal Council of Nyeri.

The Company has a valid Service Provision Agreement with Tana Water Services Board and approved by the Water Services Regulatory Board (WASREB) for five (5) years up to 3rd May 2017. The company's services area covers Nyeri Sub County and its environs.

Purpose

The main aim of this study was to carry out an Environmental Impact Assessment for the proposed sewer extension projects. This report presents the findings on the anticipated environmental and social impacts and makes recommendations on the relevant mitigation measures aimed to prevent and reduce adverse impacts. An Environmental and Social Management Plan (ESMP) has been formulated in this report to ensure that the proposed mitigation measures in this Environmental and Social Impact Assessment (ESIA) project report will be implemented effectively.

Approach and Methodology

The study adopted a participatory and collaborative approach to ensure active participation of all the key stakeholders. As such, discussions were held with community members within the project area and relevant key stakeholders with the assistance and coordination of the proponent and the local administration. The study was carried out using the methodology described in EMCA, 1999 and Environmental (Impact Assessment and Audit) Regulations 2003. The various data collection techniques adopted in the course of the study included literature review, site assessments, public consultations in form of community *barazas* and key stakeholder consultations.

Project Description

The projects under consideration are in two different Results Based Financing (R.B.F)

funding modes namely Output Based Aid (O.B.A) and Aid on Delivery (A.O.D). The areas covered under the OBA funding mode are classified as pro poor. These areas have been identified in the Government's poor areas mapping database, MajiData. Extending sewer services to these areas will ensure improved access to sanitation services for low income households. The areas under consideration under this mode include *Ruring'u, King'ong'o (Getende estate), Ngangarithi* and *Kamakwa (Kandara and Mumbi).* The approximate lengths of sewer lines for each of these areas under consideration is 9km, 7.2km, 2.8 km and 15km respectively. The area to be considered under Aid on Delivery (A.O.D) funding mode is *Ring Road Estate* whose length of the sewer line to be extended measures approximately 2km.

The proposed sewer extension projects consist of sewer trunk mains that connect to the existing Nyeri town sewer infrastructure. The trunk mains are fed by several laterals emanating from the targeted residential areas, public and commercial facilities. The sewers have been aligned as much as practical along existing road reserve to avoid interfering with existing private properties and developments. The sewers have been designed to take advantage of natural gradient and gravity. This aims at optimizing the pipe gradients in order to minimize the earthworks. The design includes a pumping station at *Gatende*. The detailed design specifications are provided in Section 2.3 of this report.

Summary of Impacts

The anticipated environmental and social impacts as a result of project implementation have been screened in this report through the analysis of impacts on soil environment, air environment, physical environment and the society. The key positive impacts that will be realised upon project implementation include the following:

- The Proponent will generate more revenue from increased connections
- Improved state of sanitation and hygiene in the target estates
- Reduction in pollution to surface water sources running within the project areas
- Increased value of land
- Improved sanitation will lessen burdens on women and children hence ensuring enhanced family health
- Improved aesthetics in the project areas
- Income generation from opportunities
- Gender benefits
- Benefits from capacity building

Table 1 presents the anticipated adverse impacts of the project and the proposed mitigation measures aimed to prevent and reduce adverse environmental impacts.

Table 1: Anticipated Adverse Impacts and Proposed Mitigation Measures

Potential Impact	**Mitigation and Enhancement Measures**
Planning phase	
Loss of Land and Land Use	RAP Exercise • Land acquisition for the pump station site in recognition of necessary legal procedures • Identification of the affected private land owners where wayleave would be required, consultations and compensation for loss of land use prior to commencement of construction activities • In cases where the way leave falls in agricultural land, adequate timeframe will be provided to the affected to enable them remove their crops prior to acquisition.
Construction phase	
Employment opportunities	• Continuous consultations with local communities to resolve emerging issues of concern • Ensure gender equity in employment opportunities • Priority of employment opportunities to be given to the local residents to enhance ownership of the project
Soil Erosion	• Soils excavated during laying of sewer pipes should immediately be used for back-filling and should not be left exposed to wind or water during rainy season • The cleared sites will be re-vegetated to improve soil cover and minimize soil erosion and also improve on aesthetics of the project area
Solid Waste Disposal	• Sensitization of workers on environmental protection and safety • Provision of waste collection facilities for the temporary storage of solid wastes prior to disposal at an appropriate and designated location • Waste segregation prior to disposal via a registered waste handler • Recycle where necessary
Drainage and Hydrology	• Excavated soils should not be left exposed to prevent drainage interference • Excavated soil should be used for back filling and landscaping
Air Pollution (Dust, Fuel and NCGs emissions)	• Sensitization of workers on environmental protection and safety • Control speed of construction vehicles • Water should be sprayed during the construction phase on dusty excavated areas • Provision of dust masks to workers for use when working in dusty conditions • Use of serviceable vehicles and machinery to avoid excessive smoke emission
Noise and Vibrations	• Even though most excavation activities maybe done manually, the contractor will be expected to use serviceable site equipment, machinery and vehicles with low noise emission

Potential Impact	**Mitigation and Enhancement Measures**
	• Machines not in use will always be switched off. • Construction works to be done during the day
Occupational Health and Safety concerns	• Appropriate safety signage to show on-going construction works will be erected on site • No children will be employed in the undertaking of the site works. Provision of an Identification Card will be a requirement to all workers on site. • Well-equipped first aid kits will be provided at working sites • All construction workers to be provided with appropriate personal protective equipment for related work • Adequate road signs to warn pedestrians and motorists of construction activities shall be provided at appropriate points • Construction vehicles shall not exceed maximum speed limit of 30km per hour within residential areas. • Ensuring that construction work is conducted by trained workers with strict adherence to specific safety standards
Loss of Vegetation	• Vegetation loss during site clearance should be mitigated through landscaping and restoration of sites to their original state.
Water pollution	• The contractor will be conscious of any other existing infrastructure such as water pipes and communication infrastructure which maybe using the road reserve during excavations
Visual Impact	• Ensure the sites are restored to their original state through backfilling and landscaping.
Operation Phase	
Employment of local labour	• Ensure gender equity in employment opportunities • Priority of employment opportunities to be given to the local residents to enhance ownership of the project • Continuous consultations with local communities to resolve emerging issues of concern
Solid and Liquid Waste Generation	• Proper waste disposal of solid wastes generated during maintenance activities. • The wastes should be collected and disposed appropriately using a registered waste handler • Maintenance of sewers and ensuring manholes are covered at all times to eradicate potential overflow of sewage from the immediate manholes into open drains
Soil Contamination	• The Proponent to ensure that cases of potential overflow of sewer from man holes are immediately addressed when they arise without delay.
Occupational Health and Safety Hazards	• Workers conducting maintenance works must be provided with proper personal protective equipment related to their activities • Potential overflow of raw sewer should also be attended with immediate effect to prevent health hazards by neighbouring communities.
Decommissioning Phase	

Potential Impact	**Mitigation and Enhancement Measures**
Solid Wastes	• Collect, segregate and dispose wastes responsibly • Use of licensed waste handlers
Air pollution (Dust and fuel emissions)	• Control speed of construction vehicles • Water should be sprayed during the construction phase on dusty excavated areas • Provision of dust masks to workers for use when working in dusty conditions • Use of serviceable vehicles and machinery to avoid excessive smoke emission
Noise and Vibrations	• Even though most decommissioning activities maybe done manually, the contractor will be expected to use serviceable site equipment, machinery and vehicles with low noise emission • Machines not in use will always be switched off. • Decommissioning works to be done during the day
Visual Impact	• Rehabilitate/restore the site to its original state

In order to ensure that environmental mitigation measures proposed in this ESIA report will be implemented effectively, an Environmental and Social Management Plan (ESMP) has been formulated in this report in Section 9.2 of this report. The Proponent will be responsible to ensure that the project ESMP is implemented during project implementation.

Conclusion

Vision 2030 recognises that every person in Kenya is entitled to a clean and healthy environment and has the duty to safeguard and enhance the Environment, as all human activities generate waste which requires to be properly managed to protect human health and environment while enhancing aesthetics. The proposed sewer extension project will improve the state of sanitation and hygiene in the target estates and also improve aesthetics in the project areas in line with Vision 2030.

The proposed project is also expected to contribute towards reduction in pollution to surface water sources among other positive impacts discussed in this report. Even though project implementation may also lead to some negative impacts, most of the anticipated negative impacts will be of temporary nature and can be mitigated and managed to acceptable levels using relevant mitigation and management measures outlined in the project ESMP.

Recommendations

The consultant recommends licensing of the proposed Sewer Extension Projects as a step towards achieving a clean and healthy environment which to a large extent contributes towards achieving Vision 2030. The Proponent should meet the conditions to which NEMA may set during issuance of license.

The proposed project should also be implemented with the following recommendations:

- Mitigation measures outlined in this report should be adhered to and the Environmental and Social Management Plan (ESMP) implemented to the letter. The implementation of this ESMP will be key in achieving the appropriate environmental management standards as detailed in this report
- NYEWASCO should undertake annual environmental audits (EA) of the project after completion to confirm the efficiency and adequacy of ESMP
- The impacts of the proposed sewer extension projects should be monitored closely and documented by the Proponent
- NYEWASCO should liase with relevant agencies like NEMA and DOSH on a need basis during project implementation to ensure compliance with various legal requirements and adopt sound construction practices without compromising on issues of environmental conservation

CHAPTER 1 INTRODUCTION

1.1 Project Background

NYEWASCO is a limited liability company by shares owned by the County Government of Nyeri.The Company was incorporated as a private company on 23rd September 1997 under the Kenyan companies act, CAP 486 and became operational in July 1998. The company's broad mandate is to provide water and sewerage services to the residents of Nyeri Sub-county and its environs. NYEWASCO operated as an agent of the municipal council of Nyeri until 4th October 2005 when the company signed Service Provision Agreement (SPA) with Tana Water Services Board as provided for by the Water Act 2002. Upon the transfer of the devolved function of the water and sanitation services to the County Governments, the County Government of Nyeri acquired full ownership of the company through transmission of the shares previously held by the defunct Municipal Council of Nyeri.

The Company has a valid Service Provision Agreement with Tana Water Services Board and approved by the Water Services Regulatory Board (WASREB) for five (5) years up to 3rd May 2017. The company's services area covers Nyeri Sub County and its environs a surface area of 244 km^2 with an estimated population of 162,756.

