

**ENVIRONMENTAL IMPACT STATEMENT (EIS) OF THE
UPGRADING OF THE MINIBUS STAND, MARKET AND ACCESS
ROADS (3KM) IN ZONGOMELA INDUSTRIAL PARK ON PLOT NO.
646, BLOCK “A” LOCATED AT ZONGOMELA MTA, ZONGOMELA
WARD, KAHAMA MUNICIPALITY IN SHINYANGA REGION**

FINAL REPORT

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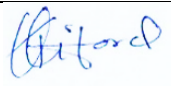

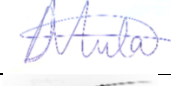
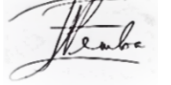

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EXECUTIVE SUMMARY

Final Environmental Impact Statement (EIS) of the Upgrading of the Minibus Stand, Market and Access Roads (3km) in Zongomela Industrial Park Plot No. 646, Block “A” located at Zongomela Mtaa, Zongomela Ward, Kahama Municipality in Shinyanga Region

Proponent: Director, Kahama Municipal Council

Background and location

Kahama Municipal Council was established on July 2012 after being officially declared as a Town Council on Government Notice NO.174 and published on the 17th June 2011 in the Local Government (Urban Authorities) Act, (CAP.288) by the Order Made under Section 5 (3). Kahama Municipal Council is located in the North-Western plateau of Tanzania. It lies approximately 3° 15” and 4° 30” South of the Equator and Longitudes 31° 30” and 33° 00” East of the Greenwich meridian. It is found along the Isaka-Benako-Rusumo trunk road, about 986.12 Kilometers from Dar es Salaam, 267 Kilometers from Mwanza, and 109 Km from Shinyanga Town. Kahama Municipal Council borders Nzega District to the East, Msalala District Council to the North. Bukombe and Mbogwe to the West and Ushetu District Council to the South.

The Projects

Kahama Municipal Council as the Implementing Agency (IA) is part of the LGAs which will be implementing the WB finance project through TACTIC. The objective of the proposed TACTIC project is to strengthen urban management performance and deliver improved basic infrastructure and services in participating urban local government authorities. At its core, the project aims to promote economic development of Tanzania’s cities and towns and its enabling infrastructure. Investments and technical assistance under the project are intended to promote urban development that is productive, inclusive and resilient. The project will support 45 urban Local Government Authorities (LGAs) spread geographically across all regions of Tanzania, ranging in population from 26,402 to 416,442 (2012), divided into three tiers based on population and growth rate. Kahama Municipal Council is grouped in Tier 1 as among the 12 larger, fast-growing LGAs.

The TACTIC project will provide funding to cover for the following projects in Kahama:

- 1) Improvement of infrastructures at Zongomela Industrial Park (roads, market and minibus stand)
- 2) Improvements of Roads at CBD
- 3) Construction of New Bus Terminal and improvement of Sango Market
- 4) Improvements of Storm Water Drainage

This reports main focus is on improvement of infrastructures at Zongomela Industrial Park (roads, market and minibus stand)

Project Summary

Zongomela industrial area was proposed to accommodate small and large industries and traders in order to reduce congestion in the town centre. The area was established in 2017. The area is surveyed and owners of individual plots have title deeds. The land was given for free by the town council and owner paid for processing of title deeds. The proposed land use is a mix of residential and commercial.

-Project location: Zongomela industrial park is located in Zongomela ward, Zongomela mtaa, at about 5 km from Kahama CBD.

-The total project area: Zongomela industrial park has a total area of 2,162 Acres; out of which 500 Acres is for small scale industries and is the one which will be improved, 1,662 Acres for small- and large-scale industries which covers 50km of roads.

-Length of proposed roads: The project will improve 3km of roads within the park to bitumen standard. Zongomela industrial park has a road network of 57km.

-Total area for the proposed Zongomela market: The proposed Zongomela market has an area of 0.98 acres.

-Total area of the proposed Zongomela bust stand: The bus stand will be built in an area covering 3.16 acres.

-Land Ownership: The zone is general land own by Kahama Municipal Council although the individual plots are owned by business people who occupy the area. Owners of the individual plots were issues with the title deeds. The KMC also owns the plots for the proposed market and mini bus stand within the industrial park. The two areas have title deeds which show ownership by the Kahama Municipal Council.

-Vegetation and other biological features of an area: Zongomela industrial park is covered by variety of trees including cassia, eucalyptus and mango as well as short grasses. The area normally floods during rainy season which necessitate for the adequate drainage system and receiving body during design.

-Neighbouring land use: Zongomela industrial area is surrounded by scattered settlement including national housing residential area.

-Natural Resources: Zongomela industrial park is not surrounded by any natural resource such as river, lake, swamp, national park or a forest.

-Stakeholders' engagement: Stakeholder's engagement is an ongoing process and the initial consultations have been conducted to make them aware of the proposed project. Further consultations and awareness are ongoing in different project stages.

- a) **3 km of roads to bitumen standards** – The proposed roads is part of the total road network of about 57km covering the whole industrial park. The roads are proposed in a way to ensure that there is connectivity within the area and with other facilities such as the market and mini bus stand. Currently the roads are passable with few drains to reduce floods during rainy season.
- b) **Upgrading of mini bus Stand** – The mini bus stand at Zongomela will take an area of 3.16 acre. Other uses such as bod boda, pedestrians, bajajis and petty traders will also be included. Currently the mini bus stand is used, surrounded by shops which are owned by individuals. During construction of the mini bus stand users will be temporarily relocated to a nearby area and all the necessary facilities will be included in the temporary site. The bus stand was moved to Zongomela industrial park from Lumambo.
- c) **Upgrading of the market** – The market and the proposed mini bus stand are close to each other. The two facilities are separated by a road. The two facilities rely on each other in terms of functionality and interaction of people. The market accommodates an area of 0.98 acre. Most of the traders at this market were moved to this area during the government operation to remove street vendors (Machingas) from the streets. Traders were initially occupying areas

of Lumambo, Nyasubi and Majengo. During construction traders will temporarily be relocated and returned later on once the construction activities are completed. The relocation of the market should go together with the bus stand because traders depend on the bus stand for customers and vice versa. Relocation of the market will be within Zongomela industrial area.

Policy and Legal Framework

The policy framework which are in conformity with the proposed project activities are environmental policy of 1997, land policy of 1997, gender policy of 2000 and HIV and AIDS Policy of 2001. The legal framework for the proposed projects includes the environmental management Act of 2004, and its Regulations, the Land Act of 1999, The Occupational Health and Safety Act of 2005, HIV and Aids Act of 2008.

Apart from country policies and legislation the World Bank Environmental and Social Framework (ESF) which describes ten (10) Environmental and Social Standards (ESS) will also be used. The ten ESSs as per the WB ESF are: ESS 1: Assessment and Management of Environmental and Social Risks and Impacts; ESS 2: Labor and Working Conditions; ESS 3: Resource Efficiency and Pollution Prevention and Management; ESS 4: Community Health and Safety; ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement; ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; ESS 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities; ESS 8: Cultural Heritage; ESS 9: Financial Intermediaries; and ESS 10: Stakeholder Engagement and Information Disclosure. Given the nature of activities of this project, with the exception of ESS 9: Financial Intermediaries almost all the ESSs will be relevant.

Stakeholders Consultation and Design Recommendations

Stakeholders consulted included Kahama District Council including the District Executive Director and the entire team (legal, community development, environment, physical planning, engineering), Kahama Water and Sewerage Authority (KUWASA), TANESCO, Kahama Office, Association of people with disabilities, Association of Traders in Zongomela Industrial Area, Representatives of Zongomela Traders, Association of vendors at Zongomela market, Association of Mama Ntilie at Zongomela market, Association of drivers at Zongomela mini bus stand, Office of the Mayor of Kahama Municipal Council, Mini bus stand users, Ward office and Mtaa office. Some of the design concerns from stakeholders are: i. The proposed developments should be designed in a way that they are manageable and affordable by the Kahama residents especially the Sango Market, ii. Involvement and consideration of the needs of people with disabilities in the proposed projects, iii. The challenges and deficiencies with the current infrastructure design is inclusivity. The need for people with disabilities were not considered like putting wheelchair ramps in buildings, iv. If there will be no proper destination/disposal point of storm water, the proposed drainage construction will have a negative impact. Hence, there is a need to have a reliable destination/ end point of the storm water in drainage to avoid stagnation and flooding to people's homes, v. The Municipal Council, contractor and consultants should cooperate with TARURA to ensure a smooth undertaking of the projects and the office is ready to offer a helping hand and their views, vi. The PIU needs to consult KUWASA prior construction to know of the water supply network where the project will cover and if they can be affected and what should be done, vii. The proposed buildings should have wheelchair ramps for easy access, viii. Important signs, there should be a translator for the deaf, Braille/tactile

system for the blind in buildings and roads to render easy use for them, ix. Make available space/frames for the PwDs to carryout businesses. Space for their bajaj for business and shops. x. There should be enough and specific parking for all types of vehicles and transport facilities (that is mini buses, buses, taxis, bajaj, bodaboda and passengers' cars upon arrival and exiting), xii. The roads in the bus stand should be big enough for 2 vehicles going on different directions.

Environmental and Social Impacts and Their Mitigation Measures

Some of the identified social and environmental positive and negative impacts and their mitigation measures are: Positive social impacts during preparatory stage are the creation of job to local communities and improved livelihoods. Negative social impacts include disruption of economic and social activities and services while its mitigation measures include, awareness rising to community within the project core area; and inclusion of local leaders (Ward/sub-ward chairpersons/executive officers or /and councilors. Potential negative environmental impacts during preparatory stage include exploitation of borrow pits/quarries and other natural resources. Its mitigation measures are to ensure that the exploitation of construction materials will be from the authorized source only; and restoration of the borrow pits/quarries after use constituting levelling the area and seeding or planting of trees and/or grasses will be done in association with local government (natural resources department) and local environmental NGOs. If appropriate the levelled area will be left for natural re-vegetation. Negative environmental and social impacts during construction phase include occupational safety and health impacts (its mitigation measures: Appropriate working gear (such as nose, ear mask and clothing) and good construction site management shall be provided by the contractor), labour and poor working Conditions (mitigation measures: develop Labour Management Procedures to guide the employment of all workers), Impacts on receiving bodies such as air, land and water (mitigation measures are: prevent possible leakage from machines such as oil, and inspect the machines to reduce air emissions).

Potential negative environmental and social impacts during operational phase and their mitigation measures include spread of diseases (mitigation measure: a safety, health and environment induction course shall be conducted to community members and workers, putting more emphasis on HIV/AIDS, which has become a national disaster), Risk of SEA/SH at the market and bus stand (mitigation measures: the identification of SEA/SH risks during operation will be considered further as part of the GBV Action Plan), pollution to the air and water due to waste generation (mitigation measures: reduce generation of waste and manage properly the exiting waste by establishing proper waste management plan). During decommissioning there will be loss of employment and revenues (mitigation measures: provide a chance for a new bigger and better project which will increase revenue), waste generation from the demolished structures (mitigation measures: proper waste management plan). An Environmental and social management and monitoring plan has been designed to ensure that the identified impacts are properly managed.

Decommissioning

As decommissioning will take place in the remote future, the specific conditions for mitigation are generally inherently uncertain. In view of this, specific mitigation measures pertaining to environmental impacts of decommissioning works cannot be proposed at the moment with a reasonable degree of certainty. A decommissioning plan that takes environmental issues into consideration shall be prepared by the developer prior to the decommissioning works. Should it be

done, decommissioning may entail a change of use (functional changes) or demolition triggered by change of land use.

Summary and Conclusion

The proposed upgrading of Zongomela Industrial Park as such, entails minimal adverse environmental impacts of which adequate mitigation measures have been proposed and incorporated in the project design. It can therefore be concluded that, the proposed project will entail no significant impacts provided that the recommended mitigation measures are adequately and timely implemented. The identified impacts will be managed through the proposed mitigation measures and implementation regime laid down in this ESIA. The proponent is committed in implementing all the recommendations given in this ESIA and further carrying out the environmental auditing and monitoring schedules.

ACKNOWLEDGEMENTS

The Kahama Municipal Council (KMC) wishes to express heartfelt thanks and appreciation to all stakeholders who in one way or another supported the completion of this work. Our gratitude goes to Wards and Mitaa leaders of all areas where the proposed projects are located. We are also grateful for other stakeholders such as the Organization of people with disabilities, association of vendors, drivers, market and bus stand users as well as other government departments for their commitment and all the information provided during preparation of this report. The proponent would like to thank Ms. Rosemary C. Nyirenda (Lead Environmental Expert), Ms. Magdalena L. Mlowe (Environmental Specialist), Dr. Lillian G. Mulamula (Ecologist), Dr. Edmund Temba (Legal Expert), Italius Kavishe (Social and Gender Expert) and Dorcas Ephraim (Economist) for their great contribution in this project. Last but not least we thank all who in one way or another were part of the succesful completion of this report. Thanks very much all of you, this report is for all of us. Let us own it.

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LIST OF ACRONYMS

BOQ	– Bill of Quantities
CBD	– Central Business District
EHS	– Environment Health and Safety
ESIA	– Environmental and Social Impact Assessment
ESF	– Environmental and Social Framework
EMA	– Environmental Management Act
EMO	– Environmental Management Officer
ESS	– Environmental and Social Standards
ESMP	– Environmental and Social Management Plan
ESCP	– Environmental and Social Commitment Plan
FYDP	– Five Year Development Plan
GDP	– Gross Domestic Plan
GIIP	- Good International Industry Practice
GRM	– Grievance Redress Mechanism
GRC	– Grievance Redress Committee
GN	– Government Notice
IE	– Implementing Agency
KMC	– Kahama Municipal Council
KUWASA	– Kahama Water Supply and Sanitation Authority
LGA	– Local Government Authority
MEO	– Mtaa Executive Officer
NEMC	– National Environmental Management Council
PwD	– People with Disability
RPF	– Resettlement Policy Framework
SEP	– Stakeholder Engagement Plan
TACTIC	– Tanzania Cities Transforming Infrastructure and Competitiveness Project
TANESCO	– Tanzania Electric Supply Company Limited
TARURA	– Tanzania Rural and Urban Roads Agency
WB	– World Bank
WEO	– Ward Executive Office

CHAPTER ONE

INTRODUCTION

1. Background and Location

Kahama Municipal Council was established on July 2012 after being officially declared as a Town Council on Government Notice No. 174 and published on the 17th June 2011 in the Local Government (Urban Authorities) Act, (CAP.288) by the Order Made under Section 5 (3). Kahama Municipal Council (KMC) is located in the North-Western plateau of Tanzania. It lies approximately 3° 15" and 4° 30" South of the Equator and Longitudes 31° 30" and 33° 00" East of the Greenwich meridian. It is found along the Isaka-Benako-Rusumo trunk road, about 986.12 Kilometers from Dar es Salaam, 267 Kilometers from Mwanza, and 109 Km from Shinyanga Town. Kahama Municipal Council borders Nzega District to the East, Msalala District Council to the North. Bukombe and Mbogwe to the West and Ushetu District Council to the South.

1.1 Population

According to the 2012 National Population and Household Census, Kahama Municipal Council had 242,208 people which are 15.8% of the regional population (1,534,808). The female population was 117,498 (48.5%) while the male population was 124,710 (51.5%). The growth rate is 3.7% per annum and by 2019 Kahama Municipality was estimated to have a population of 312,349 (Women 151,524 (48.5%) and Men 160,825 (51.5%). The age distribution for Kahama Municipal Council shows that the young population under 15 years was 49.2 percent. For the working population of the age group between 15 to 64 years the proportion was 48.7%.

1.2 Kahama Municipal Council Strategic Plan

From the year 2016/17-2020/21 Kahama Municipal Council has planned to dedicate its efforts toward realization of its vision that state KMC is to be *"With Quality Services and Conducive Investment Environment for Sustainable Development"* and its mission is *"To Provide Socio-Economic Services and Create Conducive Investment Environment in Collaboration with Stakeholders using available Resources for Sustainable Development"*.

The Kahama Strategic Plan took into account among other items aspiration of the government articulated in the Second Five Years National Development Plan (FYDP II 2016/17-2020/21) whose theme is: "Nurturing Industrialization for Economic Transformation and Human Development" is intended to rally and align society's efforts towards realization of the development aspirations. Strategic Plan has also been prepared while considering reform measures currently being undertaken by the Fifth Phase Government, within the trade Mark Philosophy of *"Hapa Kazi Tu"*. It contains useful information for our customers, various stakeholders and development partners.

1.3 The Projects

Kahama Municipal Council as the Implementing Agency (IA) is part of the LGAs which will be implementing the WB finance project through TACTIC. The objective of the proposed TACTIC project is to strengthen urban management performance and deliver improved basic infrastructure

and services in participating urban local government authorities. At its core, the project aims to promote economic development of Tanzania's cities and towns and its enabling infrastructure. Investments and technical assistance under the project are intended to promote urban development that is productive, inclusive and resilient. The project will support 45 urban Local Government Authorities (LGAs) spread geographically across all regions of Tanzania, ranging in population from 26,402 to 416,442 (2012), divided into three tiers based on population and growth rate. Kahama Municipal Council is grouped in Tier 1 as among the 12 larger, fast-growing LGAs.

The TACTIC project will provide funding to cover for the following projects in Kahama:

1. Improve infrastructures at Zongomela Industrial Park (3km access roads, market and bus stand)
2. Improvements of Roads at CBD
3. Construction of Mbulu Bus Terminal and improvement of Sango Market
4. Improvements of Storm Water Drainage

The main focus of this report is the improvement of the minibus stand, market and access roads (3km) in Zongomela Industrial Park. The internal environments of the proposed project sites are located at various areas within the Municipality on different plots with respect to their area coverages. All the proposed projects will be implemented on areas/plots which are owned by Kahama Municipal Council and have the Certificates of Right of Occupancy. The proposed projects are also in accordance with Kahama Municipal Council strategic plan as well as the Government vision and other strategic documents to reduce and eventually end poverty in coming few decades.

1.4 Environmental and Social Impact Assessment

This environmental and social finding covers for the upgrading of the minibus stand, market and access roads (3km) in Zongomela Industrial Park. The environmental and social study is conducted in accordance with the Environmental Impact Assessment and Audit Regulations of 2005 as amended in 2018 and the World Bank environmental and social framework (ESF). While the ESF acknowledges country's capacity in managing environmental risks and impacts, the country regulations on the other side give mandate to NEMC to oversee the EIA process, which culminates with an award of the EIA certificate by the Ministry responsible for Environment. The EIA certificate is among the prerequisite approvals required before the project takes off. This project will need this approval before it is implemented. The ESIA study was conducted from January to December, 2022.

The environmental and social study is also conducted as part of the design works where by some of the mitigation measures will be rectified during finalization of the designs.

This ESIA was conducted by Ms. Rosemary C. Nyirenda (Lead Environmental Expert), Ms. Magdalena L. Mlowe (Environmental Specialist), Dr. Lillian G. Mulamula (Ecologist), Dr. Edmund Temba (Legal Expert), Italius Kavishe (Social and Gender Expert) and Dorcas Ephraim (Economist).

1.5 General Objective of the Environmental and Social Impact Assessment

The environmental and social assessment has been conducted in accordance with the guidelines laid down by the Environment Management Act (EMA, 2004). Part IV of the EIA Regulations GN No. 349 7 of 2005 which provides the general objectives for carrying out EIA, among others. The list objectives include the following: -

- i) To ensure that environmental considerations are explicitly addressed and incorporated into the development of decision-making process of the project;
- ii) To anticipate and avoid, minimize or offset the adverse significant biophysical, social and relevant effects of developmental proposal.
- iii) To promote development that is sustainable and optimizes resources' use and management opportunities.

1.5.1 Specific objectives of the environmental and social impact assessment

- i) To establish the baseline information on both natural and the built environment including socio-economic activities of the proposed project area.
- ii) To ensure that environmental legal requirements are met by Kahama Municipal Council prior and during implementation of the project.
- iii) To identify, predict and evaluate anticipated environmental and socioeconomic impacts, both beneficial and adverse, of the proposed investment.
- iv) Proposing effective measures to mitigate the negative impacts during the construction and operation of the entire project that aim at eliminating or minimizing the potential negative impacts and promote positive ones.
- v) Outlining an environmental and social management plan to manage the impacts.
- vi) Preparing environmental and social monitoring plan to keep track of the environmental performance of the project.

1.6 Methodology

The methodology employed in conducting the preliminary environmental and social assessment is in line with the Environment Impact Assessment Regulations, 2005, GN No.349 of 2005. The study was undertaken based on developed checklist and complimented by past experience of similar environmental and social studies. Observations of the proposed project site and surrounding habitats were made and literature reviewed was done through reading of reports and documents which were provided by Kahama Municipal Council. The study adopted the following approach to get the findings:

1.6.1 Review of Relevant Documents

Important issues for completion of ESIA study deserve special reference to the existing official information particularly in the following documents:

- Country Policies and legislation relevant to the project
- Kahama Municipal Council socio economic profile and other reports
- 2012 Census report
- Project design report
- TACTIC project documents

It was important to note that undertaking the ESIA study requires first to be acquainted with standard guidelines provided in the project documents as well as reviewing other relevant literature available such as the proposed project design and plan of operation. Hence, the first attempt in undertaking this assignment had been for the Consultant to have an in-depth review of all relevant documents. The information from these documents have not only provided an insight to the project goals, policies and setting but, also, a background on establishing a checklist of questions to guide the consultation process.

1.6.2 Field Surveys

The field visits were essential to fully realize the scope of the project, the biophysical environment specific to the location and the socio-economic conditions in the project area. Two visits to the project area were made; the first visit was done during scoping stage and the second at the detailed interview stage. All visits were made between January and March 2022.

The ESIA team used the fieldwork to conduct interview with stakeholders and also to collect information on the state of the environment. Information collected includes land use, human demography, cultural heritage and other indicators related to environmental and socio-economic trends of Kahama Municipal Council. Other information was appraised through key informants' interviews and experts' observations.

1.6.3 Stakeholder's participation

Interview and public meetings were the major method used by the Consultants simply because much of the information was obtained from individual representing organizations/companies. A series of consultation forum convened to dialogue about the proposed project in light of their expectations and worries and, most importantly, the stakeholders' suggestions on how the environmentally and socially unfavorable impacts could be addressed. Two meetings were conducted, one with businessmen at Zongomela Market and bus stand and another one with Zongomela ward community.

Consultations were conducted involving different individuals, institutions and other key stakeholders including the following;

- i. Kahama Municipal Council including the Town Executive Director and the entire team (legal, community development, environment, physical planning, engineering)
- ii. Kahama Water Supply and Sanitation Authority (KUWASA)
- iii. TANESCO, Kahama Office
- iv. Association of people with disabilities
- v. Association of Traders in Zongomela Industrial Area
- vi. Representatives of Zongomela Traders
- vii. Association of vendors at Zongomela market
- viii. Association of Mama Ntilie at Zongomela market
- ix. Association of drivers at Zongomela mini bus stand
- x. Office of the Mayor of Kahama Municipal Council
- xi. Mini bus stand users
- xii. Ward office

Through these consultations and assessment, an assessment was made to determine the nature and magnitude of the interests and influence of the stakeholders on the planned project. The outcomes of these consultations were enriched since these were people who were knowledgeable on the likely environmental, social and economic impacts of the proposed project.

During consultations, the target was to get realistic perception and viewpoints of these stakeholders. The stockholders' analysis enabled the team to identify the extent of the stakeholders' readiness to assist or tendency of obstructing the project's development objectives, as well as ways of addressing such obstructions. The concerns of each group have been addressed in this ESIA report.

1.6.4 Project impact assessment and evaluation

Superimposing project elements onto the existing social and environmental natural conditions made it possible to identify the potential impacts of the proposed project in Kahama Municipal Council. The checklist method was used to identify the impacts and mitigation measures. Further, environmental impact matrix method was adopted in identifying impacts of major concerns. A key guiding assumption in this study is that the project will be designed, constructed and operated with due care for safety and environmental matters using current and practical engineering practices and/or Best Available Technology Not Entailing Excess Cost (BATNEEC). The implementation schedule of the mitigation measures is summarized in the EMP.

The environmental assessment has been undertaken in close interaction with the design team. In this process environmental impacts have been evaluated for various alternatives. Several project alternatives were considered including that of not implementing the project. The fundamental environmental protection strategy and environmental considerations influencing engineering design were incorporated. However, reasonable regard to technological feasibility and economic capability were taken into account.

1.7 Report Structure

Chapter one contains the introduction on the background information of the proposed project, its development objectives, rationale and the proposed project implementation arrangements.

Chapter two contains the project description, in which there is a description of the location and relevant components of the project and their activities.

Chapter three illustrates policy, legal and administrative framework, which are the relevant Tanzanian environmental policies and legislation applicable to construction projects.

Chapter four has the baseline information relevant to environmental characteristics, which gives details concerning the Bio-physical environment and socio-economic environment at the project area.

Chapter five express the consultation exercise at the project area detailing the list of stakeholders consulted and the issues raised.

Chapter six describes the positive and negative environmental impact of the project that are likely to be generated from the different phases (the planning and designing, construction, operation and maintenance and the demobilization phases).

Chapter seven gives the mitigation measure for the potential negative impact of the project.

Chapter eight presents the Environmental and Social Management Plan (ESMP).

Chapter nine presents the Environmental Monitoring Plan that contains the proposed institutions to carry out the monitoring activities, the monitoring indicators, time frame and the proposed budget for monitoring.

Chapter ten gives the cost benefit analysis of the project.

Chapter eleven provides the decommissioning plan for the proposed project however the decommissioning is not anticipated in the foreseeable future.

Chapter twelve gives the summary and conclusions of the study.

The appendices, containing some key primary information collected during the study are attached at the end of this report. Generally, the report structure flows in conformity with that specified in the EIA and Audit Regulations o 2005.

CHAPTER TWO

PROJECT DESCRIPTION AND DESIGNS

2.1 Description of the Proposed Projects

The project will focus on the Improvement of road network, existing market and a mini bus stand at Zongomela Industrial Park.

2.2 Rationale for the Project

It is argued that Roads are the blood vessels of economy. Kahama Municipal Council wishes to develop an Industrial Park at Zongomela and the Township roads at Bitumen level. The roads at Zongomela Industrial Park will ensure reliable provision of quality industrial goods and services and raise their income, reduce poverty and improve employment opportunities and easy access to services and thus improve the livelihood of the people.

Upgrading of roads to Bitumen standard (3km) and Minibus stand at Zongomela Industrial Park: The rationale of proposed upgrading of roads and minibus stand is to formalize the business to 623 plots surveyed and allocated free of charge to entrepreneurs, create good environment for marketing promotion of products, increase KMC own source revenue, create more job opportunities and stimulate socio-economic development of the community (**Figure 1**).

The Zongomela Industrial Park project is expected to generate both social and economic returns to the KMC and the public at large. Socially, the project will strengthen the status of the Township, improve livelihood, change of the life style, encourage cultural and eco-tourism. Economically, the project will also promote tourism, increase investment opportunities, create employment, expand business activities hence improve standards of living as well as the GDP of the Township. The Township is expected to enhance its financial base through collection of revenues.

Investors will make good industrial products and other light and bulk materials to unearth cost-effective markets. Kahama resident and nearby regions will benefit from the products produced at Zongomela which offers tremendous investment opportunities for investors.

Key services and solutions the project intends to solve include:

- Improve movements within and outside the Industrial area.
- Formalization of the business that 623 Plots surveyed and allocated freely to entrepreneurs
- To create good environment for marketing promotion of the products
- To create more job opportunities created (currently 1,692 jobs created)
- To stimulate socio-economic development of the community
- To enhance Town Council internal Revenue

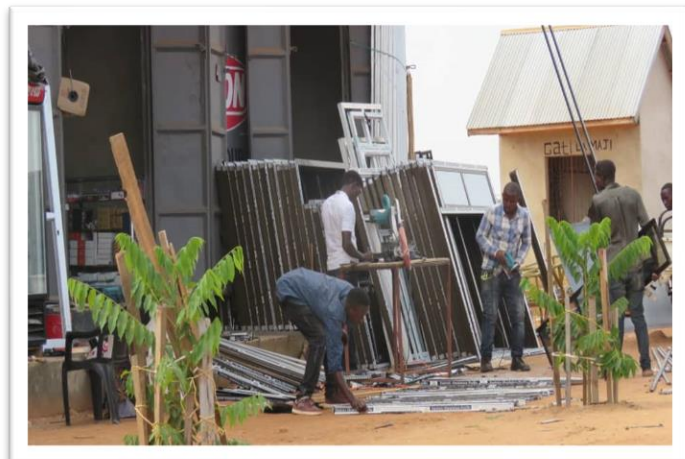


Figure 1: Business at Zongomela (Source: Kahama Socio-economic profile, 2018)

2.3 Project Summary

Zongomela industrial area was proposed to accommodate small and large industries and traders in order to reduce congestion in the town centre. The area was established in 2017. The area is surveyed and owners of individual plots have title deeds. The land was given for free by the town council and owner paid for processing of title deeds. The proposed land use is a mix of residential and commercial (**Figure 2**).