1.1.1 Water Service Coverage

The company abstracts raw water from River Chania 6km from Kamakwa treatment works (Ihwa Intake). The treatment works has a production capacity of 27000m^3 per day against a current demand of 18000m^3 per day with a Non -Revenue Water of 18%.

NYEWASCO has so far served 98% of the population within its area of jurisdiction as per the Service Provision Agreement. The number of active connections as at February 2016 was 24,713 (Twenty four thousand seven hundred and eleven). The connection status as at February 2016 is as listed here below:

Category	**Active**	**Inactive**	**Total**
Commercial	1,277	804	2,081
Domestic	23,339	4,369	27,708
Government	64	33	97
Water Kiosks	17	1	18
Schools	16	1	17
Total	**24713**	**5208**	**29,921**

1.1.2 Sewerage service coverage

NYEWASCO has two sewage treatment plants located at Kangemi (convectional type) and Gatei, two sewage pumping stations at Kiganjo and Chania. Both Kangemi and Gatei receive

and treat an approximate daily flow of 4000m^3 against a capacity of 8000m^3 per day. The number of active sewered connections is 6711as at February 2016 accessible to25% of the entire population within the area of jurisdiction. The rest of the population dispose the liquid waste into individual septic tanks, traditional pit latrine or ventilated improved pit latrines.

1.2 Purpose of the Study

The main aim of this study was to carry out an Environmental Impact Assessment for the proposed sewer extension projects.

1.2.1 The ESIA Focus

The scope of this ESIA covered the following aspects:

- Description of the baseline environmental conditions of the project area
- Description of the proposed project
- Provisions of the relevant laws and regulations
- Identification and discussion of any adverse impacts to the environment anticipated from the proposed projects with various stakeholders
- Identification of appropriate mitigation measures
- Provision of an environmental and social management plan

1.3 Terms of Reference (TOR)

The consultants on behalf of the proponent, NYEWASCO, conducted the study by incorporating, but not limited to, the following terms of reference:

1. Identify all the areas within the project's operations that can contribute to negative environmental and social impact and define remedial measures required.
2. Determine the levels and types of operations that can negatively affect the environment and are to be addressed by the Company.
3. Outline the content issues that should be dealt with for each issue raised.
4. Interview samples of all types of customers who are provided with sewerage services within the company project areas limits to establish their awareness, knowledge on negative environmental impact contributed by the company operations and the level of projects acceptance.
5. Propose measures to be introduced to the company's implementation of the project.

1.4 Approach and Methodology

1.4.1 General Approach

The study adopted a participatory and collaborative approach to ensure active participation of all the key stakeholders. As such, discussions were held with community members within the project area and relevant key stakeholders with the assistance and coordination of the proponent and the local administration.

1.4.2 Methodology

The ESIA study was carried out using the methodology described in EMCA, 1999 and Environmental (Impact Assessment and Audit) Regulations 2003. The following study procedures were employed in the study.

1. **Environmental Screening**

The screening process helped narrow down to the most critical issues requiring attention during the environmental impact assessment. Environmental issues were categorized into physical, natural/ecological and social, economic and cultural aspects.

2. **Desk Review**

The consultant reviewed the baseline information on the project area, project design documents and relevant government legislations and guidelines which are presented in Section 3 of this Report among others.

3. **Site Assessment**

Field investigations were undertaken from 19th December 2016 to 31st December 2016 for data collection and community consultations. Public consultations in form of key informant interviews and public *barazas* were conducted with communities living within the vicinity of the project area. The minutes and lists of attendees at the consultations are provided in the appendices of this report.

Key Stakeholder Consultations were done with various key stakeholders who included Nyewasco staff, Nyeri County Government officials, public administration, key government ministries and public and private institutions within the project area. A comprehensive list of all the consulted stakeholders is attached in the appendices.

4. **Data Analysis and Reporting**

The consultants have used their past experience and knowledge to analyse the data from the desk studies and site assessments in order to determine the potential impacts of the proposed

sewer extension projects, the severity of effects arising from these impacts and how these adverse impacts can be best mitigated and positive impacts enhanced.

This analysis provides the framework for the recommendations on corrective actions and remedial measures and provides the basis for the formulation of the environmental and social management plan which forms part of this report.

1.5 ESIA Report Outline

This report follows the format prescribed in the Legal Notice No. 101 of 13th June 2003 which deals with the Environmental (Impact Assessment and Audit) Regulations.

- Chapter One outlines the background and procedure to the ESIA study process
- Chapter Two provides a description of the project
- Chapter Three provides a description of the project baseline environment
- Chapter Four reviews relevant policies, legal, regulatory and administrative frameworks governing conduct of environmental assessment in Kenya
- Chapter Five provides an analysis of project alternatives
- Chapter Six reports on the outcome of stakeholders consultations
- Chapter Seven analyses potential impacts of the project
- Chapter Eight outlines the proposed mitigation and enhancement measures for the proposed projects
- Chapter Nine presents the Environmental and Social Management and Monitoring Plan
- Chapter Ten provides the Conclusion and Recommendations of this ESIA Study
- Chapter Eleven presents the Reference material that informed the study
- Chapter Twelve provides the Annexes

CHAPTER 2 PROJECT DESCRIPTION

2.1 Introduction

This chapter describes the proposed projects in terms of their geographic location, proposed design and materials and activities at various phases of project implementation. This helps identify the extent of the project's impact. The proposed project activities described, design and materials borrows largely from the Design report.

2.2 Project Overview

The projects under consideration are in two different Results Based Financing (R.B.F) funding modes namely Output Based Aid (O.B.A) and Aid on Delivery (A.O.D).

2.2.1 Output Based Aid (O.B.A)

The areas covered under the OBA funding mode are classified as pro poor. These areas have been identified in the Government's poor areas mapping database, MajiData. Extending sewer services to these areas will ensure improved access to sanitation services for low income households. The areas under consideration under this mode include;

a) Ruring'u/Skuta

The length of the sewer line to be extended measures approximately 9km. The area has a total population of 12,523 out of which 10,337 are expected to be served through 1,219 targeted connections. The sewer service will also serve one institution in the area, Siema Academy. The proposed sewer line will be connected to an existing sewer network where the topography permits gravity flow.

b) King'ong'o (Gatende Estate)

The length of the sewer line to be extended measures approximately 7.2km; this length includes a raising main (H.D.P.E material) of approximately 1.2km. Due to the area ground levels in relation to the existing sewer network connection point, a station shall be incorporated in the design. The area has a total population of 2,628 out of which 2,168 are expected to be served through 257 targeted connections. In addition it will serve an industrial estate (K.I.E) and institutions with student population as listed here below;

Table 2.1 Institutions within Gatende estate affected by the project

Institution	Population
Nyeri Primary	1500
Good Shepherd Academy	700
Nyeri Baptist High School	400

Institution	**Population**
Rware High School	600

Figure 2.1 presents some of the housing facilities at Gatende estate expected to benefit from the proposed sewer extension projects.

Figure 2.1: Housing facilities at Gatende estate expected to benefit from the proposed sewer extension projects

c) Ngangarithi (Classic)

The length of the sewer line to be extended measures approximately 2.8km. The area has a total population of 3,349 out of which 2,795 is expected to be served through 327 targeted connections. The proposed sewer line will be connected to an existing sewer network where the topography permits gravity flow.

d) Kamakwa – Kandara, Mumbi

The length of the sewer line to be extended measures approximately 15km. The area has a total population of 7,500 out of which 6,000 are expected to be served through 1,200 targeted connections. The proposed sewer line will be connected to an existing sewer network where the topography permits gravity flow.

2.2.2 Aid on Delivery (A.O.D)

The area to be considered under this funding mode is Ring Road Estate. The length of the sewer line to be extended measures approximately 2km. The area has a total population of 3,000 out of which 2,000 are expected to be served through 302 targeted connections. The

proposed sewer line will be connected to an existing sewer network where the topography permits gravity flow.

2.3 Proposed Design and Materials

2.3.1 Design

The proposed sewer extension projects consist of sewer trunk mains that connect to the existing Nyeri town sewer infrastructure. The trunk mains are fed by several laterals emanating from the targeted residential areas, public and commercial facilities. The sewers have been aligned as much as practical along existing road reserve to avoid interfering with existing private properties and developments.

The sewers have been designed to take advantage of natural gradient and gravity. This aims at optimizing the pipe gradients in order to minimize the earthworks. The sewer nominal diameters range from 100mm for laterals to 450mm for trunk mains as dictated by ground gradient and the sewage discharge from the service areas. The sewers will be buried in trenches of a minimum depth of 0.5m and laid above concrete beddings. The sewers also contain manholes at intervals of between 10m and 60m. Manholes will be provided on sewers at all changes of direction, sewer level or gradient, at every junction and throughout the sewerage system at intervals sufficiently close to simplify sewer cleaning.

The design includes a pumping station at Gatende (GPS coordinates: 273032.7410 East, 9955138.6020m North). The pumping station's features are as presented in Table 2.2 below.

Table 2.2 Pumping station features

Parameters	**Specification**
Pump type	• Centrifugal, variable speed pump
Pump size	• Head (H): 66metres • Discharge (Q): 0.15 cu.m/sec • Velocity (v): 0.943 m/sec
Emergency pumping	• Two pumps to be provided; one being a duty pump and the other a standby pump
Sump	• Sump capacity equal to 2 hours at peak flow
Emergency Storage	• Storage equivalent to six (6) to 24 hours at the average flow rate
Prime-mover and Stand-by System	• Station to be connected to the national grid • A stand-by generator will however be provided so as to run the station in the event of power outages
Control Units	• A 'no flow' trip switch to prevent the pumps from running dry as well as a thermal overload to protect the motors; • Incoming voltmeter;

	• An ammeter for each pump; • An hour meter for each pump; • Duty selector switch; • High level alarm siren; • Float control switches; • Telemetry devises
Safety Provisions and Ergonomics	• All sumps and wells will be adequately ventilated • Handrails will be provided to all landings and staircases and to the sides of open sumps and dry wells • Skid-proof surfaces will be provided to all floors and steps • The layout of the pumps, pipe work and equipment will be such as to allow easy access to individual items of equipment without obstruction by pipe work • The pump station will be fully enclosed in a securely fenced area to prevent un-authorised access • A provision has been made for lifting mechanisms and for a flatbed truck/ pick-up truck to enter the area for the purpose of removing or replacing the pumps or motors.