- **Project location:** Zongomela industrial park is located in Zongomela ward, Zongomela mtaa, at about 5 km from Kahama CBD.

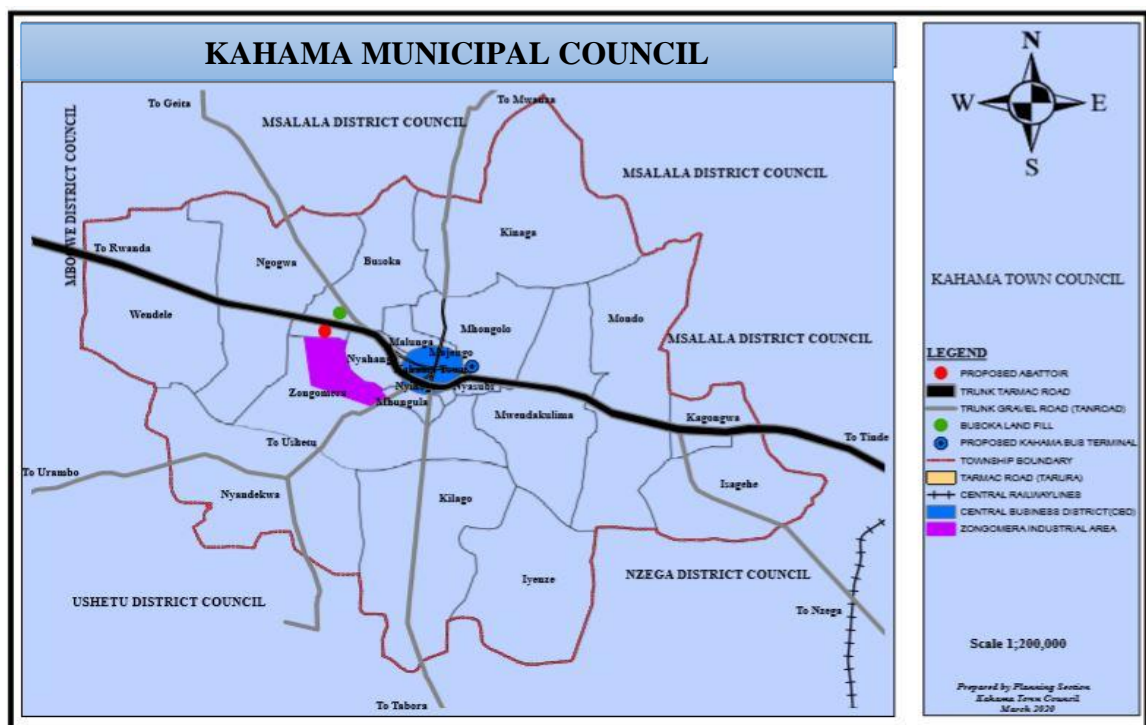


Figure 2: Map of Kahama Municipal Council (Source: Kahama Socio-economic profile, 2018)

- **The total project area:** Zongomela industrial park has a total area of 2,162Acres; out of which 500Acres is for small scale industries and is the one which will be improved, 1,662 Acres for small- and large-scale industries which covers 57 km of roads.
- **Length of proposed roads:** The project will improve 3km of roads within the park to bitumen standard. Zongomela industrial park has a road network of 57km.
- **Total area for the proposed Zongomela market:** The proposed Zongomela market has an area of 0.98 acres.
- **Total area of the proposed Zongomela bust stand:** The bus stand will be built in an area covering 3.16 acres.
- **Land Ownership:** The proposed project site is general land owned by Kahama Municipal Council although the individual plots within the park are owned by business owners within it. Owners of the individual plots were issued with the title deeds. The KMC owns the plots for the proposed market and mini bus stand within the industrial park. The two areas have title deeds which show ownership by the Kahama Municipal Council.
- **Vegetation and other biological features of an area:** Zongomela industrial park is covered by variety of trees including cassia, eucalyptus and mango as well as short grasses. The area normally floods during rainy season which necessitate for the adequate drainage system and receiving body during design.
- **Neighbouring land use:** Zongomela industrial area is surrounded by scattered settlement including national housing residential area.
- **Natural Resources:** Zongomela industrial park is not surrounded by any natural resource such as river, lake, swamp, national park or a forest.
- **Stakeholders' engagement:** Stakeholder's engagement is an ongoing process and the initial consultations have been conducted to make them aware of the proposed project. Further consultations and awareness are ongoing in different project stages.

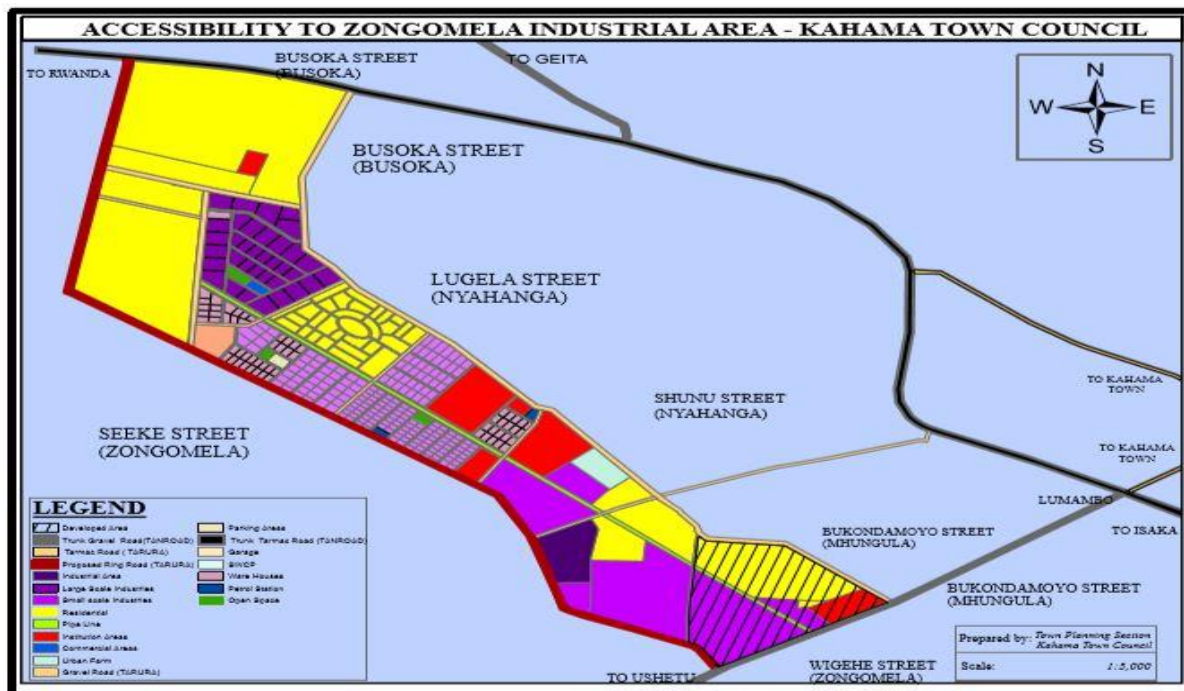


Figure 3: Map of the proposed Zongomela Industrial Park (Source: KMC, 2017)

2.4 Project Description

The roads at Zongomela Industrial Park which need to be upgraded from earth roads to Asphalt standards, will include also drainage system, culverts, pedestrian walk ways, street lights and other needed road furniture's.

The Project will include construction of the following:

- i) **Upgrading of 3km of roads to bitumen standards** – The proposed roads is part of the total road network of about 57km covering the whole industrial park. The roads are proposed in a way to ensure that there is connectivity within the area and with other facilities such as the market and mini bus stand. Currently the roads are passable with few drains to reduce floods during rainy season (**Figures 3 and 4**).





Figure 5: Proposed Roads at Zongomela Industrial Park (Source: Field Visit, January 2022)

- ii) **Upgrading of mini bus Stand** – The mini bus stand at Zongomela will take an area of 3.16 acre (**Figure 5**). Other uses such as bod boda, pedestrians, bajajis and petty traders will also be included. Currently the mini bus stand is used, surrounded by shops which are owned by individuals. During construction of the mini bus stand users will be temporarily relocated to a nearby area and all the necessary facilities will be included in the temporary site. The bus stand was moved to Zongomela industrial park from Lumambo.



Figure 6: Mini bus stand to be upgraded in Zongomela (Source: Field Visit, January 2022)

- iii) **Upgrading of the market** – The market and the proposed mini bus stand are close to each other. The two facilities are separated by a road (**Figure 6**). The two facilities rely on each other in terms of functionality and interaction of people. The market accommodates an area of 0.98 acre (**Figure 7**). Most of the traders at this market were moved to this area during the government operation to remove street vendors (Machingas) from the streets. Traders were initially occupying areas of Lumambo, Nyasubi and Majengo. During construction traders will temporarily be relocated and returned later on once the construction activities are completed. The relocation of the market should go together with the bus stand because traders depend on the bus stand for customers and vice versa. Relocation of the market will be within Zongomela industrial area.



Figure 7: Left Photo: Road separating the mini bus stand (left) and the market (right), Right photo: Proposed market for upgrading in Zongomela Industrial Park (Source: Field Visit, January 2022)

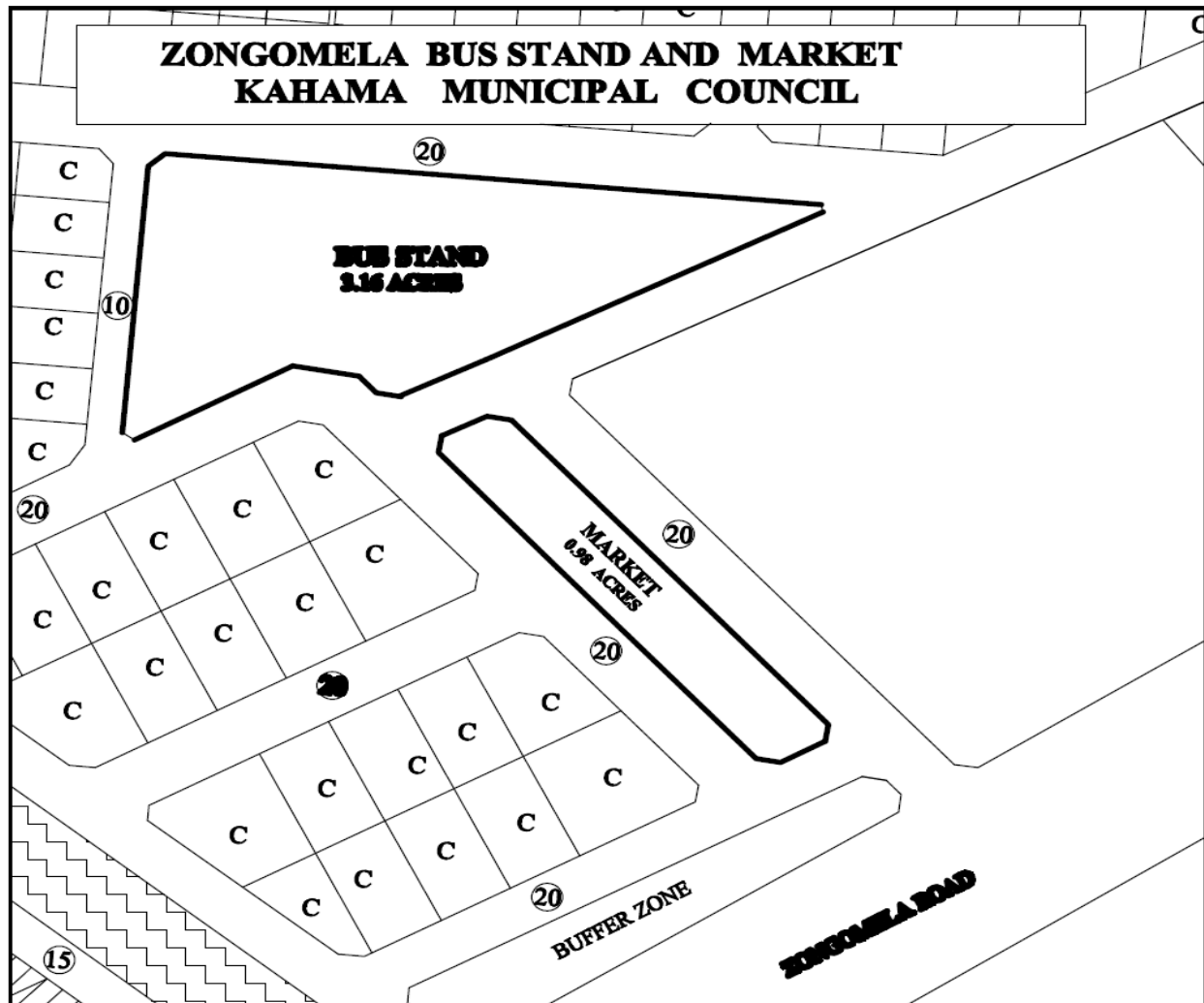


Figure 8: The size of the plots for the proposed market and mini bus stand in Zongomela Industrial Park (Source: Field Visit, January 2022)

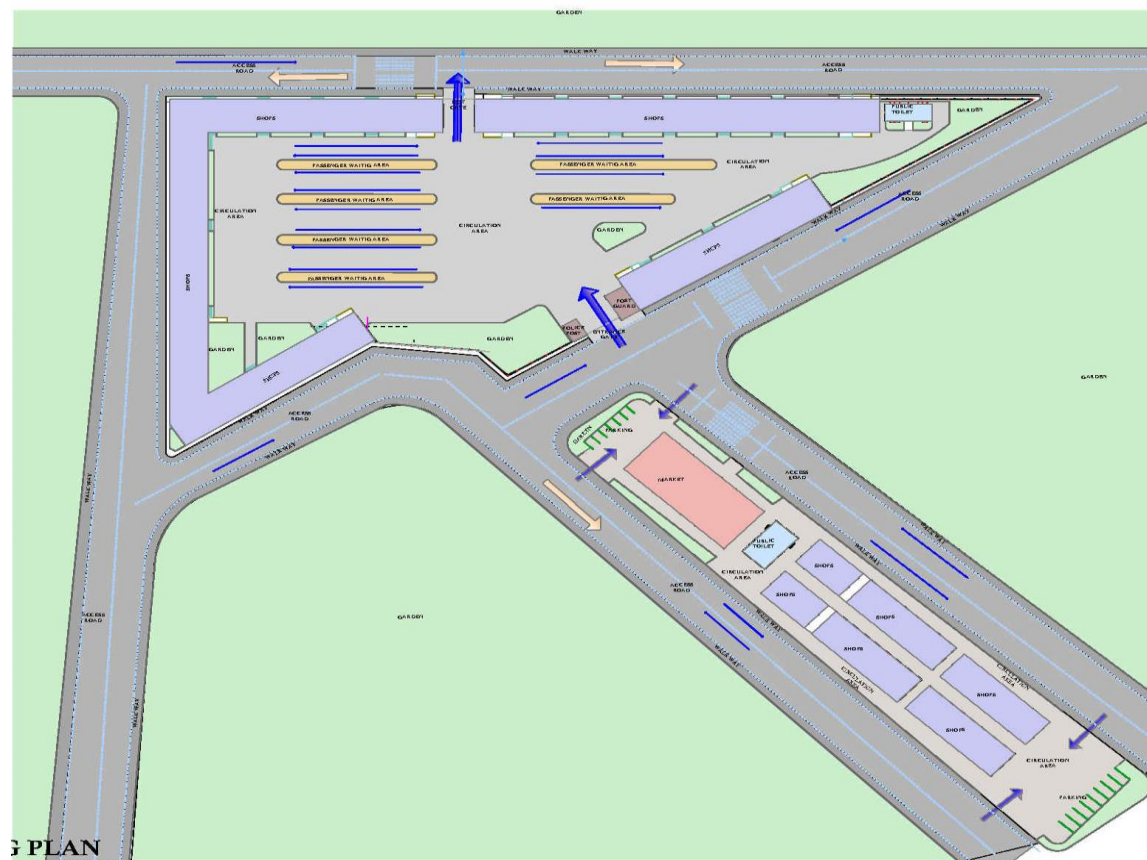
The rest part of Zongomela industrial park is owned by residences who have businesses and industries that have been running for some years hence their own it is responsibility to upgrade them but the part of the roads to be improved cross these areas. Therefore, they will also benefit from the upgraded infrastructure.

2.5 Project Designs

The stakeholders design considerations for Zongomela industrial park as described during stakeholders' consultations are outline here under:

- The Shops surrounding the mini-bus stop to be demolished and new designs to be formed.
- The area should have a modern building with hidden roof.
- The toilet block should be separated from other blocks; it should be a separate building.
- To introduce waste collection point
- The market should be open.

- The designs include upgrading of 3km of roads to bitumen standards, upgrading of mini bus Stand and the upgrading of the market. The proposed designs have taken all the considerations as narrated by stakeholders and is geared to reducing potential environmental and social impacts as identified during preliminary assessment. As observed during site visit the status of the current onsite building's terminal is in good condition. Therefore, the kind of intervention proposed in this part of the site is to conserve, organize and upgrade through defining the traffic of the bus terminal. Project requirement indicates that the current bus terminal and commercial area are congested and need upgrade. There is space proposed for shade, also there is existing bus stand which services for the regional and local buses. The bus stand has a toilet, water supply, electricity shops in and out access gets, there is gravel rough road surrounding the stand. **Figures 9, 10, 11 and 12** show the proposed site plan, the architectural designs of the mini-bus stand and the market as well as their connection with the proposed road network at Zongomela industrial market.



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Figure 10: The proposed architectural designs for the mini-bus stand and the market at Zongomela industrial park (Source: Consultant, 2022)

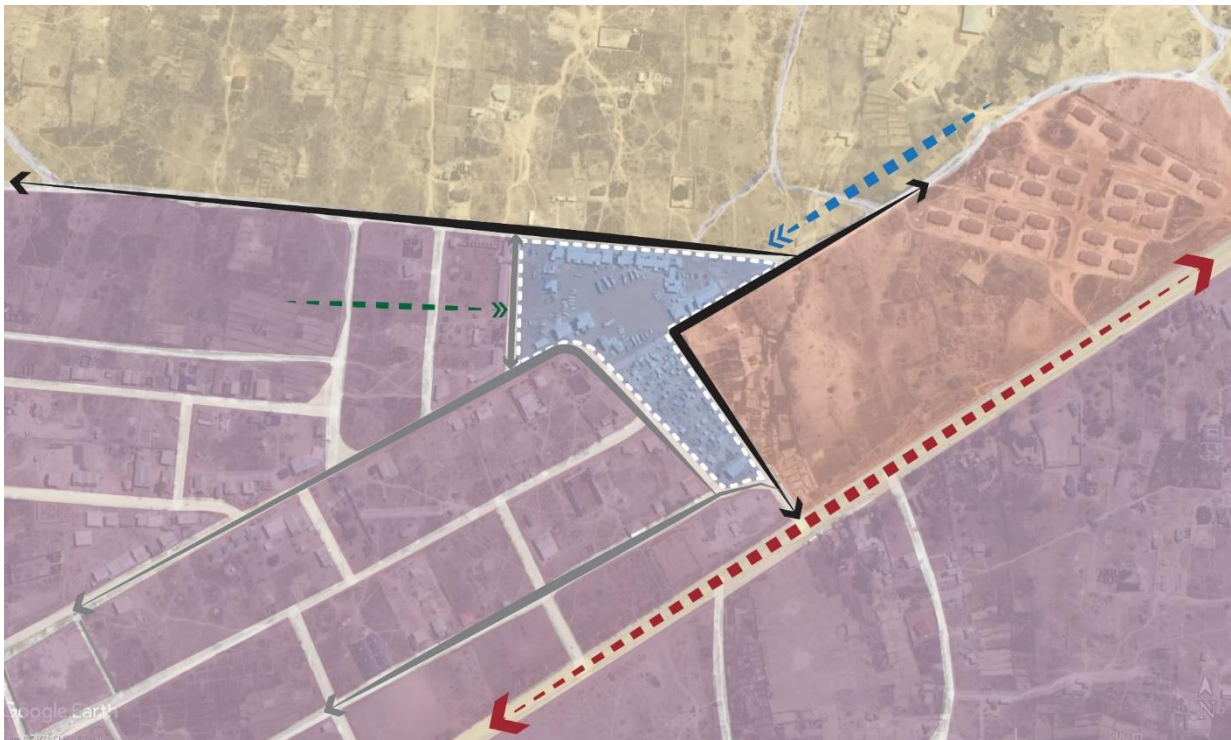


Figure 11: The connectivity between the proposed mini-bus stand, the market and road network in Zongomela industrial park (Source: Consultant, 2022)

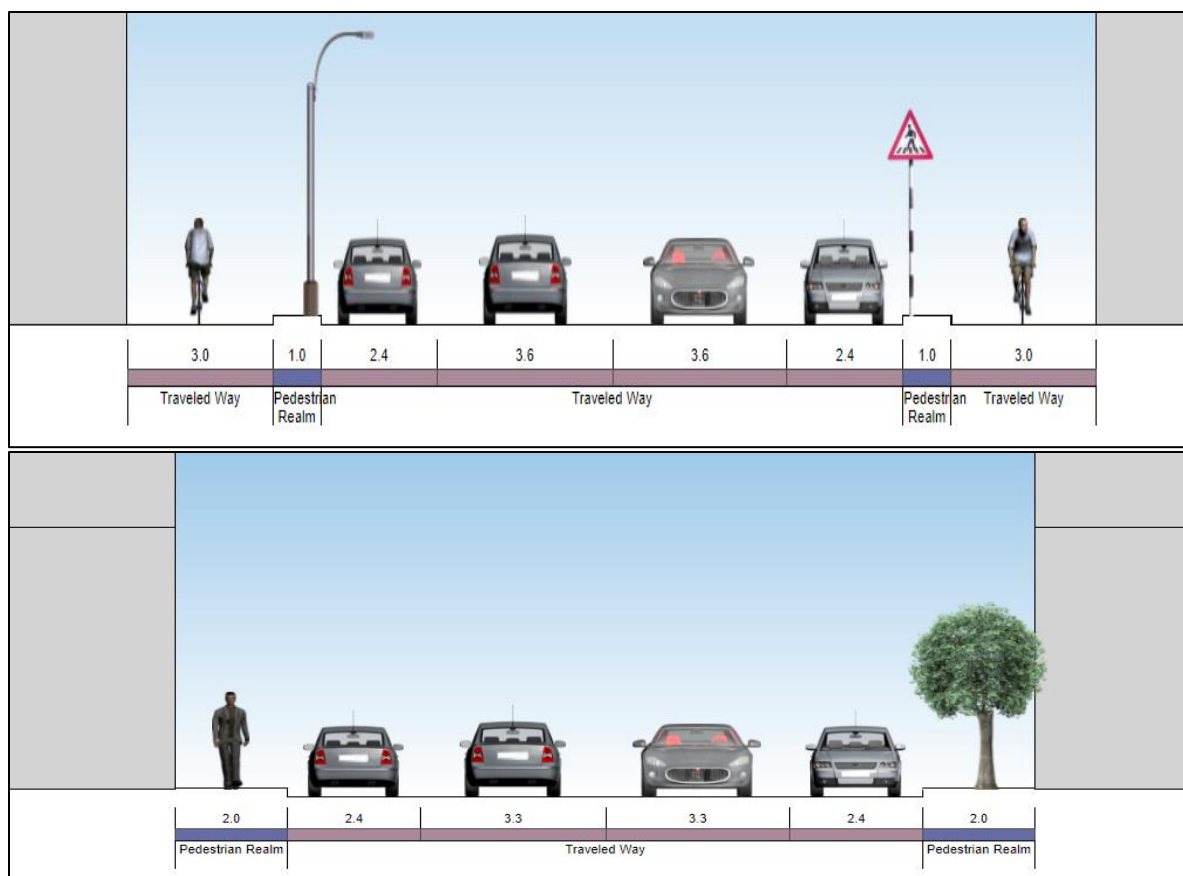


Figure 12: Proposed Road designs for Zongomela Industrial Park in Kahama Municipal Council (Source: Consultant, 2022)

2.6 Project Activities

2.6.1 Mobilization Activities

This is the initial phase of project implementation; this phase will commence when all necessary permits and processes have been accomplished. In this case the required permits are the Environmental certificate from the National Environmental Management Councils (NEMC) and the preparation of environmental and social management plan (ESMP). During this phase the contractor shall recruit all necessary administrative and engineering staff for the project including transportation of construction equipment to the site. Mobilization phase also entails establishment of offices on site, assembling equipment, as well as construction of materials and workforce. The following are the main activities to be executed on the site during Pre- construction phase;

- **Topographical Survey** - Done by Surveyors to establish the boundaries and the ground levels.
- **Hydrology and Hydraulic study** - Done by hydrologists to determine determining design peak flood discharges across project roads. These peak floods will be the basis for the designs of the hydraulic structures with the required capacities (**Appendix VI**).
- **Geotechnical investigations** - done by the geotechnical engineers to determine the physical properties of rock and soil around the site (**Appendix VII**) .

- **Architectural and Services Designs** - Preparation of Architectural drawings was done by Dar Al Handasah in joint venture with Don Consult Ltd architects to provide drawings which fits the Clients' requirements. Architectural Drawings provide in **Appendix IX**.
- **Environmental Impact Assessment (EIA)** - This ESIA report is part of the EIA for the project. It has been prepared according to EIA and Audit regulations of 2005 as amended in 2018.
- **Acquisition of various permits/ certificates** - Including building permit from relevant authorities.

The proposed project will have a total of 100 workers who will be skilled and non-skilled labor.

Duration

- The duration of this phase will be 6 (6) months.

2.6.2 Construction Activities

The major construction activities include excavation of foundation, transportation of the construction materials to the site, concrete work, vertical construction, structural work, installation of electrical and water conduits, finishing work, painting and other minor associated civil works. Main activities of the proposed project during construction will include but not limited to the following:

- Earthworks: This entails excavation of soil / earth to required foundation level, hauling away excavated material and depositing at the designated site for disposal, dewatering of excavated area, protection of excavated sites from falling, backfilling with the excavated material around the foundations and walls, hard-core filling.
- Acquisition and transportation of construction materials from tendered suppliers.
- Concrete works; Steel reinforcement, cutting, bending and fixing, concrete mixing, transportation, vibrating, curing, masonry walling and plastering.
- Roofing of the main structure and other supporting structures like power house, pump house and others.
- Metal and Glass works for the entire structure.
- Electrical installation works; laying of PVC especially for the construction of the market and the mini bus stand, conduits in structural members, electrical wiring and such other related works.
- Plumbing for the market and the mini bus stand and drainage works for all the three proposed facilities; installation of drain pipes, water distribution pipes, water tanks and general plumbing.

Duration

- The duration of this phase will be two (2) year.

Materials to be used for construction phase

The materials that will be used for the construction of the proposed infrastructure at Zongomela Industrial Park includes cement, sand, aggregates, steel reinforcement bars, timber, bricks, roofing sheets, water and sanitary ware; some components like power from TANESCO and water supply

from KUWASA. Most of materials to be used for the proposed building will be sourced from within the district and if not available from within the country (**Table 1**).