Figure 2.2 shows the proposed location of a pump station at *Gatende*.

Figure 2.2: Proposed site for a pump station at Gatende Estate

2.3.2 Materials

Construction materials shall be procured from locally and internationally accepted sources that meet the threshold of public health, occupational safety and health as well as

environmental standards. The main construction materials and equipment for this project will be as follows:

- Sewer pipes will be constructed from PVC pipes
- Manholes will be constructed from: In-situ mass concrete and Precast concrete rings, with or without in-situ mass concrete surrounds
- Heavy duty manhole covers made from composite material
- Mass concrete sewer pipe surrounds
- Steel steps for manholes
- Chain-link fencing and steel gate for the pump station

2.4 Project Implementation Activities

2.4.1 Activities during Construction Phase

The main activities during the project implementation will include but not limited to the following:

- Procurement of construction materials from approved dealers
- Transportation of construction materials and debris using heavy and light machinery
- Appropriate storage of construction materials
- Preparation of the grounds-this will involve excavation works to create space for laying of sewer pipes
- Plumbing works: Includes installation of sewer pipes, connection to existing sewer
- Covering of the laid sewer lines and landscaping.
- Disposal of the resulting debris/waste materials. All debris and excavated materials will be dumped on approved sites but should be recycled in then project as much as possible e.g. in backfilling.

2.4.2 Activities during Operation Phase

The sewer line infrastructure will be repaired and maintained regularly by the proponent during the operational phase of the projects. Activities at operation phase will include:

- Carrying out any required repairs
- Maintain sewers and ensuring manholes are covered at all times to eradicate potential overflow of sewage from the immediate manholes into open drains
- Provide/supply reliable water for flushing the toilets
- Engaging community groups and leaders in resolving emerging issues
- Collection of sewer payments by the proponent through the water bills as the sewer charges

2.4.3 Activities during decommissioning phase

Decommissioning phase is an important aspect of a project cycle which comes at the end of the operation phase of a project. Activities at decommissioning phase of the project will involve excavation and earthworks; transportation of waste materials from site and disposal by registered waste handlers; landscaping and backfilling. The Proponent must ensure that project sites are restored or rehabilitated to acceptable environmental standards.

CHAPTER 3 DESCRIPTION OF THE BASELINE PROJECT AREA ENVIRONMENT

3.1 Geographical Location

The proposed sewer extension projects are located within Nyeri Town Sub County. Nyeri Water & Sewerage Company Ltd, operates within Nyeri Town Sub County which covers an area of 244 km^2 but most of this is essentially rural and outside the main town. The water supply system serves approximately 90% (126,000) of the population while the sewer network serves 30% (36,500) of the population. Figure 3.1 shows the map of Nyeri Town Sub County within which the coverage of proposed projects are located at Ruringu, Gatende (King'ong'o), Kamakwa, Ngangarithi and Ring Road estate.

Figure 3.1: Map of Nyeri Town Sub County

This project entails extending sewer services to targeted areas to ensure improved access to sanitation services for low income households.

3.2 The Physical Environment

3.2.1 Climate

The county experiences equatorial rainfall due to its location and being within the highland equatorial zone of Kenya. The long rains occur from March to May while the short rains falls from October to December although sometimes this pattern is occasionally disrupted by abrupt and adverse changes in climatic conditions. The annual rainfall ranges from 500mm in dry areas of Kieni plateau to 1,500mm in the Aberdare hills and areas around Mt. Kenya. The climate contains temperatures ranging from of an annual minimum of 12oc to a mean of 27oc. It is densely populated with fertile soils especially in the central highland between the Eastern base of Aberdare range and Western slope of Mount Kenya.

3.2.2 Geology and Soils

Soils at Nyeri are composed of tropical residual red clay soil developed over slightly to moderately weathered volcanic tuff; the soils are Nitisols with associated andosols that support tea and coffee growing in a humid-cool temperate climate. This soil was found to possess high strength and low compatibility. The area's volcanic stuff is easily recognizable from numerous quarries where it is shaped into building stone.

3.2.3 Topography

The topography is often characterized by steep ridges and valleys, occasionally interrupted by hills such as Karima, Nyeri and Tumutumu. The northern part of the district is flat, whereas further southwards and western, the topography is characterized by steep ridges and valleys, occasionally interrupted by hills such as Karima, Nyeri and Tumutumu. To some extent these hills affect the pattern of rainfall, thus influencing the mode of agricultural production in some localized areas. The major rivers found in the county are: Sagana and Chania. These rivers and other numerous streams make the county self-sufficient in surface and sub-surface water resources for domestic, agricultural and industrial development. The problems associated with physiographic conditions in the county are soil erosion, road construction and farm mechanization. This problem is aggravated by increased exploitation of land for settlement and agriculture. The soils in the county are generally well drained. Only in higher areas of the Aberdares do we find areas with embedded drainage.

3.2.4 Water and Sanitation

The county's water resource comprises of both ground and surface water. Surface water consists of permanent rivers such as Sagana, Nairobi, Chania, Gura, Honi and Ragati among others. The main catchment areas for the rivers are the Aberdare Ranges and Mount Kenya. There are 49 permanent rivers, 32 water dams, 72 boreholes and other various sources including roof catchment. The quality of the water is good and suitable for domestic, livestock and irrigation purposes. The average distance to the nearest water point is two s.

Majority of the population, that is, 41.6 per cent take between five and 29 minutes to fetch water for domestic use.

The water and sewerage companies also provide sanitation services. Human waste is well disposed with 97.68 per cent of the county population using covered and uncovered pit latrines while 2.32 per cent use other waste disposal methods especially in the informal settlements of Witemere, Kiawara, Majengo, and Ndurutu among others.

3.3 The Social Economic Environment

3.3.1 Population

The greater Nyeri County had a population of 693,558 people and a population density of 208 people per sq. as at 2009. Nyeri Town, being the largest urban centre and hosting the county headquarters has the highest urban population and density; according to projected population estimates for 2017, the town is home to 123,942 people with a population density of 739 people per sq.^{2}.

3.3.2 Health Profile

Nyeri County has one level- 5 hospital, four level- 4, three mission and three private hospitals. It also has one nursing home, 30 level- 3, 84 level- 2, 33 levels- 1, one hospice and 228 private clinics spread across the county. The doctor/population ratio is about 1:7610 and a nurse/population ratio of 1:834 depicting shortage of medical personnel to serve the people. The county through the Public Health and Sanitation sub-sector funded by APHIA II and GOK has been able to train 365 Community Health Workers to help the households in maintaining good health status and sanitation. Nyeri Town Sub County has four health centres and eight dispensaries which include:

1. Nyeri Town Health Centre
2. Karia Health Centre (Nyeri Town)
3. Kiganjo Health Centre
4. Kinunga Health Centre

Dispensaries

1. Gatitu Dispensary
2. GK Prison Dispensary (Kingongo)
3. Kahiga Dispensary
4. Kamuyu Dispensary
5. Kihuyo Dispensary
6. Marua Dispensary
7. Muruguru Dispensary
8. Nyaribo Dispensary

The morbidity rate for the county is 28.8 per cent with that of male being 27.03 per cent and 30.5 per cent for female. In the county, the maternal mortality rate stands at 318 per 100,000, while the child mortality rate stands at 10 out of a 1000. The most common diseases, in the county, in order of prevalence are Upper Respiratory Trachea Infection, with a prevalence rate of 54.4 per cent, skin diseases 15.4 per cent, rheumatic and joint pains 13.1 percent, hypertension 11 percent and diarrhea 6.2 percent. HIV and AIDS prevalence in the county is 2.1 per cent, affecting mostly the youth between 15-34 years with the highest percentage being among females. HIV and AIDS prevalence is high in peri-urban areas. There is a general increase in non communicable diseases such as cancer, diabetes, kidney failure among others.

3.3.3 Education Profile

Nyeri County is well served with school facilities with a fair distribution of pre-primary, primary and secondary schools. There are 758 ECD centers where 486 are public and 272 are private. The teacher/pupil ratio is 1:39 and enrolment is 37,617. In the year 2012, the county had 542 primary schools (private and public) with a total enrolment of 141,243 comprising of 72,227 boys and 69,016 girls. The completion, retention, and transition rates are 89.4 per cent, 91 per cent and 85 percent respectively.

Secondary schools in the county are 217 (most of them being public; 194), with a total enrolment of 31,242 boys and 31,959 girls. The teacher/pupil ratio is 1:20. The completion and transition rates are 86.2 per cent and 89 per cent respectively.

There are two university, five university affiliates, two technical training institutes, three teachers' training colleges, five medical training colleges and 41 youth polytechnics. The adult education classes stand at 303 with an enrolment of 1885 males and 1811 females.

Issues on Education

- The transition levels after secondary school is low.
- The cost of joining these private universities is also limiting the residents in accessibility to higher levels.
- There are fewer boys enrolled in secondary school than girls that has caused concern in the county.

3.3.4 Land Use

The county has a total area of 987.5 km^2 and 758.5 km^2 of arable and non-arable land respectively. The larger part of the land is used for food crop while the rest is used for cash crop farming, livestock rearing and farm forestry. The average land ownership is one (1) hectare per household with an estimated 85 per cent of land owners possessing title deeds.

Land is an important factor of production for food crops, cash crops, livestock production and agro-forestry. The county has gazetted forests covering an area of 935.5 sq.km and water mass covering 213 sq.km Nyeri town is made up of residential buildings, business/ office premises and other infrastructure.

3.3.5 Crops and Livestock production

The main food crops grown in the county are maize, beans, Irish potatoes and vegetables whereas the major cash crops are coffee, tea, horticulture and cut flowers. Tea is grown in the upper zone next to Aberdare's and the Mt. Kenya forest while coffee is grown in the lower region. Cut flowers are mainly grown in Kieni Sub County where there are large land holding sizes.

Additionally, the main livestock breeds are dairy cattle, poultry, pigs, goats, donkeys, and sheep. On average the land carrying capacity (i.e. Livestock per hectare) is five. Bee keeping and other small stock such as rabbits; guinea pigs and quails are also on the increase.

3.3.6 Fishing Activities

The main fisheries activities in the county are pond fish farming, dam and river line fisheries. There are a total of 2,400 households involved in the subsector with 2,622 fishponds spread across the county. The main fish species include tilapia, catfish, and trout. The mini processing plant under construction will have a continuous supply of fish and there is potential for production of fish feed.

3.3.7 Tourism

The Sub County receives foreign exchange through Tourism. It has a number of tourist attractions such Mt. Kenya, Mt. Kenya National Park, Aberdare National Park and the Baden Powell Burial Site (former head of the Scout Movement). Animals easily observed in the park include; the Black Rhino, leopard, baboon, elephants, buffalos, black and white Columbus monkey ,rhinoceros, giraffes, lions, the golden cat and the bongo, antelopes, eland and spotted and melanistic serval cats can be found higher up in the moorlands.

Visitors are able to indulge in picnics, trout fishing in the rivers, camping in the moorlands, game viewing, camping, trekking, bird viewing and photography. The tourists travel by air or road. There are two airstrips Mweiga and one near Nanyuki. The tourists enjoy classic accommodation in serene hotels such Green Hills, White Rhino Hotel, Outspan Hotel ,Mt Kenya Leisure Lodge, Tree tops, Ark Lodge and Tafari Castle.

3.4 Gender Inequality Index

It reflects gender-based disadvantage in three dimensions—reproductive health, empowerment and the labour market. The index shows the loss in potential human

development due to inequality between female and male achievements in these dimensions. It varies between 0 when women and men fare equally and 1, where one gender fares as poorly as possible in all measured dimensions.

Kenya has an overall Gender Inequality Index of 0.651. However Arid and Semi Arid Lands (ASALS) like Nyeri County, have high Gender Inequality Indices with the most vulnerable groups in this regions being children living in poor households, the disabled and the youth.

CHAPTER 4 INSTITUTIONAL POLICY AND LEGAL FRAMEWORK

4.1 Introduction

The activities of the proposed sewer extension projects are regulated by several legal instruments and policies, the main ones being the EMCA, which sets the requirements and procedures for obtaining operating licenses and permits. This chapter highlights the specific sections of both national and international legal and institutional framework which will enable the proponent, NYEWASCO, to be compliant with the law and attain the set standards.

4.2 National Legislative and Regulatory Framework

In Kenya, several Acts of Parliament work together, regulating and guiding environmental management. One specific law dealing with all developments in Kenya is the Environmental Management and Co-ordination Act (EMCA) of 1999. Other regulations do not refer specifically to water and sanitation development projects but, due to their implications, affect such developments at various stages in various ways. These are presented below:

4.2.1 Environmental Management and Coordination Act (EMCA), 1999

The Environmental Management and Coordination Act, 1999 (EMCA, 1999) provides the legal and institutional framework for the management of the environment and related matters in Kenya. It provides for improved legal and administrative co-ordination of the diverse sectoral initiatives in order to improve the national capacity for the management of the environment. The Act, in section 3 (1) vests the responsibility for maintenance of a clean healthy environment on every person living or working in Kenya.

EMCA, 1999 in Section 7(1) creates the National Environment Management Authority (NEMA) with the mandate to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government in the implementation of all policies relating to the environment. The authority has gazetted several regulations aimed at achieving the above mandate which should also be complied with during the implementation of the project:-

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

These regulations were promulgated to shed light and give concrete substance, detail and procedures required to do EIA under sections 58 to 69 of the Act. Regulation 4 provides that no proponent shall implement a project that is likely to have any negative environmental impacts and for which an environmental impact assessment is required under the act or these Regulations. As such, water and sanitation projects require environmental and social impact assessment. The detailed requirements of an EIA are laid down in regulation 7. Regulation 16 provides that an EIA has to take into account environmental, social, cultural, economic, and

legal considerations. Hence the present ESIA is within the framework of this regulation for it evaluates the social and environmental repercussions of the proposed sewer extension projects.

2. **Environmental Management and Co-ordination (Water Quality) Regulations, 2006**

These regulations set the standards of domestic water and waste water. The regulations are meant for pollution control and prevention and provide for the protection of water sources.

3. **Environmental Management and Co-ordination (Waste Management) Regulations, 2006**

The Waste Management Regulations sets out standards for handling, transportation and disposal of various types of wastes. The regulations stipulate the need for facilities to undertake, in order of preference, waste minimization or cleaner production, waste segregation, recycling or composting. The proponent has been conscious of these regulations during their operations and shall continue adhering to these regulations particularly during operation phase of the project.

4. **Environmental Management and Co-ordination (Noise and Excessive Vibrations) Regulations, 2009**

The regulations define noise as any undesirable sound that is intrinsically objectionable or that may cause adverse effects on human health or the environment. The regulations prohibit any person from making or causing to be made any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment. In adherence to these regulations, through the Proponent, the contractors will be encouraged to use properly serviced machinery and ensure working hours are limited between, 8.00 am and 5.00pm particularly when working near residential areas.

4.2.2 The Constitution of Kenya

The Constitution of Kenya states under Article 43 (1) (d) that every person has a right to clean and safe water in adequate quantities. It is in the spirit of embracing the Constitution of Kenya that NYEWASCO will always position itself to provide clean, safe, and adequate water to the people of Nyeri Sub-County and its environs.

4.2.3 County Integrated Development Plan

The Nyeri County Water Sector Vision is ‘’Sustainable access to clean, safe and adequate water in a clean and secure environment’’. NYEWASCO’s mandate and vision is well placed to enable the county attain this vision especially on the services area covered by

NYEWASCO. However a lot of funding is required to attain the targeted county programs. The proposed sewer extension projects are covered under CIDP of Nyeri County.

4.2.4 Water Act 2002

NYEWASCO seeks to align its operations with the water sector reforms in the context of Water Act 2002 that is stipulated in Act No. 8 as "An Act of Parliament to provide for the management, conservation, use and control of water resources and for the acquisition and regulation of rights to use water; to provide for the regulation and management of water supply and sewerage services; to repeal the Water Act (Cap. 372) and certain provisions of the Local Government Act; and for related purposes."

4.2.5 Water Act 2016

NYEWASCO is cognizant of the existence of Water Act 2016 that has been enacted by Parliament as an Act of Parliament to provide for the regulation, management and development of water resources, water and sewerage services; and for other connected purposes.

4.2.6 County Water Act

The County Government of Nyeri is due to gazette its County water Act that will guide and direct water and related services in the region. NYEWASCO aspires to align its operations and services with the spirit of the new County Water Act.

4.2.7 Way-leaves Act (Cap 292)

Under Section 3 of this Act, the Government may carry any sewer, drain or pipeline into, though, over or under any lands whatsoever but may not in so doing interfere with any existing building. The proposed sewer connection projects will require way leave acquisition since most of the infrastructure is expected to follow the road network with a few exceptions passing through private land. In such instances negotiations with the land owners on way leave acquisition and compensation on loss of use should be conducted prior to project implementation. The Proponent also intends to secure some land (approximately 1/8 acre) for a pump station at Gatende estate.

4.2.8 The Occupational, Safety and Health Act, 2007

The Act makes provision for the health, safety and welfare of persons employed in factories and other places of work. The provisions require that all practicable measures be taken to protect persons in places of work from dust, fumes or impurities originating from any process within the workplace. The provisions of the Act are also relevant to the management of hazardous and nonhazardous wastes, which may arise at a project site. The Act provides for all necessary safety precautions to ensure the health and safety of workers. The proponent

and contractor undertake to prevent pollution, minimize the emission of dust and production of noise during the process of site preparations and development. The proponent shall undertake to provide all workers with Personal Protective Equipment for all works associated with this project as applicable so as to ensure health, safety and welfare for the workers that will be engaged during project implementation.

4.2.9 The Public Health Act, Cap 242

Section 116 of the Act imposes a duty to all local authorities to maintain sanitary conditions within their district and prevent nuisances therein. Nuisance is defined under Act as any accumulation or deposit of refuse, offal, manure or other matter whatsoever which is offensive or which is injurious or dangerous to health. The Proponent will at all stages of the projects adhere to environmentally sound waste disposal procedures of sewer so as prevent nuisance that is prohibited by this Act.

4.2.10 Kenya Labour Laws

1. **Employment Act, 2007**

This Act deals with the conditions of employment and the rights of workers. All workers, including those employed during the construction phase of the project, should be employed under conditions of this Act which includes provision with respect to minimum wage, working conditions and time, and adequate measures in the resolution of disputes.

2. Work Injury Benefits Act, 2007

This law governs the rights of employees and employers at the workplace. The act sets out obligations of employers and employees rights in cases of accidents, occupational diseases, rights to medical aid, among other pertinent issues.

3. NSSF Act and NHIF Act

The National Social Security Fund Act makes it mandatory for all employers and employees to register and submit to the fund prescribed monthly payments with respect to social security. Similar arrangement is provide for healthcare through the National Health Insurance Fund (NHIF) Act no. 9 of 1998. Registration with the NSSF and NHIF and regular remittances to the funds by both employers and employees are legal requirements.

4.2.11 Gender Policy, 2011

The Gender Policy aims at mainstreaming gender concerns in the national development process in order to improve the social, legal/civic, economic and cultural conditions of women, men, girls and boys in Kenya. It provides direction for setting priorities to ensure that all ministerial strategies and their performance frameworks integrate gender equality objectives and indicators and identify actions for tackling inequality. In addition, each program will develop integrated gender equality strategies at the initiative level in priority areas. Within selected interventions, the policy will also scale-up specific initiatives to advance gender equality. The proponent will spearhead the requirements of gender equality advocated in this policy throughout the project implementation.

4.2.12 The Kenya Roads Act of 2007

The Act stipulates the legal and institutional aspects of the road sub-sector policy. The Act provides for the establishment of three independent Road Authorities, namely: (i) Kenya National Highways Authority , responsible for the administration, control, development and maintenance of all class A, B and C roads in Kenya, (ii) Kenya Rural Roads Authority, responsible for rural and small town roads including class D, E roads and Special Purpose Roads and (iii) Kenya Urban Roads Authority responsible for all City and Municipal Roads. The Authorities fall under the Ministry of Transport and Infrastructure, which will retain the role of policy formulation, and general oversight of public roads including regulatory aspects such as technical standards.