Table 1: Types and sources of project requirements during the construction phase

Requirements	Type	Source	Quantity (Approx.)
Raw Materials	Gravel	Mwendakulima, Nyandekwa and Lowa	As per the BOQ
	Hard Stone	Quarry in Zongomela	As per the BOQ
	Sand	Quarries in Zongomela	As per the BOQ
	Water	Dams in Kofija - Mbulu and Bijampola - Zongomela	500,000 L
	Bitumen	Contractors Apshalt plant	As per the BOQ
	Cement	Local Vendors	As per the BOQ
	Reinforcement bars	Local Vendors	60 tons
	Timber	Local Vendors	1-3 tons
Energy	Electricity	TANESCO (National Grid)/ Generators	As per the BOQ
	Fuel	Local vending stations	As per the BOQ
Manpower	Skilled	Contractor	50
	Unskilled	Local People along the road	150
Equipment	Dozer	Contractor	2
	Grader	Contractor	2
	Pay Loader	Contractor	2
	Excavator	Contractor	3
	Vibro Roller	Contractor	1
	Tandem Roller	Contractor	1
	Macadam Roller	Contractor	1
	Tire Roller	Contractor	2
	Dump Truck	Contractor	3
	Mixer Truck	Contractor	2
	Water Truck	Contractor	3
	Tractor w/Trailer	Contractor	2
	Tire crane	Contractor	2
	Cargo Crane Truck	Contractor	1
	Cargo Truck	Contractor	3
	Crusher Plant	Contractor	1
	Screen Unit	Contractor	1

	Concrete Batch Plant	Contractor	2
	Asphalt Plant	Contractor	3
	Asphalt Finisher	Contractor	2
	Asphalt Distributor	Contractor	1
	Air Compressor	Contractor	3
	Generator	Contractor	3
	Fuel Truck	Contractor	1
	Light Vehicle	Contractor	6

(Source: Consultant's analysis, 2022)

The list of materials to be used is in tandem with the **ESS 3 on Resource Efficiency and Pollution Prevention and Management** where raw materials will be sourced from the natural resources which upon their usage will cause pollution to various receiving bodies. As stated in the Environmental and Social Standards applicable to this project, implementation of most of the investment subprojects will involve construction activities that will source raw materials and generate dust, erosion, sediments, solid and liquid wastes that will be properly managed via ESIA's, ESMPs and WMP. More or less similar impacts are likely to be experienced during operation phases and will be managed by the same tools as well as operation and maintenance plans.

Machinery and Equipment

Various equipment and machinery will be used during construction activities at Zongomela Industrial Park as shown in **Table 2**.

Table 2: Types of equipment and machinery to be used during construction:

S/No	Machinery/Equipment	Activity required
<i>Construction Equipment: Type and Characteristics</i>		
1.	Backhoe excavator	General earthworks, e.g., excavation of drains
2.	Bulldozer with ripper	General earthworks
3.	Wheel loader	General earth works and transport of concrete
4.	Motor grader	General grading works, including earth works
5.	Vibrating/sheep foot roller compactor	Compaction works
6.	Truck-mounted crane	Lifting of construction materials e.g., pre-cast culverts
<i>Construction Machines</i>		
1.	Concrete batching plant	Preparation of concrete (batch concrete mixing)
2.	Concrete truck mixer (mobile concrete mixer)	Concrete mixing
3.	Concrete mixer	Concrete mixing
4.	Small site dumper	Transport of construction and waste materials
5.	Quarry dump trucks	Transport of stones and aggregates

6.	Dump trucks	Transport of construction materials and wastes
7.	Concrete batch plant	Concrete mixing in a concentrated way
8.	Equipment for geotechnical investigations	Geotechnical investigation works
9.	Concrete vibrator and poker	Vibrating concrete
10.	Dewatering pump	Dewatering to allow for waterless construction
11.	Generator, mobile workshop, welding facilities	Repair and maintenance of machinery and equipment
<i>Transport Facilities</i>		
1.	Light duty vehicles	Transport of light construction materials, stationery machines, and staff
2.	Water tanker truck	Dewatering of earth surfaces to attain effective compaction, minimizing generation of dust
3.	Dump trucks	Transport of construction materials (sand, gravel, aggregated, cement etc.)

(Source: Consultant's analysis, 2022)

Labour to be used during construction

During construction, there will be manpower need which will comprise of skilled and unskilled labour as described in Table 3.

Table 3: Manpower needed for construction activities in Zongomela Industrial Park

Manpower	Skilled	50	Contractor	Social unrest and conflicts
	Unskilled	150	Local People	

(Source: Consultant's analysis, 2022)

Table 2 is also in tandem with the Environmental and Social Standard (ESS) 2 on Labour and working conditions. A number of project workers will be employed for the implementation of the project including construction of different investment subprojects. Project workers will be provided with information and documentation that is clear and understandable regarding their terms and conditions of employment. The information and documentation will set out their rights under national labor and employment law (which will include any applicable collective agreements), including their rights related to hours of work, wages, overtime, compensation and benefits, as well as those arising from the requirements of this ESS. This information and documentation will be provided at the beginning of the working relationship and when any material changes to the terms or conditions of employment occur.

In order, to ensure fair treatment of workers, the Project will ensure that terms and conditions of employment (hours, rest periods, annual leave, non-discrimination and equal opportunity in recruitment and employment), respect for workers organizations, inclusion of redundancy plans, the prohibition of forced labor and of worst forms of child labor, occupational health and safety,

including use of Personal Protective Equipment (PPE), and operation of a worker grievance mechanism for workers to address employment-related concerns, including sexual harassment, are aligned with the requirements of national law and ESS2. To protect workers, the project will ensure the application and implementation of all appropriate Occupational Health and Safety (OHS) measures, to avoid and manage the risks of ill health, including in relation to COVID-19, accidents and injuries. Labour Management Procedures (LMP) have been prepared to ensure these requirements of ESS2 and national law are observed and included in the specifications for contractors. The project will manage any labor influx and work camps for project workers in accordance with the provisions ESS2 and ESS4. As the situation permits and depending on the public health circumstances, the project will ensure compliance with national law, policies and protocol requirements as well as World Health Organization and World Bank guidance¹ regarding the COVID-19 situation in relation to stakeholder consultations, project worksites and related areas. Table 1 shows the estimated types and the amount of labour forces which will be needed during construction phase.

2.6.3 Demobilization of construction phase

This phase involves activities related to the completion of the construction phase of the proposed project. Activities to be conducted during this phase include demolition of temporal structures that will be installed to support the construction phase, removal of installations and equipment from the workshop and transportation of all remain construction materials from site back to contractor office. Also, all machines used during construction phase will be removed from site. Trees will also be planted at this stage before operation of the infrastructures.

Activities

Demobilization of temporary structures will be done for proper restoration of the site. Other activities including;

- Rehabilitation of the site, workshop and stockpile yard, at least to the original condition;
- Clearance of all sorts of wastes including solid wastes (plastics, wood, metal, papers, etc.);
- Deposit all wastes to the authorized to the authorized dumping site; and
- Termination of temporary employment.

Duration

Demobilization stage will last for a period of three (3) month.

Project Labor Requirements

Types and sources of project requirements during the demobilization phase are shown in Table 4.

¹ World Bank Technical Note: Public Consultations and Stakeholder Engagement in WB-supported operations when there are constraints on conducting public meetings. March 20, 2020; and “ESF/Safeguards Interim Note: COVID-19 Considerations in Construction/Civil Works Projects”, April 7, 2020.

Table 4: Types, amounts and sources of project requirements during the demobilization phase

Requirements	Type	Source	Quantity
Manpower	Skilled	Contractor	12
	Unskilled	Local People	60
Equipment	Motor grader	Contractor	1
	Tippers	Contractor	1
	Plate compactor	Contractor	2

(Source: Consultant's analysis, 2022)

2.6.4 Operation Phase

This will include use of roads, market and the mini bus stand at Zongomela Industrial Park. The duration of use of the proposed project infrastructure is expected to be 30 years.

Activities

The activities that are expected to be executed during operational phase include:

- **Market-** The market facilities shall be open for use by vendors and the public in general.
- **Premises and facilities Maintenance** -The premises and associated facilities will be repaired and maintained regularly during the operational phase of the project. Such activities will include repair of building walls and floors, repairs and maintenance of electrical gadgets and equipment, repairs of refrigeration equipment, repairs of leaking water pipes, painting, maintenance of flower gardens and grass lawns, and replacement of worn out materials among others. This shall be the responsibility of the Council as per Operation and Maintenance Plan.
- **Good housekeeping of the area** - The buildings and other and premises shall be cleaned by a private cleaning firm commissioned by Kahama Municipal Council. Cleaning operations will involve the use of substantial amounts of water, disinfectants and detergents. A garbage collection station shall be within the premises of the market and that cleaning firm and council shall be responsible for collection and disposal to the collection point before being transported to the authorised dumpsite.
- **Occupational health and safety management**-The vendors and market staff shall be instructed on the operation of the equipment installed for safety purposes including appropriate use of fire extinguishers. This shall be the responsibility of the proponent.

Types, Amounts and Sources of Project requirements

Types and sources of project requirements during the operational phase are shown in **Table 5**.

Table 5: Types and sources of project requirements during the operation

Requirements	Type	Source
Water		KUWASA
Energy	Electricity	<ul style="list-style-type: none"> • TANESCO (National Grid) • Standby Generator • Solar Power
Sewerage system		<ul style="list-style-type: none"> • To be constructed

(Source: Consultant's analysis, 2022)

2.6.5 Decommissioning Phase

Since the building lifespan will be 30 years with proper maintenance and service, therefore the activities that will be undertaken are to demolish all structures and propose a completely new structure or different development project. The area may also be used for other activities.

2.7 Waste Generation and Management

2.7.1 During Construction Phase

Major wastes generation associated with the project construction and their treatment/ disposal methods are described in the **Table 6**.

Table 6: Waste Generation and its management during Construction Phase

Type of waste	Sources	Disposal / Management procedure
Debris and Rubble (overburden)	-Site clearance -Excavation for foundation and storm water channel especially for the market and mini	Collected and stockpiled near construction site and to be used as a base material in other construction works. Also, shall be used for site leveling after construction
Biodegradable materials mainly domestic waste (food, paper,	-Construction crew - offices	Collected into area designed for temporary solid waste collection while waiting to be taken to authorized dump site (engage a private company)
Non-biodegradable materials (Plastic, glass, cut	-Construction crew	Collected into special area designed for hazardous waste temporary storage while waiting to be taken by authorized dealers for hazardous waste disposal
Domestic wastewater	Toilets and floor cleaning	Collected into septic tank for management and once it is full cesspit emptier truck will be employed to empty it to final disposal at

Gaseous emission	Trucks delivering construction materials and machines used during compaction	All used machines will be regular serviced its engine for avoiding incomplete fuel burning and used fuel will be one accepted by EWURA of low sulphur contents
Dust emission	Excavation, trucks passing on unpaved road and construction materials at site	Water spray practice shall be employed twice a day for all area where dust emission expected, All stockpiles found at site shall be covered

Source: Field work, January 2022.

2.7.2 Operation Phase

-Solid Wastes

Solid wastes such as waste papers, packaging materials, plastics, oil leakage, market waste and other organic waste (vegetables/food waste) are expected during the operation phase. The project will ensure that all solid wastes are sorted at the source for proper solid waste management. Collected recyclables will be sorted out by type such as papers, bottles, plastics, food and general waste, paper, cardboard, and printer cartridges/ribbons. All decomposable waste will be taken into separate area designated at the market and the mini bus stand before collected by vendors to dump site while plastic bottles will be collected into separate chamber and taken bay authorized dealers for disposal.

-Liquid waste

Generated liquid waste will include domestic wastewater to be generated from washrooms, kitchen and toilets. Domestic wastewater will be directed into onsite septic tank for management and once a septic tank is full cesspit emptier truck will be employed to empty it for final disposal at nearest WSP owned by KUWASA.

-Hazardous waste

During project operation hazardous waste will include electrical equipment like bulb, damaged parts of learning machines for tannery process and other metal waste. Generated hazardous waste shall be collected into special dustbin named for hazardous waste collection into area designed for hazardous waste storage while waiting to be disposed by authorized dealer.

-Storm water management

There will be storm water drains in Zongomela industrial park to accommodate roads, mini bus stand and the market. After the construction phase, the project developer must ensure that the constructed area is covered with concrete pavement to allow storm water flows to the drainage systems more easily.

2.7.3 Decommissioning Phases

In the decommissioning phase much of demolition waste for the market and mini bus stand will be generated, these will be demolished concrete from foundations, mild steels from piping network, electrical and firefighting equipment and some paint remains. The anticipated types of wastes to be generated at this phase are in **Table 7**.

Table 7: Wastes Generated during Decommissioning Phase

S/N	Types of Waste	Management
1	Mild steel	To be sold to authorized dealers registered by NEMC
2	Concrete	reuse for street road maintenance
3	Electrical wires	To be sold to authorized dealers registered by NEMC
4	Timber	Reused as fire wood
5	Plastics	Collected by authorized dealers for recycling
6	Scrap metal	To be collected and sold to authorized dealers for scrap waste management (with permits for scrap wastes collection and disposal)

CHAPTER THREE

POLICY, ADMINISTRATIVE AND LEGAL FRAMEWORK

3.1 Environmental Management Regulation in Tanzania

A clean and safe environment is the constitutional right of every Tanzanian citizen. Regulation on environmental management in the country is mainly vested on two public institutions, the National Environment Management Council (NEMC) and the Division of Environment (DoE) in the office of the Vice President. The NEMC undertakes enforcement, compliance, and review of environmental impact statements whereas the DoE provides the policy formulations and technical back-up and executes the overall mandate for environmental management in the country. The EIA certificate is issued by the minister responsible for environment. There are many policies and pieces of legislation on environmental management in Tanzania, the relevant ones to this project briefly discussed below.

3.2 Policy Framework

Environmental awareness in the country has significantly increased in recent years. The government has been developing and reviewing national policies to address environmental management in various sectors. Among others, the objective of these policies is to regulate the development undertaken within respective sectors so that they are not undertaken at the expense of the environment. The national policies that address environmental management as far as this project is concerned and which form the corner stone of the present study include the following:

3.2.1 National Environmental Policy (NEP) of 2021

Tanzania currently aims to achieve sustainable development through the rational and sustainable use of natural resources and to incorporate measures that safeguard the environment in any development activities. The environmental policy document seeks to provide the framework for making the fundamental changes that are needed to bring consideration of the environment into the mainstream of the decision-making processes in the country. The National Environmental Policy, 2021 serves as a national framework for planning and sustainable management of the environment in a coordinated, holistic and adaptive approach taking into consideration the prevailing and emerging environmental challenges as well as national and international development issues. It is worth noting that, effective implementation of this policy requires mainstreaming of environmental issues at all levels, strengthening institutional governance and public participation in environmental management regime. The long-term vision of this policy is geared towards realization of environmental integrity, assurance of food security, poverty alleviation and increased contribution of the environmental resources to the national economy.