Section 22 of the Act details the procedure for acquisition of any land required by an authority for the purposes of its functions under this Act. Most of the sewer infrastructure will utilise road reserve along existing road networks. The proponent will therefore be expected to liaise with the relevant road authorities in acquisition of necessary permits.

4.2.13 Land Act, 2012 (Revised 2015)

The lands Act was enacted in May 2012 and revised in 2015 to provide for the review, consolidation and rationalization of land laws and to provide a framework for sustainable management and utilization of all categories of land. The act provides the legal framework for administration and management of public and private land, leases, charges, compulsory acquisition, easements and related rights. Section 61 of Kenyan constitution recognizes three classification of land namely;

- Public land: It includes all un-alienated government land held and occupied by government agencies, territorial sea and sea bed, all public roads whether gazetted or not and any land not classified as private or community land under the Constitution; and any other land declared to be public land by an Act of Parliament.
- Community land: This is all land vested in and held by communities identified on the basis of ethnicity, culture or similar community of interest. Any unregistered community land shall be held in trust by county governments on behalf of the communities.
- Private land: This is land which is registered and held by any person under freehold tenure; or land held by any person under leasehold tenure; and any other land declared private land under an Act of Parliament.

Even though most of the sewer lines will be laid along the public road reserve, way leave will be required in areas where it passes through private land. The pump station will also necessitate land acquisition of approximately an eighth an acre. As such valuation for purposes of compensation for loss of land and land use of affected project affected persons will be conducted.

The valuation practice in Kenya is governed by the Valuers Act Cap 532, which provides for a Valuers Registration Board that regulates the activities and conduct of registered valuers. The Act governs the formation and composition of valuation practices including the qualification of partners and directors in charge of valuation. The Board also deals with discipline and complaints in respect to valuation practice. Other statutes that govern valuation are the Government Lands Act Cap 280 that regulates the valuation for land rent while valuation for rating is governed by the Rating Act Cap 267. Land Acquisition Act Cap 295 governs valuations for compulsory acquisition purposes.

4.3 Environmental Policies of Funding Institutions

4.3.1 World Bank Safeguard Policies

The objective of the World Bank's environmental and social safeguard policies is to prevent and mitigate undue harm to people and their environment in the development process. These policies provide guidelines for the bank and borrowers in the identification, preparation, and

implementation of programs and projects. Safeguard policies have often provided a platform for the participation of stakeholders in project design, and have been an important instrument for building ownership among local populations. The relevant World Bank Safeguard Policies relevant to the proposed sewer extension projects include:

1. **OP/ BP 4.01, Environmental Assessment**

The policy addresses an ideal environmental impact assessment that meets the World Bank standards to ensure that projects are implemented in an environmentally sound and sustainable manner. Under OP 4.01 projects are screened and assigned either of four categories (A, B, C & F). During the screening, it was determined that the project activities in in the selected areas may have limited, site specific, mostly reversible impacts and hence assigned Category B. An ESMP has been developed to address various anticipated negative impacts.

The operational policy also outlines five prerequisite steps that must be undertaken in any environmental impact assessment. Emphasis is put on an evaluation of all pertained legal and institutional framework including ratified international treaties and convention; secondly, on stakeholder consultation by public participation to increase the acceptability of the projects by all those affected. This environmental and social impact assessment report is consistent within this policy.

2. **Involuntary Resettlement (OP 4.12)**

The proposed sewer connection projects will result in land acquisition for a pump station and way leave acquisition from a few private owners from Gatende and Kamakwa estate. However, most of the infrastructure will be laid along the road network hence compensation issues will not apply. In line with this policy, the proponent shall ensure that consultations are done with the affected land owners prior to project implementation and necessary compensations where applicable are effected.

3. **Public Disclosure (BP 17.50)**

This policy encourages Public Disclosure or Involvement as a means of improving the planning and implementation process of projects. This procedure gives governmental agencies responsibility of monitoring and managing the environmental and social impacts of development projects particularly those impacting on natural resources and local communities. The policy provides information that ensures that effective public disclosure is carried out by project proponents and their representatives. Monitoring and grievances address mechanism should also be incorporated in the project plan.

The proposed project incorporated public participation and stakeholders' consultation as part of the ESIA process in order to collect the views of the local communities and their leaders

for incorporation in the project mitigation plan. The consultation was successful and the community members gave their views which have been considered in the mitigation plan.

4.3.2 European Union Environmental Policy

The European Union has an elaborate policy statement on environmental management covering a wide range of issues. EU-supported projects and programmes worldwide are expected to observe the relevant policy issues. These policy statements also apply to projects/programmes supported by member states of the EU.

4.4 Institutional Structure of the Water Sector

4.4.1. Ministry of Water and Irrigation (MWI)

This is the overall Ministry in charge of water and sewerage in Kenya. It is responsible for policy development, sector co-ordination, monitoring and supervision to ensure effective Water and Sewerage Services in the Country, sustainability of Water Resources and development of Water resources for irrigation, commercial, industrial, power generation and other uses. It's mission statement is to contribute to national development by promoting and supporting integrated water resource management to enhance water availability and accessibility. The MWI has the following technical departments: Water Services, Water Resources, Water Storage and Land Reclamation, and Irrigation and Drainage. The Ministry executes its mandate through the following sector institutions presented below.

4.4.2. Water Services Trust Fund (WSTF)

The Water Services Trust Fund (WSTF) serves to assist in the financing of water deficient service area through providing financial support to improve water services towards;

- Active community participation in the management of water services
- Capital investment to community water schemes in underserved areas
- Capacity building activities and initiative among communities
- Water services activities outlined in the Water Services Strategic Plan as prioritized by the Government
- Awareness creation and information dissemination regarding community management of water services

This project shall be a beneficiary of the body's financing services in partnership with European Union.

4.4.3 Water Services Regulatory Board (WASREB)

The regulatory Board is responsible for the regulation of the water and sewerage services in

partnership with the people of Kenya. Its mandate covers the following key areas;

- Regulating provision of water and sewerage services including licensing, quality assurance and issuance of guidelines for tariffs, prices and disputes resolution.
- Overseeing the implementation of policies and strategies relating to provision of water services licensing of Water Services Boards and approving their appointed Water Services Providers,
- Monitoring the performance of the Water Services Boards and Water Services Providers,
- Establishes the procedure of customer complaints,
- Informs the public on the sector performance,
- Provides advice to the Minister in charge of water affairs.

4.4.4 Water Services Boards (WSBs)

The WSBs are responsible for the efficient and economical provision of water and sewerage services in their areas of jurisdiction. Nyeri Water and Sewerage Company (NYEWASCO) being the implementer of the project fall under the jurisdiction of Tana Water Services Board. The board shall assist in preparation of performance targets for the project which will directly have an impact on provision of water and sanitation services to the proposed estates.

4.4.5 Water Services Providers

Water Service Providers are the utilities or water companies. NYEWASCO being the implementer of the proposed sewer extension projects, will be responsible for the following:

- Ensure effective communication of all matters related to project to the target group.
- Sensitize the community for buy in of the project and ensure its sustainability.
- Ensure implementation of the project in accordance with the project rules

CHAPTER 5 ANALYSIS OF PROJECT ALTERNATIVES

5.1 Introduction

This Section provides the project alternatives considered to ensure that the most feasible option of the proposed project was adopted. The project alternatives were compared in regard to their potential environmental and social impacts, capital costs and acceptability by potential beneficiaries. The project alternatives considered include the following:

5.2 The "No Project" Alternative

This alternative also referred to as "Nil intervention" leaves the status quo of the project area as it is. As a result, the benefits of proper sanitation for the project beneficiaries would not be realized. This would also contribute to stagnation of the regions social economic development since proper sanitation is an indicator of development in an area. Other negative attributes that would not be solved include contamination of the water bodies such as rivers and proliferation of water borne diseases. From the analysis above, the "No Project Alternative" is not the preferred option by neither the Proponent nor the project beneficiaries since the environmental and socio economic benefits of the project would be foregone.

Other benefits associated with the proposed sewer extension projects are presented in Section 7.2 of this Report.

5.3 Alternative Technologies

Other alternatives which can be adopted include continuation and expansion of pit latrines and septic tanks which are in use by the target beneficiaries in urban and pre – urban areas. This will however not provide a better long term solution for proper sanitation since such technologies have limitations for scaling up. Even though pit latrines and septic tanks have less environmental risks during construction in comparison to sewer line connections, during operational phase and O&M activities, cumulatively, they present higher environmental risks and costs.

5.4 Alternative layouts and Designs

The proponent engaged a technical team who has come up with the most optimal design and layouts. This has taken into consideration the topographic levels since the proposed sewer lines will be connected to an existing sewer network where the topography permits gravity flow.

5.5 The Comparison of Alternatives

Implementation of the proposed sewer extension projects would create a more efficient system for collection and disposal of waste water from various targeted estates, alleviate

sanitation problems particularly in peri urban areas served by pit latrines and provide employment opportunities to locals during construction and operational phase. Under "No Project Alternative", the above benefits will not be realized. Even though some negative impacts such as noise, soil and water contamination associated with such a development maybe experienced, these negative impacts can be mitigated through various measures proposed in the Environmental and Social Management Plan (ESMP).

CHAPTER 6 CONSULTATIONS AND PUBLIC PARTICIPATION

6.1 Introduction

The following section describes the public consultation events held to discuss the proposed sewer extension projects with various stakeholders. The aim of the consultations was to ensure that stakeholder interests were identified during the ESIA and that stakeholder views, and in particular those of PAPs were taken into account. The copies of the lists of attendants at various public meetings (*barazas*) and key informants are provided in the Annexes.

Community members were mobilized through the provincial administration (local chiefs and sub chiefs) and village chairmen. The public consultations took the form of public meetings (*barazas*), which brought together representatives from the larger community including the local leaders and village chairmen.

6.2 Stakeholders Consulted

During the field investigations, the Consultants held discussions and interviews with various stakeholders with the view of gathering their views on various aspects regarding the proposed rehabilitation project and incorporating them in the ESIA report. These stakeholders included:

Table 6.1 List of stakeholders consulted

Category of stakeholder	**Stakeholder consulted**
Project Proponent	• NYEWASCO staff
Nyeri County Government	• County Executive (Ministry of Environ, Water and Natural Resources)
Public Administration	• Deputy County Commissioner, Nyeri County • Chiefs
General public	• Community barazas (Kamakwa, Ruring'u, Kandara, Ngangarithi centre)
Key Ministries and related agencies	• Tana Water Services Board (TWSB) • Water Resources Management Authority • Public Health & Sanitation • Lands office • Ministry of Roads • Directorate of Occupational Health and Safety Services
Affected Institutions (Schools and Industrial Institutions)	• Mt. Kenya Bottlers • Kirinyaga Printing Place Ltd • Muhoya Auto Ltd • PCEA Imani church, Gatende • Good Shepherd Academy

Category of stakeholder	Stakeholder consulted
	• King'ong'o prison
WRUA	• Chania River Water Resource User Association

6.3 Main Issues from Public Participation

The stakeholders consulted expressed their support to the proposed sewer extension projects which they felt will result into the following main direct and indirect benefits:

- Improved economic development in the project areas
- Improved state of sanitation and hygiene in the target estates
- Reduction in pollution to surface water sources running within the project areas
- Increased value of land
- Enhanced family health with lesser cases of children diseases associated with sanitation problems
- Improved aesthetics in the project areas
- Employment opportunities

The stakeholders also felt that these negative impacts that could be associated with the project implementation should be mitigated accordingly:

- Compensation on loss of land use in areas where way leave will be required from private land particularly in Gatende, Kandara, Rurin'gu and Kamakwa estates
- Overflow or Leakage of sewer to the environment in case of blockages causing bad odor to neighbouring communities
- Some participants felt that NYEWASCO should consider lowering their tariff rates which were higher and affordable
- Dust emissions from project vehicles
- Some respondents also expressed concerns that NYEWASCO was not efficient in addressing water connection issues in the area and they feared that their extension of sewer projects would lead to poor service delivery
- The community members recommended that the proponent should conduct more consultations on the proposed projects prior to any implementation
- Some community members from Kamakwa felt that their area being a poor urban centre, they should not be billed like other regions

Figure 6.1 shows attendants at a public consultation meeting at Kamakwa.

Figure 6.1: On-going public consultation of affected land owners at Kamakwa

6.4 Specific Concerns from various Stakeholders

- Representatives from Tana Water Services Board emphasized that the Proponent should ensure they meet the standards of waste water stipulated in Waste Regulations to ensure that treated sewage does not pollute Chania river
- NYEWASCO to ensure that all their industrial customers have a pre-treatment plant for treating their industrial waste prior to disposal through the main sewer system
- The Deputy County Commissioner expressed his support for the proposed sewer extension project and felt that the development would indirectly contributes towards the areas economic growth. He appreciated that the proposed sewer extension projects will create more employment opportunities to the local communities
- The County Environment office urged NYEWASCO to ensure that during project implementation, all environmental requirements as stipulated in the laws are adhered to. He particularly emphasized on adherence to the following:

    - The Water Quality Regulations which provides for the protection of lakes, rivers, streams, springs, wells, and other water sources
    - The Waste Management Regulations which sets out standards for handling, transportation and disposal of various types of wastes
    - The Noise and Excessive Vibrations Regulations
- Representation from Kingongo prison urged NYEWASCO to improve on their response time in-case of sewer overflow from the manholes located in their land

CHAPTER 7 POTENTIAL ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS

7.1 Introduction

This chapter presents positive and negative environmental and social impacts anticipated as a result of the implementation of the proposed sewer extension projects. The impacts have been categorized into three distinct phases of the project cycle i.e. construction phase, operation phase and decommissioning phase.

The positive impacts should be enhanced while the negative impacts identified should be adequately mitigated.

7.2 Construction Phase

7.2.1 Positive Impacts

- **Job creation** - Construction labour will be provided by the local communities (mainly the youth and women) contributing a direct economic benefit to the residents. This will also enhance project ownership.
- **Gender Benefits** - Women as well as men will benefit from the short term local employment opportunities that will be created during the construction phase of the proposed sewer extension projects. Women may also benefit from income generating activities such as catering / restaurants to serve workers doing construction phase.
- **Benefits from Capacity Building** - The effective undertaking of the proposed projects will require capacity building and awareness campaigns. Health, safety and environmental training and awareness will be extended to workers both during the construction and operational phases of the projects (including site labourers, both skilled and unskilled, site management and maintenance teams). This will be of great benefit to all workers.

7.2.2 Negative Impacts

1. **Loss of Land and Land Use**

Even though most of the sewer infrastructure will utilise road reserve along existing road networks, there are a few cases where way leave will be required from private land particularly in Gatende, Kandara, Rurin'gu and Kamakwa estates. The proposed pump station to be located at Gatende estate will also necessitate land acquisition of about an eighth of an acre of land. As a result of this, there will be loss of land and land use by some residents.

2. **Soil erosion**

Excavations during construction phase may result to temporary disruptions of surface run off resulting to soil erosion during a rainy season. This may affect residential houses in close proximity to the sewer lines and access roads.

1. **Solid Waste Generation**

Solid wastes will be generated during the implementation phase of the proposed sewer projects. These may range from metal cuttings, rejected materials, packaging materials among others. Improper waste disposal of these wastes may result into negative effects to the environment.

2. **Drainage**

Drainage interference may occur due to interruption of surface run off during construction of sewer extension systems.

3. **Air Pollution (Dust and NCG Emissions)**

Dust emissions are likely to occur as a result of disturbances of surface soils and vehicle travel on unpaved roads. Site machinery, generators and vehicles if not well serviced may also cause air pollution from exhaust emissions.

4. **Noise and Vibrations**

The key sources of noise will be project vehicles excavators during project construction. However, even though the ambient noise levels are expected to be generally higher than the anticipated levels, these effects expected to be low as manual labor with low noise generation will be preferred. All construction works will also be undertaken during the day.

5. **Occupational Health and Safety Hazards**

Workers working on site will be prone to occupational health and safety hazards during all phases of the project if adequate mitigation measures are not put in place. During construction phase some of these hazards include health risks as a result of injuries and accidents.

6. **Loss of Vegetation**

During site clearance, loss of vegetation and trees is inevitable particularly at the proposed site for a pump station. However, this is expected to be minimal since most of the sewer pipes will be laid along the existing road infrastructure with only a few areas utilising private land.

7. **Water Quality Degradation**

Excavation activities can lead to surface and ground water quality degradation if not handled with care. This is because piping for water connections are mainly laid along the road networks.

8. **Visual Impacts**

Visual intrusion will be prominent during various project activities at construction phase. These impacts will however be short term since after excavations, back filling and landscaping will restore the sites to their initial state.

7.3 Operation Phase

7.3.1 Positive Impacts

The key positive social economic impacts during operation phase of the projects include:

- The Proponent will generate more revenue from increased connections
- Improved state of sanitation and hygiene in the target estates
- Reduction in pollution to surface water sources running within the project areas
- Increased value of land – Implementation of the proposed project will lead to increased value of land in the target areas hence benefitting the beneficiaries.
- Improved sanitation will lessen burdens on women and children hence ensuring enhanced family health
- Improved aesthetics in the project areas
- Income generation from opportunities of repair and maintenance activities

7.3.2 Negative Impacts

1. **Waste Generation (Solid and Liquid waste)**

Solid wastes likely to be generated during the operation phase of the projects include sanitary towels and rags. These may be generated during unblocking blocked sewer lines and may pose environmental hazards if not well managed. Liquid wastes likely to be generated during operation phase of the project include raw sewer as a result of leakage.

2. **Soil Contamination**

Soil contamination may result in cases of potential overflow of sewage from manholes into open drains. Bad odor may also be a nuisance to the neighboring communities.

3. Occupational Health and Safety Hazards

Workers conducting maintenance works may be prone to occupational health and safety hazards such as accidents and lack of proper personal protective equipment. Health hazards may also be experienced by neighboring communities from unattended overflow of raw sewer to the environment.

7.4 Decommissioning Phase

All components of a sewerage system have a lifespan after which they may no longer be cost effective to continue operating them. Positive impacts anticipated during decommissioning phase include job creation during dismantling and removal of all components of the sewer system.

Potential negative environmental impacts anticipated during decommissioning phase will include dust and noise to the surrounding environment, visual impacts, solid waste generation and occupational, health and safety hazards.

CHAPTER 8 MITIGATION AND ENHANCEMENT MEASURES

8.1 Introduction

This section presents the proposed mitigation measures for negative environmental and social impacts associated with the proposed sewer extension projects. They are intended to eliminate or bring the impacts to a minimum.

8.2 Construction Phase

8.2.1 Enhancement Measures

- Continuous consultations with local communities to resolve emerging issues of concern
- Ensure gender equity in employment opportunities
- Priority of employment opportunities to be given to the local residents to enhance ownership of the project

8.2.2 Mitigation Measures

1. Loss of Land and Land Use Mitigation

Land acquisition for the pump station site will be finalised prior to project implementation in recognition of necessary legal procedures required. The affected private land owners will also be identified, contacted and compensated for loss of land use prior to commencement of construction activities. In cases where the way leave falls in agricultural land, adequate timeframe will be provided to the affected to enable them remove their crops prior to acquisition.

2. Soil Erosion Mitigation

The soils excavated during laying of sewer pipes should immediately be used for back-filling to prevent it from being eroded during rainy season. The cleared sites should also be re-vegetated to improve soil cover and minimize soil erosion and also improve on aesthetics of the project area.

3. Solid Waste Mitigation

The Proponent should adhere to the following mitigation measures to ensure proper waste management during construction phase of the sewer extension projects.

- Sensitization of workers on environmental protection and safety

- Provision of waste collection facilities for the temporary storage of solid wastes prior to disposal at an appropriate and designated location
- Waste segregation prior to disposal via a registered waste handler
- Recycle where necessary

4. Drainage Mitigation

The Proponent shall ensure that if construction activities are carried out during the rainy season, excavated soils should not be left exposed to prevent drainage interference. Excavated soil should be used for back filling and landscaping.

5. Air Quality Mitigation (Dust, Fuel and NCGs Emissions)

The following mitigation measures will be adhered to during project construction to mitigate against air pollution.