The National Environmental Policy of 2021 replaces the NEP of 1997 whose objective was to provide for the implementation of a range of strategic interventions to address the identified priority areas of environmental concerns by involving Government sectors and other stakeholders. This approach was preferred on the understanding that all stakeholders would take priority actions to address the environmental challenges based on the fact that environment is a cross-cutting issue and as such environmental challenges affect all sectors. In order to implement the Policy, the Government enacted the Environmental Management Act (2004) to provide for legal and institutional framework for sustainable management of the environment. In addition to this, the Government in collaboration with other stakeholders implemented

several strategies, programmes, plans and projects through which the policy objectives were implemented.

The specific objectives of the National Environmental Policy of 2021 are: i) To strengthen coordination of environmental management in sectors at all levels; ii) To enhance environmentally sound management of land resource for socio-economic development; iii) To promote environmental management of water sources; iv) To strengthen conservation of wildlife habitats and biodiversity; v) To enhance conservation of forest ecosystems for sustainable provision of environmental goods and services; vi) To manage pollution for safe and healthy environment; vii) To strengthen the national capacity for addressing climate change impacts; viii) To enhance conservation of aquatic system for sustained natural ecosystem; ix) To ensure safety at all levels of application of modern biotechnology; x) To promote gender consideration in environmental management; xi) To promote good governance in environmental management at all levels; and xii) To ensure predictable, accessible, adequate and sustainable financial resources for environmental management.

3.2.2 The National Land Policy, 1997

The policy recognizes the need for protecting the environmental. It stresses protecting the environment and natural ecosystem from pollution; degradation and physical destruction. Important sections of the policy relevant to the proposed project are section 2.4 (on use of land to promote socio-economic development; section 2.8 (on the protection of land resources), section 3 (iii) and section 4 (on land tenure). This sub-section is relevant and guides the proponents in terms of occupancy, land use and land-use change at the project site. The proposed project implementation shall use existing land which planned for education use and generated waste (solid and liquid) will be managed where septic tank will be used for management of domestic wastewater and wastewater treatment plant will be constructed for treating effluent from workshop training.

3.2.3 The National Policy on HIV/AIDS, 2001

The Policy provides the framework for leadership and coordination of the national multi-Sectoral response to the HIV/AIDS epidemic. This includes the formulation by all sectors of appropriate interventions that are effective in preventing transmission of HIV/AIDS and other sexually transmitted infections, protecting and supporting vulnerable groups and mitigating the social and economic impacts of HIV/AIDS. The project proponent shall observe this policy by introducing awareness raising programme, to protect workers and communities around the project area against HIV/AIDS, also the project contractor will coordinate with the HIV/ AIDs ant-activists.

3.2.4 The National Gender Policy, 2000

The key objective of this policy is to provide guides to ensure that gender sensitive plans and strategies are developed in all sectors and institutions. While the policy aims at establishing strategies to eradicate poverty, it puts emphasis on gender equality and equal opportunity for both men and women to participate in development undertakings and values the role played by each member of society. The project proponent shall ensure equal opportunities at all levels during project implementation including number of employment opportunities will consider gender issues.

3.2.5 National Transport Policy (2003)

The National Transport Policy (NTP) takes cognizance of the fact that fundamental requirement for effective transport system is an institutional framework which ensures that:- i) each fundamental element of transport is provided in the appropriate quality, quantity and form. ii) all elements of transport are combined in a technologically optimum way for each mode of transport iii) each mode is operated in a most efficient way; and iv) appropriate mechanisms exist to ensure effective intermodal coordination and communication between the user, the operator, the regulatory agency and the government on all transport questions and issues. The NTP strives to enhance transit trade by way of improving the infrastructure including facilities of the various transport modes, routes and interface points such as those at transshipments. Similarly, the NTP strives to enhance the other key issues such as security, environmental sustainability and gender.

3.2.6 The National Employment Policy, 2008

To reiterate the afore-stated assertion, the development of our economy has been far from satisfactory. Such development has led to the reduction of employment opportunities and a growing state of not only poverty but also misery especially in rural areas. Based on the National Development Vision 2025, the goal of the National Employment Policy is to achieve full and productive employment for all Tanzanians. The aim of this National Employment Policy is therefore to stimulate an adequate employment growth in our economy, in order to reduce Unemployment and Underemployment rates and eventually attain full, productive, and decent employment for all Tanzanians.

The major aim of this policy is to promote employment, mainly for Tanzania citizens. Relevant sections of this policy are (i) 10, which lays down strategies for promoting employment and section 10.1 is particularly focusing on industry and trade sectors (ii) 10.6 which deals with employment of special groups i.e., women, youth, persons with disabilities and (iii) 10.8 which deals with the tendencies of private industries to employ expatriates even where there are equally competent nationals.

The proponent shall abide by this policy by ensuring gender balance throughout the project implementation and give priorities to local people

3.2.7 The National Sustainable Industries Development Policy (SIDP), 1996-2020

The overall mission of industrial development in Tanzania over the coming two decades will be: to contribute towards the achievement of the overall national long-term development goals as enshrined in the overall national vision; and to enhance sustainable development of the industrial sector.

However, the national goals towards which the industrial sector will be geared include: Human development and creation of employment opportunities; Economic transformation for achieving sustainable economic growth; External balance of payments; Environmental sustainability; and Equitable development.

In order to achieve the above goals, the industrial sector needs to undergo a continuous structural orientation and enhancement of sustainable technologies progress.

Therefore, going hand in hand with the objectives of the policy, the proposed project will help stir up the industrial development for economic growth of the country due to improved and increased infrastructure.

3.2.8 The National Water Policy, 2002

The National Water Policy recognizes that there is a growing scarcity, misuse and wastage of water resources in many places of Tanzania, which may become a serious threat to sustainable availability of the resource. The National Water Policy advocates that industrial performance depends, among other factors, on reliable water supply. However, the growth in the industrial sector has significant impact on water supply, and also in terms of potential pollution and degradation of water resources due to industrial solid wastes and effluents if not properly disposed of but are allowed into water bodies without adequate treatment.

The National water policy requires all water users to avoid contaminating water sources. The policy also supports the application of the “polluter pays principle” and has a specific objective to “have in place water management system which protects the environment, ecological system and biodiversity”.

The proponent shall abide with the policy by using its waste management systems that ensures efficiency of the facility in management of its surrounding environment.

3.2.9 The National Investment Promotion Policy, 1996

The policy encourages investment of all possible commercial and alternative sources of energy with emphasis of utilization of domestic resources with aim of ensuring security and continuity of supplies as well as reducing dependence on biomass fuels. It also promotes adoption of system of production, procurement, transportation, distribution and end-use, which are efficient and not detrimental to the environment.

The National Investment Promotion Policy encourages protection of environment in line with the countries socio-economic policies. Under the policy, investors are required to undertake activities in a manner that best contributes to consumer and environmental protection. The investors are also encouraged to use local raw materials/components where possible.

This study is undertaken to ensure that the project operation abide by the relevant provisions of the policy to ensure compliance with the development.

3.2.10 National Human Settlements Development Policy (NHSDP), 2000

Among the objectives of this policy that touch the project is to improve the level of the provision of infrastructure and social services for the development of sustainable human settlements and to make serviced land available for shelter to all sections of the community. Such infrastructure and services constitute the backbone of urban/rural economic activities. Another objective is environmental protection within human settlements and protection of natural ecosystems against pollution, degradation and destruction. The NHSDP recognizes planning and management of human settlement areas as one of the broad human settlement issues for environmental management. Within this regard, the NHSDP identifies environmental protection as one of the strategic issues in human settlement planning and development. NHSDP also addresses the following issues: Lack of solid and liquid waste management,

leading to environmental deterioration; Emission of noxious gases from vehicles and industrial activities as a major cause of air pollution in urban areas; Encroachment into fragile and hazardous lands (river valleys, steep slopes and marshlands) leading to land degradation, pollution of water sources, etc.; increasing dependence on firewood and charcoal as a main source of energy in human settlements leading to depletion of forest, environmental deterioration and air pollution; and Un-authorized sand mining in river valleys leading to environmental degradation.

The project activities shall be carried out in such a way that pollution of any kind is avoided, and the environment is protected. More-so, for all settlements which will be affected by the proposed project, the proponent will ensure they are rightfully compensated.

3.2.11 The Construction Industry Policy, 2003

This policy promotes among other things, application of cost effective and innovative technologies and practices to support socio-economic development including utilities and ensure application of practices, technologies and products which are not harmful to both the environment and human health. This EIA is undertaken to ensure that the project proponent uses technologies, materials and products not harmful to both the environmental and human health by providing appropriate mitigation measures. The construction team shall abide by this policy by using modern technology during construction but with emphasis on value for money for a cost-effective project.

3.2.12 Small and Medium Enterprises Development Policy, 2003

The Small and Medium Enterprises Development Policy (SMEDP) (URT, 2003) harmonizes the role of informal sector that constitute the bulk of the SMEs in Tanzania. The main objective of the SMEDP is to foster job creation and income generation through promoting the creation of new SMEs and improving the performance and competitiveness of existing ones to increase their participation and contribution to the Tanzania economy” (URT, 2003: 16). The Policy defines SME as entities mainly based on non-farm economic activities in manufacturing, mining, commerce and services, employing between 5 - 99 people with capital investment of Tshs. 5 million to 800 million (*ibid*: 4). The proposed projects Is likely to stimulate growth and spread of SMEs, that may be engaged in a variety of activities, including service provision and employment opportunities.

3.2.13 The National Trade Policy, 2003

In accordance with the National Development Vision 2025, the goal of trade policy is that of raising efficiency and linkages in domestic production and building a diversified competitive export sector as the means of stimulating higher rates of growth and development. Five specific objectives emanate from and reflect this goal. The first specific objective is to stimulate a process of trade development as the means of triggering higher performance and capacity to withstand intensifying competition within the domestic market. This includes the establishment of improved physical market-place infrastructure and stimulating dissemination of market information and increasing access to the market. The second objective involves economic transformation towards an integrated, diversified and competitive entity capable of participating effectively in the MTS. The third objective entails the stimulation and

encouragement of value-adding activities on primary exports as a means of increasing national earnings and income flows even on the basis of existing output levels. Fourth is the stimulation of investment flows into export-oriented areas in which Tanzania has comparative advantages as a strategy for inducing the introduction of technology and innovation into production systems as the basis for economic competitiveness. The fifth objective is the attainment and maintenance of long-term current account balance and balance of payments through effective utilization of complementarities in regional and international trading arrangements as a means of increasing exports combined with initiatives for higher efficiency in the utilization of imports. The ultimate target is to enhance income generation and the people's earning power at the grass-roots level as the key to poverty reduction in fulfilment of the fundamental human right of equal opportunity for all citizens as enshrined in the constitution of the United Republic of Tanzania. The proposed project is likely to facilitate trading activities as they are important infrastructure that help in increasing accessibility and fast movement between producers and consumers.

3.2.14 The National Economic Empowerment Policy, 2004

The National Economic Empowerment Policy of 2004 provides general guidelines which will ensure that the majority of the citizens of Tanzania have access to opportunities to participate effectively in economic activities in all sectors of the economy. In this regard, sector policies will give preferential treatment to nationals where necessary so as to enhance their bargaining position and opportunities. Among others, the Policy focuses on: - Improving efficiency in public service delivery; Raising skills and knowledge levels; Strengthening economic infrastructure and involving Tanzanians in infrastructure development; Encouraging and strengthening the development of cooperatives; Using land as a springboard to accelerate empowerment; and establishing a sound institutional framework for managing and supervising the implementation of the National Economic Empowerment Policy. Aligning with this policy, the proponent shall ensure that the local people in the proposed project area are given priority and equal opportunity when it comes to employment along with making sure the proposed project bring a positive impact by stimulating the city's economic development.

3.2.15 The Tanzania 2025 Development Vision

The Tanzania Vision 2025 aims at achieving a high-quality livelihood for its people attain good governance through the rule of law and develop a strong and competitive economy. Specific targets include:

1. A high-quality livelihood characterized by sustainable and shared growth (equity), and freedom from abject poverty in a democratic environment. Specifically, the Vision aims at: food self-sufficiency and security, universal primary education and extension of tertiary education, gender equality, universal access to primary health care, 75% reduction in infant and maternal mortality rates, universal access to safe water, increased life expectancy, absence of abject poverty, a well-educated and learning society.
2. Good governance and the rule of law moral and cultural uprightness, adherence to the rule of law, elimination of corruption.
3. A strong and competitive economy capable of producing sustainable growth and shared benefits a diversified and semi-industrialized economy, macro-economic stability, a

growth rate of 8% per annum, adequate level of physical infrastructure, an active and competitive player in regional and global markets.

This proposed project is one of the most important agents to enable Tanzania achieve its Development Vision objectives (both social and economic), such as improving transport of passengers and quality of goods and services as well as working environment.

3.2.16 The Construction Policy, 2003

This policy promotes among other things, application of cost effective and innovative technologies and practices to support socio-economic development including utilities and ensure application of practices, technologies and products which are not harmful to both the environment and human health. This EIA is undertaken to ensure that the project proponent uses technologies, materials and products not harmful to both the environmental and human health by providing appropriate mitigation measures. The construction team shall abide by this policy by using modern technology during construction but with emphasis on value for money for a cost-effective project.

3.3 Legal Framework

This section addresses the legal and regulatory conditions that are relevant to the proposed project that shall be complied by Developer.

3.3.1 The Environment Management Act No.20, 2004

The Act provides legal and institutional framework for sustainable management of the environment in the implementation of the National Environmental Policy. It gives mandate to the National Environmental Management Council (NEMC) to undertake enforcement, compliance, review and monitoring of environmental impact assessments and the Division of Environment to coordinate and oversee its implementation; therefore, in complying with provision of this Act, the proponent is undertaking this EIA study in accordance with EIA and EA regulation.

3.3.2 The Land Act of 1999 Cap 113 R: E 2019

The Act among other issues provides for the administration of land, the role of local government in land administration, land allocation and occupation. It contains provisions of critical environmental importance. One of important fundamental principles of the Act is to ensure that land is used productively and that any such use complies with the principles of sustainable development. Therefore, the project will be erected in the land designated for education building purposes only, during construction the environmental management systems will be adhered accordingly where all measures shall apply to control all generated impacts.

3.3.3 The Occupational Health and Safety Act No. 5, 2003

This Act provide for the protection of human health from occupational hazards. It requires the employer to ensure the safety of workers by providing personal protecting gears at work place. It specifically demands: the provision of regular medical examination of employees, safe means of access and safe working place; prevention of fire; supply of clean and safe water to workers; sanitary convenience; washing facilities, first aid kit with recommended facilities and trained first aider will be provided at the site. Proponent ensure that he will observe the requirement of the Act, where firstly he will register a working place at OSHA and procedures for acquiring a compliance certificate will be followed during project operation.

3.3.4 The HIV and AIDS (Prevention and Control) Act, 2008

The Act provides for prevention, treatment, care, support and control of HIV and AIDS for promotion of public health in relation to HIV and AIDS. The Act also requires, provisions for appropriate treatment, care and support to people living with or at risk of HIV and AIDS. It requires the employer in consultation with the Ministry of health to establish and coordinate a workplace program on HIV and AIDS for employees under his control and such program to include provision of gender responsive HIV and AIDS education, distribution of condoms and support people living with HIV and AIDS. The project proponent / contractor will adhere with this Act by ensure that their workers will be aware of HIV /AIDs and other STDs, where special programmes about HIV will be provided.

3.3.5 The Environment Impact Assessment and Audit Regulation, G.N No. 349, 2005 as Amended in 2018

The EIA and Audit Regulation (G.N. No. 349) 2005 provides guidance on how the Environmental Impact Assessment should be carried out. It prescribes the procedure to be followed in carrying out the environmental assessment and provides the format for the preparation of the environmental impact statement. The Regulations prohibit the project proponent (including Kahama Municipal Council) from undertaking any construction project without carrying out an EIA study required under the Environmental Management Act. This study has been prepared in line with EIA and Audit Regulations of 2005.

3.3.6 Environmental Management (solid waste management) Regulations 2009

This Act has been made to control a facility or premises which generates waste to minimize the waste generated by adopting the following cleaner production principles: -

- (a) Improvement of production process through conserving raw materials and energy by:
 - (i) Eliminating the use of toxic construction materials within such times as may be prescribed by the Minister; and
 - (ii) Reducing toxic emissions and wastes to a level prescribed in the applicable national environmental quality standards.
- (b) Monitoring the product cycle from beginning to end by-
 - (i) Identifying and eliminating potential negative impacts of the product,
 - (ii) Enabling the recovery and re-use of the product where possible; and
 - (iii) Reclamation and recycling.

The Act also requires any person intending to operate a hazardous waste treatment plant or disposal site or facility to apply to the Director of Environment for a license. The Project proponent will comply with this regulation by ensuring proper environmental management system within the project site during construction activities and operations of a project, where any generated hazardous waste shall be collected at a temporary storage area before disposed by authorized dealer.

3.3.7 Environmental Management Act (Air Quality Standards) Regulations, 2007

These regulations have been made under sections 140, 145 and 230 (2) (s) of the Environmental Management Act, 2004. They are aimed at setting minimum standard of air quality as well as prohibit emission of hazardous substances, chemicals and materials or gas. They also provide for emission limits, highest permissible quantity (emission), and special tolerance limits of emissions from special project which exhaust emissions.

The project proponent will be abiding by these regulations including adhering to permissible weight concentration (Emission limits) to the atmosphere as set out in the first schedule of the regulations.

3.3.8 Environmental management (Standards for Control of Noise and Vibrations pollution) Regulations, 2015

The objectives of these Regulations shall be to;

- (a) Ensure the maintenance of a healthy environment for all the people in Mainland Tanzania by regulating noise and vibration levels,
- (b) Prescribe the maximum permissible noise and vibration levels from a facility or activity to which a person may be exposed,
- (c) Ensure protection of human health and the environment from various sources of noise and vibration pollution

Also, section 7 (1) of the Act says; no person shall made or cause to make any loud, unreasonable, unnecessary or unusual noise that annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and that of the environment.

3.3.9 Environmental Management (Solid Waste Management) Regulations 2016

These regulations have been made to control a facility or premises which generates waste to minimize the waste generated by adopting the following cleaner production principles: -

- (a) Improvement of production process through conserving raw materials and energy by:
 - (i) Eliminating the use of toxic raw materials within such times as may be prescribed by the Minister; and
 - (ii) Reducing toxic emissions and wastes to a level prescribed in the applicable national environmental quality standards.
- (b) Monitoring the product cycle from beginning to end by-
 - (i) Identifying and eliminating potential negative impacts of the product,
 - (ii) Enabling the recovery and re-use of the product where possible; and
 - (iii) Reclamation and recycling.

The Act also requires any person intending to operate a hazardous waste treatment plant or disposal site or facility to apply to the Director of Environment for a license.

Project proponent shall comply with this regulation by ensuring proper environmental management especially proper solid waste management where a temporary solid waste collection chamber will be constructed, sorting of solid waste will be done at site.

3.3.10 The Urban Planning (Use Groups and Use Classes), Regulations 2018

For the purposes of planning and the control of land use development, all uses of land and buildings are categorized in the use groups and use classes in the First Schedule

4 (1) The planning authority may, under special permissible circumstances (Second Schedule); permit any use not classified under a separate use class in these regulations provided that such use is in the public interest.

5 (1) The making of any change of use of any land or buildings from a purpose within any use class prescribed under Part I of these Regulations to the use thereof for any other purpose within the same use class shall not be deemed to be "development" as defined in section 2 of the Act

6 (1) Change of land uses shall aim the following: -

- (a) to maximize use of land and the existing infrastructure;

- (b) to control urban sprawl;
- (c) to allow for new investment;
- (d) to create employment and income opportunities;
- (e) to increase the number of good shelters; and
- (f) to improve the environment.

3.3.11 The Urban Planning Act, 2007

The Act provides for control of urban and sub rural development while implementing a project for land development. Important aspects include the designation and allocation of adequate land for solid waste disposal in any urban and sub rural areas. The law empowers local authorities to enforce such schemes and punishments as stipulated in the Act. The law further empowers neighbors and any individual to take to court anyone who injuriously affects others due to his/her unhygienic activities.

Urban Planning Act, 2007 stipulates that in planned areas, the construction of any building should start when the building permit has been issued by responsible land office. This permit will be issued after the site plan has been approved by City, Municipal or Town planner The Architectural plans with sanitation drawings need to be approved by an Engineer, an Architect and Health officer. Through this process, the issues of accessibility in case of emergency, emergency exits, proper ventilation and health and hygiene issues are usually taken seriously before the approval. Therefore, the proposed project is approved by the authority that is the Kahama municipal Council and therefore it is in line with the objectives of this law. The project proponent will observe good solid and liquid waste disposal practice as required by the Act

3.3.12 The Land Transport Regulatory Authority Act, 2019

This is an Act to make provisions for the establishment of Land Transport Regulatory Authority, to regulate land transport sector, to repeal the Surface and Marine Transport Authority and for related matters. The Act establishes functions of the Authority which are: (a) to perform the functions conferred on the Authority; by sector legislation; (b) to issue, renew and cancel permits or licenses; (c) subject to sector legislation to-(i) establish standards for regulated goods and regulated services; (ii) establish standards for the terms and conditions of supply of the regulated goods and services; and (iii) regulate rates and charges; (d) to coordinate land transport safety activities; (e) to register crew and certify drivers of regulated sector; (f) to certify worthiness of rolling stock and road worthiness of public service vehicles and goods vehicles; (g) to monitor the performance of the regulated sectors including- (i) levels of investment; (ii) availability of safe, quality and standards of services; (iii) cost of services; (iv) efficiency of production and distribution of services; and (v) other matters relevant to the Authority; (h) to facilitate resolution of complaints and disputes; (i) to disseminate information about matters relevant to the functions of the Authority; (j) to consult with other regulatory authorities or bodies or institutions discharging functions similar to those of the Authority in Mainland Tanzania or elsewhere; and (k) to perform such other functions as may be conferred on the Authority by this Act or any other law. (2) In the performance of its functions, the Authority shall not award or cancel a license having a term of five or more years without prior consultation with the Minister and the relevant sector Minister. (3) The Minister may, for the purposes of securing the effective performance by the Authority of its functions, give to the Authority directions of a specific or general character.

3.3.13 The Environmental Management (Registration and Practice of Environmental Experts) Regulations, 2021

The Regulations applies to registration, categorization, practicing and conduct of environmental experts and firms of environmental experts registered and certified under these Regulations to conduct- (a) environmental impact assessment; (b) environmental audit; or (c) any other environmental study that may be required to be undertaken under the Act or its Regulations. The objectives of these Regulations are to- (a) establish a system of registration, categorization and practicing of environmental experts; (b) provide for qualifications for persons who may conduct environmental studies; (c) provide for a system of nurturing competence, knowledge and consistence of environmental experts in the carrying out of environmental impact assessment and environmental audits; and (d) provide for a code of conduct, discipline and control of environmental experts.

3.3.14 The Land Use Planning Act, 2007

The Act provides for the procedures for the preparation, administration, and enforcement of land use plans; to repeal the National Land Use Planning Commissioning Act, and to provide for related matters. Among the objectives of the Act as given in Section 4 are to facilitate the orderly management of land use and to promote sustainable land-use practices. This proposed project aligns with the provisions of this act, any infringement on existing land use shall need a consultation with land use planning authorities.

3.3.15 Environmental Management Act (Air Quality Standards) Regulations, 2007

These regulations have been made under sections 140, 145 and 230 (2) (s) of the Environmental Management Act, 2004. They are aimed at setting minimum standard of air quality as well as prohibit emission of hazardous substances, chemicals and materials or gas. They also provide for emission limits, highest permissible quantity (emission), and special tolerance limits of emissions from special project which exhaust emissions.

The project proponent will be abiding by these regulations including adhering to permissible weight concentration (Emission limits) to the atmosphere as set out in the first schedule of the regulations.

3.3.16 Fire and Rescue Act (2007)

According to the Act, among others, the functions of the force are to: *‘(a) Extinguish fire (b) grade cities, municipalities, townships and villages into various fire and rescues services levels (c) conduct fire inspection and investigations for purposes of obtaining information relating to the causes of fire and loss inflicted by fire (d) Conduct studies on investigation of arson and accidental fire (e) Conduct training for fire department personnel, other officers and voluntary fire fighters (f) Prepare fire statistics and fire service information (g) Conduct fire tests on protection facilities, equipment and materials’*. In section 3(1) (g) it covers premises of facility used as a place for storage flammable liquids, gas or chemicals. The Act also obliges the owners and managers of the structures to set aside places with free means of escape, and install fire alarm and detection systems, or such other escape and rescue modalities in the event of fire. IMC shall take onboard all the requirements of this legislation during both phases of the project.

3.3.17 The Companies Act Cap 212 R.E 2019

The amendment of the Companies Act (Cap. 212) provides that any company that intends to promote commerce, investment, trade or any other activity as the Minister may, by notice published in the Gazette, prescribe, shall be incorporated or registered under this Act.

Therefore, all companies that will be involved in this proposed project must adhere to this Act to ensure the projects smooth undertaking.

3.3.18 Public Health Act 2009

An Act provide for the promotion, preservation and maintenance of public health with the view to ensuring the provision of comprehensive, functional and sustainable public health services to the general public and to provide for other related matters. Section 66 of the Act state that *“(1) A building or premises shall not be erected without first submitting the plans, sections and specifications of the building site for scrutiny on compliance with public health requirements and approval from the Authority. (2) A building or premises or its part or any structure shall not be occupied until a certificate of occupancy has been granted. (3) The provisions of subsections (1) and (2) shall not apply to the dwelling houses in the rural areas or houses erected in urban which have been recognized as such under the Squatter Upgrading Programme.”* Section 54 of this law states that *"A person shall not cause or suffer from nuisance, likely to be injurious or dangerous to health, existing on land, premises, air or water"* The provisions of this act shall be obeyed during all phases of the project.

3.3.19 The Engineers Registration Act,1997

This Act establishes an Engineering Registration Board (ERB) which regulates the conduct of engineers, to provide for their registration and for related matters. The Act provides restriction that no person other than a registered engineer shall engage in professional engineering work or services which includes professional service consultation, planning, designing or responsible supervision of construction or operation in connection with any public or privately owned public utilities, buildings, machines, equipment, processes, works or projects where public interest and welfare, or the safeguarding of life, public health or property is concerned or involved, and that requires application of engineering principles and data. Furthermore, the Act stipulates that no person shall employ or continue to employ - any engineer who is not a registered as a professional engineer.

The developer abides to the Act by assigning the registered engineers to carry out the engineering activities and guidance to the completion of the project. The proponent shall engage qualified engineers so as to observe the provisions of the Act when executing its activities. Laws require any foreigner engineer to register with ERB before practicing in the country. Foreign engineers working with this project shall abide to the law requirement.

3.3.20 The Water Supply and Sanitation Act, 2019

This Act to provide for sustainable management and adequate operation and transparent regulation of water supply and sanitation services; to provide for the establishment of water supply and sanitation authorities, Rural Water Agency, National Water Fund and Community based water supply organizations; to provide for appointment of service providers, repeal of the Water Supply Act, 2009 and Dar es Salaam Water and Sewerage Authority Act, 2001 and to provide for related matters. Water supply authorities are duty bound to enter into a trade waste agreement for the discharge of waste into a sewerage system, to prohibit the discharge of certain wastes into sewerage a system. The Act creates the offence of willfully or negligently damaging water works, any sewer, sewerage treatment plant or other assets of water supply

authorities. Any person who unlawfully diverts or takes water from the water works also commits an offence.

The proponent will abide to the given provisions by making sure all sewage produced and any other waste is well contained in the designed facilities and once full are properly disposed through contractors to the designated areas. Also, the proponent shall ensure all water used in the project is accounted for and the water sources and supply infrastructures are protected. All this is to ensure the environment becomes sustainable to all living beings at neighborhood of the proposed project.

3.3.21 Workers Compensation Act (2008)

An Act to provide for compensation to employees for disablement or death caused by or resulting from injuries or diseases sustained or contracted in the course of employment; to establish the Fund for administration and regulation of workers' compensation and to provide for related matter. The Act applies to all employers and employees, including those in the public service, as well as those employed on a Tanzania ship or aircraft. The Act applies to mainland Tanzania.

3.3.22 Architects and Quantity Surveyors Act, 1997

An Act to establish the Board to regulate the conduct of Architects, Quantity Surveyors, Architectural and Quantity Surveying firms, to provide for their registration and for related matters. This Act was enacted by the parliament to provide for establishment of a board to regulate the conduct of Architects and Quantity surveyors and architectural and quantity surveying consulting firms in Tanzania.