- Sensitization of workers on environmental protection and safety
- Control speed of construction vehicles
- Water should be sprayed during the construction phase on dusty excavated areas
- Provision of dust masks to workers for use when working in dusty conditions
- Use of serviceable vehicles and machinery to avoid excessive smoke emission

6. Noise and Vibration Mitigation

The Proponent shall ensure the following measures are put in place to ensure noise and vibrations are adequately mitigated.

- Even though most excavation activities maybe done manually, the contractor will be expected to use serviceable site equipment, machinery and vehicles with low noise emission
- Machines not in use will always be switched off.
- Construction works to be done during the day

7. Occupational Safety and Health Hazards Mitigation

These impacts can be mitigated through the following ways:

- Appropriate safety signage to show on-going construction works will be erected on site
- No children will be employed in the undertaking of the site works. Provision of an Identification Card will be a requirement to all workers on site.
- Well-equipped first aid kits will be provided at working sites

- All construction workers to be provided with appropriate personal protective equipment for related work
- Adequate road signs to warn pedestrians and motorists of construction activities shall be provided at appropriate points
- Construction vehicles shall not exceed maximum speed limit of 30 per hour within residential areas.
- Ensuring that construction work is conducted by trained workers with strict adherence to specific safety standards

8. Loss of Vegetation Mitigation

Vegetation loss during site clearance should be mitigated through landscaping and restoration of sites to their original state.

9. Water Pollution Mitigation

The contractor will be conscious of any other existing infrastructure such as water pipes and communication infrastructure which maybe using the road reserve during excavations.

10. Visual Impact Mitigation

After construction activities, the Proponent will ensure the sites are restored to their original state through backfilling and landscaping.

8.3 Operation Phase

8.3.1 Enhancement Measures

- Continuous consultations with local communities to resolve emerging issues of concern
- Ensure gender equity in employment opportunities
- Priority of employment opportunities to be given to the local residents to enhance ownership of the project

8.3.2 Mitigation Measures

1. Solid and Liquid Waste Generation Mitigation

The Proponent should adhere to the following measures to ensure proper solid and liquid waste management during operation phase of the projects.

- Proper waste disposal of solid wastes generated during maintenance activities. The wastes should be collected and disposed appropriately using a registered waste

handler
- Maintenance of sewers and ensuring manholes are covered at all times to eradicate potential overflow of sewage from the immediate manholes into open drains

2. Soil Contamination

In order to mitigate against soil contamination from raw sewer, the Proponent should ensure that cases of potential overflow of sewer from man holes are immediately addressed when they arise without delay.

3. Occupational Health and Safety Hazards

Workers conducting maintenance works must be provided with proper personal protective equipment related to their activities. Potential overflow of raw sewer should also be attended with immediate effect to prevent health hazards by neighbouring communities.

8.4 Decommissioning Activity Mitigation

The decommissioning exercise will follow laid down procedures which will take into account the following issues:

- Inform stakeholders and relevant authorities
- Rehabilitate/restore the site to its original state
- Collect, segregate and dispose wastes responsibly
- Apply the following methods to minimise dust and air pollution
    - Control speed of construction vehicles
    - Water should be sprayed during the construction phase on dusty excavated areas
    - Provision of dust masks to workers for use when working in dusty conditions
    - Use of serviceable vehicles and machinery to avoid excessive smoke emission
- Provision of appropriate safety gear to workers

The following mitigating factors to guard against noise and vibrations should be adhered to

- Even though most decommissioning activities maybe done manually, the contractor will be expected to use serviceable site equipment, machinery and vehicles with low noise emission
- • Machines not in use will always be switched off.
- • Decommissioning works to be done during the day

CHAPTER 9 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

9.1 Introduction

This Environmental and Social Management Plan (ESMP) provides a logical framework within which the negative environmental and social impacts identified during the ESIA study can be mitigated and the positive impacts enhanced. Monitoring and management practices as well as monetary compensation are considered and cost estimates included. Responsibilities and time frames for the implementation of the various aspects of the ESMP have been identified.

The project proponent, NYEWASCO, will be responsible for ensuring that the ESMP is implemented accordingly.

9.2 Environmental and Social Management Plan

Table 9.1 Environmental and Social Management Plan

Potential Impact	Mitigation and Enhancement Measures	Responsibility	Monitoring means / Frequency	Verifiable Indicators	Estimated Costs (KSh.)
Planning Phase					
Loss of Land and Land Use	Resettlement Action Plan (RAP) Exercise • Land acquisition for the pump station site in recognition of necessary legal procedures • Identification of the affected private land owners where wayleave would be required, consultations and compensation for loss of land use prior to commencement of construction activities • In cases where the way leave falls in agricultural land, adequate timeframe will be provided to the affected to enable them remove their crops prior to acquisition.	NYEWASCO	Routinely prior to project implementation	• Minutes of PAPs consultation meetings • RAP report	10,000,000
Construction Phase					
Employment opportunities	• Continuous consultations with local communities to resolve emerging issues of concern • Ensure gender equity in employment opportunities • Priority of employment opportunities to be given to the local residents to enhance ownership of the project	NYEWASCO Contractor	Routinely	• Minutes of community consultation meetings • Community project facilities	Operational / Contractors costs
Soil Erosion	• Soils excavated during laying of sewer pipes should immediately be used for back-filling and should not be left exposed to wind or water during rainy season	NYEWASCO Contractor	Daily Inspection	• No. of sites revegetated and landscaped	Operational / Contractors costs

Potential Impact	**Mitigation and Enhancement Measures**	**Responsibility**	**Monitoring means / Frequency**	**Verifiable Indicators**	**Estimated Costs (KSh.)**
	• The cleared sites will be re-vegetated to improve soil cover and minimize soil erosion and also improve on aesthetics of the project area				
Solid Waste Disposal	• Sensitization of workers on environmental protection and safety • Provision of waste collection facilities for the temporary storage of solid wastes prior to disposal at an appropriate and designated location • Waste segregation prior to disposal via a registered waste handler • Recycle where necessary	NYEWASCO Contractor	Daily Inspection	Status of ground cover within the project area	Operational / Contractors costs
Drainage and Hydrology	• Excavated soils should not be left exposed to prevent drainage interference • Excavated soil should be used for back filling and landscaping	NYEWASCO Contractor	Daily Monitoring	Unclogged drainage systems	Operational / Contractors costs
Air Pollution (Dust, Fuel and NCGs emissions)	• Sensitization of workers on environmental protection and safety • Control speed of construction vehicles • Water should be sprayed during the construction phase on dusty excavated areas • Provision of dust masks to workers for use when working in dusty conditions • Use of serviceable vehicles and machinery to avoid excessive smoke emission	NYEWASCO Contractor	Daily Monitoring	• Records of water sprinkling • Records of machine and vehicle service • Evidence of use of dust masks by workers on site	Operational / Contractors costs
Noise and Vibrations	• Even though most excavation activities maybe done manually, the contractor will be expected to use serviceable site equipment, machinery and vehicles with low noise emission	NYEWASCO Contractor	Frequently	• Number of complains from local residents • Machine service records	Operational / Contractors costs

Potential Impact	**Mitigation and Enhancement Measures**	**Responsibility**	**Monitoring means / Frequency**	**Verifiable Indicators**	**Estimated Costs (KSh.)**
	• Machines not in use will always be switched off. • Construction works to be done during the day				
Occupational Health and Safety concerns	• Appropriate safety signage to show on-going construction works will be erected on site • No children will be employed in the undertaking of the site works. Provision of an Identification Card will be a requirement to all workers on site. • Well-equipped first aid kits will be provided at working sites • All construction workers to be provided with appropriate personal protective equipment for related work • Adequate road signs to warn pedestrians and motorists of construction activities shall be provided at appropriate points • Construction vehicles shall not exceed maximum speed limit of 30 per hour within residential areas. • Ensuring that construction work is conducted by trained workers with strict adherence to specific safety standards	NYEWASCO Contractor	Routinely	Field Inspection Reports	Operational / Contractor's cost
Loss of Vegetation	• Vegetation loss during site clearance should be mitigated through landscaping and restoration of sites to their original state.	NYEWASCO Contractor	Routine Inspection	Rehabilitated sites	Operations / Contractor's cost
Water pollution	• The contractor will be conscious of any other existing infrastructure such as water pipes and communication infrastructure which maybe using the road reserve during excavations	NYEWASCO Contractor	Routine Inspection	Non-interference with existing infrastructure	Operations / Contractor's cost
Visual Impact	• Ensure the sites are restored to their original	NYEWASCO	Daily monitoring	Restored sites	Operations /

Potential Impact	**Mitigation and Enhancement Measures**	**Responsibility**	**Monitoring means / Frequency**	**Verifiable Indicators**	**Estimated Costs (KSh.)**
	state through backfilling and landscaping.	Contractor			Contractor's cost
Operation Phase					
Employment of local labour	• Ensure gender equity in employment opportunities • Priority of employment opportunities to be given to the local residents to enhance ownership of the project • Continuous consultations with local communities to resolve emerging issues of concern	NYEWASCO	Throughout the operation phase	Percentage local workers employed as a percentage of total workforce	Operations costs
Solid and Liquid Waste Generation	• Proper waste disposal of solid wastes generated during maintenance activities. • The wastes should be collected and disposed appropriately using a registered waste handler • Maintenance of sewers and ensuring manholes are covered at all times to eradicate potential overflow of sewage from the immediate manholes into open drains	NYEWASCO	Throughout the operation phase	Field reports Complaint records	Operations costs
Soil Contamination	• The Proponent to ensure that cases of potential overflow of sewer from man holes are immediately addressed when they arise without delay.	NYEWASCO	Throughout operation phase	Field reports	Operations costs
Occupational Health and Safety Hazards	• Workers conducting maintenance works must be provided with proper personal protective equipment related to their activities • Potential overflow of raw sewer should also be attended with immediate effect to prevent health hazards by neighbouring communities.	NYEWASCO	Throughout operation phase	Field reports	Operations costs
Decommissioning Phase					
Solid Wastes	• Collect, segregate and dispose wastes	NYEWASCO	Daily inspection	Status of ground cover	Operations /

Potential Impact	**Mitigation and Enhancement Measures**	**Responsibility**	**Monitoring means / Frequency**	**Verifiable Indicators**	**Estimated Costs (KSh.)**
	responsibly • Use of licensed waste handlers	Contractor			Contractors cost
Air pollution (Dust and fuel emissions)	• Control speed of construction vehicles • Water should be sprayed during the construction phase on dusty excavated areas • Provision of dust masks to workers for use when working in dusty conditions • Use of serviceable vehicles and machinery to avoid excessive smoke emission	NYEWASCO Contractor	Periodic inventory of personal protective equipment	•Records of water sprinkling •Records of machine and vehicle service •Evidence of use of dust masks by workers on site	Operations / Contractors cost
Noise and Vibrations	• Even though most decommissioning activities maybe done manually, the contractor will be expected to use serviceable site equipment, machinery and vehicles with low noise emission • Machines not in use will always be switched off. • Decommissioning works to be done during the day	NYEWASCO Contractor	Frequently	• Number of complains from local residents • Machine service records	Operational / Contractors costs
Visual Impact	• Rehabilitate/restore the site to its original state	NYEWASCO Contractor	Daily Inspection	Rehabilitated area	Operations / Contractors Cost

9.3 Monitoring

Monitoring is an important tool to ensure that the recommended enhancement and mitigation measures in an ESMP are implemented as planned and are effective too. Monitoring can either be done internally or externally by conducting annual environmental audits as required under EMCA regulations of 1999.

9.3.1 Internal Monitoring

Internal monitoring is conducted to verify the level of ESMP implementation or to verify the results of a Contractor where one has been engaged in project implementation.

9.3.2 External Monitoring

The Environmental Impact Assessment and Audit Regulations of 2003 states that an Annual Environmental Audit is to be done following an ESIA, or an initial Environmental Audit conducted for continuing projects. In line with this regulation, NYEWASCO shall contract an external consultant to conduct an Annual Environmental Audit for the sewer extension projects to evaluate the level of compliance with the identified legal and regulatory requirements and the projects ESMP.

An Annual Environmental Audit must be conducted by an external NEMA registered consultant and the reports submitted to NEMA for issuance of compliance certificate or improvement orders.

CHAPTER 10 CONCLUSIONS AND RECOMMENDATIONS

This section presents the conclusions from the ESIA study findings and proposed recommendations for effective implementation of the rehabilitation project of Olkaria I power plant.

10.1 Conclusion

Vision 2030 recognises that every person in Kenya is entitled to a clean and healthy environment and has the duty to safeguard and enhance the Environment, as all human activities generate waste which requires to be properly managed to protect human health and environment while enhancing aesthetics. The proposed sewer extension project will improve the state of sanitation and hygiene in the target estates and also improve aesthetics in the project areas in line with Vision 2030.

The proposed project is also expected to contribute towards reduction in pollution to surface water sources among other positive impacts discussed in this report. Even though project implementation may also lead to some negative impacts, most of the anticipated negative impacts will be of temporary nature and can be mitigated and managed to acceptable levels using relevant mitigation and management measures outlined in the project ESMP.

10.2 Recommendations

The consultant recommends licensing of the proposed Sewer Extension Projects as a step towards achieving a clean and healthy environment which to a large extent contributes towards achieving Vision 2030. The Proponent should meet the conditions to which NEMA may set during issuance of license.

The proposed project should also be implemented with the following recommendations:

i. Mitigation measures outlined in this report should be adhered to and the Environmental and Social Management Plan (ESMP) implemented to the letter. The implementation of this ESMP will be key in achieving the appropriate environmental management standards as detailed in this report
ii. NYEWASCO should undertake annual environmental audits (EA) of the project after completion to confirm the efficiency and adequacy of ESMP
iii. The impacts of the proposed sewer extension projects should be monitored closely and documented by the Proponent
iv. NYEWASCO should liase with relevant agencies like NEMA and DOSH on a need basis during project implementation to ensure compliance with various legal requirements and adopt sound construction practices without compromising on issues of environmental conservation

CHAPTER 11 REFERENCES

Republic of Kenya (2005); Kenya Gazette Supplement Acts 2000, Environmental Management and Coordination Act (EMCA) No. 8 of 1999, Government Printer, Nairobi

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Republic of Kenya (2011); Kenya Gazette Supplement Acts, Urban Areas and Cities Act No. 13 of 2011, Government Printer, Nairobi

United Nations (1992); Rio Declaration on Environment and Development, Rio de Janeiro

CHAPTER 12 ANNEXES

- Annex 1 Minutes of Public *Barazas* held
- Annex 2 List of Key Stakeholders Consulted during the ESIA Study
- Annex 3 Project Layout

Minutes of a meeting held between the Consultant and Community Members on 23 December 2016 at Kamakwa Centre from 10:30 am

Agenda

1. Introductions
2. Brief presentation of the proposed sewer extension projects
3. Concerns and comments from local communities
4. AOB

Min 1/23/12/2016: Introductions

The meeting was called to order by the Clients representative at 10.30 a.m as he welcomed the consultants and led the introductions. The consultant was then invited to give a brief presentation of the proposed projects.

Min 2/23/12/2016: Brief presentation of the proposed sewer extension projects

The consultant gave a brief on the proposed projects by indicating that NYEWASCO intended to expand sewer systems in various areas of Ruring'u, King'ong'o, Ngangarithi and Kamakwa. She indicated that the project was still in the planning phase and as required by NEMA regulations, public consultations were mandatory to enable all stakeholders give their views regarding the proposed projects. She assured the community members that their views would be included in the ESIA report and be considered in crafting adequate mitigation measures for negative impacts anticipated from project implementation.

The consultant also presented the preliminary findings of the expected activities during project implementation and welcomed them to ask questions and give their views.

Min 3/23/12/2016: Concerns and comments from the Local community

The community members expressed their support for the proposed sewer extension project in their area and gave the following concerns:

- They felt the project would lead to improved sanitation in their area.
- They expressed their frustrations in digging pit latrines due to inadequate land facility especially in areas where rental facilities had been put up
- They felt that sewer connection in the area would lead to increased value of land
- Cases children diseases associated with sanitation problems would lessen
- Improved aesthetics in the project areas

- They urged NYEWASCO to consider the locals for employment opportunities during project implementation
- The community members recommended that the proponent should conduct more consultations on the proposed projects prior to any implementation
- Some community members felt that their area being a poor urban centre, they should not be billed like other regions

Min 4/23/12/2016: AOB

There being no other business, the meeting was adjourned at 12.00 noon with a vote of thanks from the chief.

Minutes of a meeting held between the Consultant and Community Members on 23 December 2016 at Kandara Centre from 3.00 pm

Agenda

1. Introductions
2. Brief presentation of the proposed sewer extension projects
3. Concerns and comments from local communities
4. AOB

Min 1/23/12/2016: Introductions

The meeting was called to order by the Clients representative at 3.00 p.m as he welcomed the consultants and led the introductions. The consultant was then invited to give a brief presentation of the proposed projects.

Min 2/23/12/2016: Brief presentation of the proposed sewer extension projects

The consultant gave a brief on the proposed projects by indicating that NYEWASCO intended to expand sewer systems in various areas of Ruring'u, King'ong'o, Ngangarithi and Kamakwa. She indicated that the project was still in the planning phase and as required by NEMA regulations, public consultations were mandatory to enable all stakeholders give their views regarding the proposed projects. She assured the community members that their views would be included in the ESIA report and be considered in crafting adequate mitigation measures for negative impacts anticipated from project implementation.

The consultant also elaborated to the community members the expected activities during project implementation and welcomed them to ask questions and give their views.

Min 3/23/12/2016: Concerns and comments from the Local community

- They felt the project would improve the sanitation conditions in their area where pit latrines were in use
- NYEWASCO should ensure immediate maintenance incase of overflow or leakage of sewer to the environment as a result of blockages
- Revision of tariff rates which they felt were higher
- Dust emissions from project vehicles
- Some respondents also expressed concerns that NYEWASCO was not efficient in addressing water connection issues in the area and they feared that their extension of sewer projects would lead to poor service delivery
- They felt that sewer connection in the area would lead to increased value of land

- Improved aesthetics in the project areas
- They urged NYEWASCO to consider the locals for employment opportunities during project implementation
- The community members recommended that the proponent should conduct more consultations on the proposed projects prior to any implementation and ensure that compensation in areas where wayleave would be acquired from private land owners was done before project implementation

Min 4/23/12/2016: AOB

There being no other business, the meeting was adjourned at 12.00 noon with a vote of thanks from the chief.

Adjournment

The meeting was adjourned with vote of thanks from the client representative and the consultant. The meeting closed with a word of prayer from a community representative.

Minutes of a meeting held between the Consultant and Community Members on 23 December 2016 at Ngangarithi Centre from 11.30 am

Agenda

1. Introductions
2. Brief presentation of the proposed sewer extension projects
3. Concerns and comments from local communities
4. AOB

Min 1/23/12/2016: Introductions

The meeting was called to order by the chief at 11.30 a.m as he welcomed the consultants and led the introductions. The consultant was then invited to give a brief presentation of the proposed projects.

Min 2/23/12/2016: Brief presentation of the proposed sewer extension projects

The consultant gave a brief on the proposed projects by indicating that NYEWASCO intended to expand sewer systems in various areas of Ruring'u, King'ong'o, Ngangarithi and Kamakwa. She indicated that the project was still in the planning phase and as required by NEMA regulations, public consultations were mandatory to enable all stakeholders give their views regarding the proposed projects. She assured the community members that their views would be included in the ESIA report and be considered in crafting adequate mitigation measures for negative impacts anticipated from project implementation.

The consultant also elaborated to the community members the expected activities during project implementation and welcomed them to ask questions and give their views.

Min 3/23/12/2016: Concerns and comments from the Local community

- The project would lead to improved sanitation in the area
- They felt that sewer connection in the area would lead to increased value of land
- Improved aesthetics in the project areas
- NYEWASCO to consider the locals for employment opportunities during project implementation in the area
- Need for more consultations on the proposed projects prior to any implementation and ensure that compensation in areas where wayleave would be acquired from private land owners was done before project implementation
- The consultant to ensure the outcome of the ESIA report is shared with interested members of the community

Min 4/23/12/2016: AOB

There being no other business, the meeting was adjourned with vote of thanks from the chief and the consultant. The meeting closed with a word of prayer from a community representative.