The board is vested with powers to inspect premised or construction sites to verify whether the rules and regulations of carrying out construction projects are adhered by consulting firms. This is aimed at ensuring that appropriate professionals who are registered by the board are involved in undertaking works as required by the law.

This Act has direct implications to the proposed project and thus the proponent has hired registered Architects and Quantity Surveyors when preparing the drawings of the proposed project. Therefore, the proponent abides by this Act.

3.3.23 Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations, 2018

Based on Regulation No. 6(1) of the Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations G.N. No. 474 of 2018, the project falls under Type B2 of the third schedule of the regulations on which EIA shall be undertaken and can be done. This report has been prepared with reference to Regulation No. 6(1) of the Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations G.N. No. 474 of 2018, as a one step toward integrating Environmental concerns into development processes for sustainable development.

In this regard, proponent shall abide by the relevant provisions given in the Regulation. Being aware of the above, Proponent commissioned Rosemary C. Nyirenda to carry out the

Environmental Impact Assessment and submit an Environmental Impact statement report to the Council for review as Environmental Management Act, 2004 requires.

3.3.24 Environmental Management (Soil Quality Management) Regulations, 2007

The object of these Regulations is to:

- a) Set limits for soil contaminants in agriculture and habitat;
- b) Enforce minimum soil quality standards prescribed by the National Environmental Standards Committee;
- c) Prescribe measures designed to maintain, restore and enhance the sustainable productivity of the soil;
- d) Prescribe minimum soil quality standards to maintain, restore and enhance the inherent productivity of the soil in the long term;
- e) Enforce minimum soil standards prescribed by the National Environmental Standards Committee for such purposes as agricultural practices;
- f) Ensure implementation of criteria and procedures prescribed by the National Environmental Standards Committee for the measurement and determination of soil quality;
- g) Prescribe measures and guidelines for soil management; and
- h) Ensure compliance with any such measures and guidelines for soil management that may be prescribed by the minister.

The proposed project may result to soil pollution in one way or another due to several activities. In this regard, proponent shall be required to properly handle all the oil spills during the operations or any other activities that will result to soil pollution.

3.3.25 Environmental Management (Control of Ozone Depleting Substances) Regulations, 2007

These Regulations shall apply to:

- a) All persons dealing or otherwise handling or using controlled substances or products that contain, is made with or is dependent on, or designed to contain chemical substances that have the potential to destroy ozone molecules in the stratosphere and includes the products listed in the First Schedule to these Regulations;
- b) Every importer and distributor of ozone depleting substances;
- c) Every importer of technology which uses ozone depleting substances;
- d) Every company and individual who services refrigerators, air conditioners including mobile and other ozone depleting substances technologies;
- e) Every company or an individual using or servicing fire extinguishers.

The project proponent will abide to the given regulation to make sure ozone is protected from any ozone depleting substance.

3.3.26 Environmental Management (Water Quality Standards) Regulations of 2007

Part I of this regulation Section (3) provides the objectives the following objectives;

- a) Protect human health and conservation of the environment;
- b) Enforce minimum water quality standards prescribed by the National Environmental Standards Committee;

- c) Enable the National Environmental Standards Committee to determine water usages for purposes of establishing environmental quality standards and values for each usage; and
- d) Ensure all discharges of pollutants take account the ability of the receiving waters to accommodate contaminants without detriment to the uses specified for the waters concerned.

However, Part III of this regulation gives the prohibitions and prescribed minimum water quality standards.

The proponent shall protect water sources from any kind of pollution by having well organized and designed structures to ensure all the operations are compliant to this regulation provided.

3.3.27 The Environment Management (Prohibition of Plastic Carrier Bags) Regulations, 2022

The Environment Management (Prohibition of Plastic Carrier Bags and Plastic Bottle Cap Seals) Regulations of 2022 shall apply to (a) the import, export, manufacturing, sale, supply, storage and use of plastic carrier bags within Mainland Tanzania; and (b) the import, export, manufacturing, sale and use beverages with plastic bottle cap seal. The objectives of these Regulations are to: (a) impose a total ban on the import, export, manufacturing, sell or offer for sale and use of plastic carrier bags regardless of their thickness; (b) impose a total ban on the import, export, manufacturing, sale and use beverages with plastic bottle cap seal; (c) protect human and animal health as well as the environment from likely adverse effects of utilization of plastic carrier bags, or plastic bottle cap seals; and (d) provide economic and financial incentives for the production and importation of alternative carrier bags. Part III Section 5 (Prohibition of plastic carrier bags) states that “All plastic carrier bags, regardless of their thickness are prohibited from being imported, exported, manufactured, sold, stored, supplied and used in Mainland Tanzania” and Section 6 (Prohibition of plastic bottle cap seals) states that a person shall not import, export, manufacture, store, distribute, supply, sell or offer for sale beverages with plastic bottle cap seals.

Part IV Section 10 (Exemption of plastic packaging) states that without prejudice to the provisions of regulation (5), plastic or plastic packaging for medical services or industrial products or construction industry or agricultural sector or food processing or sanitary and waste management are exempted from the prohibition. Section 11 (Management of waste exempted plastic packaging) provided that any person who imports, exports, manufactures, sells, stores, distributes, supplies, possesses or uses plastic packaging exempted under these Regulations shall ensure that the waste exempted plastic packaging are managed and disposed of in accordance with the Environmental Management (Solid Waste Management) Regulations, 2009 and the Environmental Management (Hazardous Waste Control and Management) Regulations, 2021.

The proponent shall see to it that the contractor for the proposed project ensures all the plastic waste materials are well managed i.e., that is collected, stored and disposed of properly in accordance to the NEMC guidelines.

3.4 World Bank Environmental and Social Framework (ESF)

3.4.1 World Bank Environmental and Social Standards (ESS)

The World Bank's Environmental and Social Framework sets out the Bank's commitment to sustainable development, through a Bank Policy and a set of Environmental and Social standards that are designed to support Borrowers' projects, with the aim of ending extreme poverty and promoting shared prosperity. The E&S Framework comprises of: (1) Vision for Sustainable Development, which sets out the Bank's aspirations regarding environmental and social sustainability; (2) The World Bank Environmental and Social Policy for Investment Project Financing, which sets out the mandatory requirements that apply to the Bank; and (3) The Environmental and Social Standards, together with their Annexes, which set out the mandatory requirements that apply to the Borrower and projects.

The World Bank Environmental and Social Policy for Investment Project Financing sets out the requirements that the Bank must follow regarding projects it supports through Investment Project Financing. The Environmental and Social Standards set out the requirements for Borrowers relating to the identification and assessment of environmental and social risks and impacts and mitigation measures associated with projects supported by the Bank through Investment Project Financing. The E&S standards are expected to: (a) support Borrowers in achieving good international practice relating to environmental and social sustainability, (b) assist Borrowers in fulfilling their national and international environmental and social obligations; (c) enhance non-discrimination, transparency, participation, accountability and governance; and (d) enhance the sustainable development outcomes of projects through ongoing stakeholder engagement. The ten ESSs as per the WB ESF are: ESS 1: Assessment and Management of Environmental and Social Risks and Impacts; ESS 2: Labor and Working Conditions; ESS 3: Resource Efficiency and Pollution Prevention and Management; ESS 4: Community Health and Safety; ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement; ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; ESS 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities; ESS 8: Cultural Heritage; ESS 9: Financial Intermediaries; and ESS 10: Stakeholder Engagement and Information Disclosure. Given the nature of activities of this project, with the exception of ESS 9: Financial Intermediaries almost all the ESSs will be relevant.

Environmental and Social Standard ESS1 applies to all projects for which Bank Investment Project financing is sought. ESS1 establishes the importance of: (a) the Borrower's existing environmental and social framework in addressing the risks and impacts of the project; (b) an integrated environmental and social assessment to identify the risks and impacts of a project; (c) effective community engagement through disclosure of project-related information, consultation and effective feedback; and (d) management of environmental and social risks and impacts by the Borrower throughout the project life cycle. The Bank requires that all environmental and social risks and impacts of the project be addressed as part of the environmental and social assessment conducted in accordance with ESS1. ESS2–10 set out the obligations of the Borrower in identifying and addressing environmental and social risks and impacts that may require particular attention based on the proposed project activities. The World Bank Access to Information Policy, which reflects the Bank's commitment to transparency, accountability and good governance, applies to the entire Framework and includes the disclosure obligations that relate to the Bank's Investment Project Financing. Borrowers and projects are also required to apply the relevant requirements of the World Bank Group Environmental, Health and Safety Guidelines (EHSGs). These are technical reference

documents, with general and industry specific examples of Good International Industry Practice (GIIP).

According to the TACTIC ESMF the proposed sub projects will apply the Environmental and Social Standards as described in **Table 8**.

Table 8: Application of World Bank's ESSs to the TACTIC Project

ESSs	Yes/No	Application
ESS 1: Assessment and Management of Environmental and Social Risks and Impacts	Yes	The Project will exert site-specific environmental and social impacts which will be managed through this ESMF. Site-specific ESIA and ESMPs will be prepared to recommend E&S measures to be incorporated into designs of the specific subprojects.
ESS 2: Labor and Working Conditions	Yes	<p>A number of project workers will be employed for the implementation of the project including construction of different investment subprojects. Project workers will be provided with information and documentation that is clear and understandable regarding their terms and conditions of employment. The information and documentation will set out their rights under national labor and employment law (which will include any applicable collective agreements), including their rights related to hours of work, wages, overtime, compensation and benefits, as well as those arising from the requirements of this ESS. This information and documentation will be provided at the beginning of the working relationship and when any material changes to the terms or conditions of employment occur.</p> <p>In order, to ensure fair treatment of workers, the Project will ensure that terms and conditions of employment (hours, rest periods, annual leave, non-discrimination and equal opportunity in recruitment and employment), respect for workers organizations, inclusion of redundancy plans, the prohibition of forced labor and of worst forms of child labor, occupational health and safety, including use of Personal Protective Equipment (PPE), and operation of a worker grievance mechanism for workers to address employment-related concerns, including sexual harassment, are aligned with the requirements of national law and ESS2. To protect workers, the project will ensure the application and implementation of all appropriate Occupational Health and Safety (OHS) measures, to avoid and manage the risks of ill health, including in relation to COVID-19, accidents and injuries. Labour Management Procedures (LMP) have been prepared to ensure these requirements of ESS2 and national law are observed and included in the specifications for contractors. The project will manage any labor influx and work camps for project workers in accordance with the provisions ESS2 and ESS4. As the situation permits and depending on the public health circumstances, the project will ensure compliance with</p>

ESSs	Yes/No	Application
		national law, policies and protocol requirements as well as World Health Organization and World Bank guidance ² regarding the COVID-19 situation in relation to stakeholder consultations, project worksites and related areas.
ESS 3: Resource Efficiency and Pollution Prevention and Management	Yes	Implementation of most of the investment subprojects will involve construction activities that will generate dust, erosion, sediments, solid and liquid wastes that will be properly managed via ESIA, ESMPs and WMP. More or less similar impacts are likely to be experienced during operation phases and will be managed by the same tools as well as operation and maintenance plans.
ESS 4: Community Health and Safety	Yes	<p>Construction activities (excavation, vehicle operations, work at height, use of chemicals, use of crane or other heavy equipment etc.) may have irreversible effects of disability or fatality to community. Localized negative impacts (like dust emissions, accidents, etc.) to sensitive receptors such as schools, religious buildings and community centers will need to be managed. The Project will require Contractors to prepare appropriate plans for emergency preparedness and response, management and safety of hazardous materials, traffic and road safety, security personnel, etc. as per the requirement of ESS4.</p> <p>Implementation of the Project is likely to trigger influx of workers or job seekers and their followers into a sub-project areas. If a significant labor influx does occur, the project will develop and implement a Labor Influx Management Plan in line with ESS2, ESS4 and other provisions of the ESF. The project workforce could facilitate an increase in the transmission of HIV and other communicable diseases to members of the local/host communities during implementation of the sub-projects. Specific measures to address GBV risks are presented in section 3.11 and the Project GRM in section 4 will be implemented.</p> <p>As the situation permits and depending on the public health circumstances, the project will ensure compliance with national law, policies and protocol requirements as well as World Health Organization and World Bank guidance³ regarding the COVID-19 situation in relation to stakeholder consultations, project worksites,</p>

² World Bank Technical Note: Public Consultations and Stakeholder Engagement in WB-supported operations when there are constraints on conducting public meetings. March 20, 2020; and “ESF/Safeguards Interim Note: COVID-19 Considerations in Construction/Civil Works Projects”, April 7, 2020.

³ World Bank Technical Note: Public Consultations and Stakeholder Engagement in WB-supported operations when there are constraints on conducting public meetings. March 20, 2020, and “ESF/Safeguards Interim Note: COVID-19 Considerations in Construction/Civil Works Projects”, April 7, 2020.

ESSs	Yes/No	Application
		communities and related areas.
ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Yes	<p>Land acquisition, restrictions on land use and involuntary resettlement are likely during the implementation of the Project. The RPF will provide guidance on RAP preparation.</p> <p>The project shall try to minimize land acquisition and any associated physical or economic resettlement wherever possible especially during detailed engineering designs for roads, drains, and other community facilities to be upgraded/constructed.</p>
ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	Yes	<p>No sub-projects will be financed inside or near protected areas and sensitive habitats. Sub-projects will be screened for potential direct and indirect impacts on natural habitats.</p> <p>In case the project will purchase natural resources commodities such as timber, it will be important to establish the source area and to have a mechanism in place to ensure that the Primary Suppliers are not significantly impacting sensitive ecosystem or degrading natural habitats.</p>
ESS 7: Indigenous People/Sub-Saharan African Historically Underserved Traditional Local Communities	No	Relevance of this ESS will further be assessed during project preparation as part of the ESIA process and as we get more information and clarity especially about selected and confirmed locations and sites for project implementation.
ESS 8: Cultural Heritage	Yes	The Project will be implemented in 45 LGAs, all with different cultural backgrounds. Elements of cultural heritage are found in some of the ULGAs such that there is potential for cultural heritage resources to be found unexpectedly (chance finds) and screening of subproject sites to avoid impacts on cultural heritage during construction. Chance finds procedures will be included in the Specifications for the contracts.
ESS 9: Financial Intermediaries	No	This ESS is not relevant to the Project.

ESSs	Yes/No	Application
ESS 10: Stakeholder Engagement and Information Disclosure	Yes	A Stakeholder Engagement Plan (SEP) has been prepared to guide implementing agencies on how to provide stakeholders with timely, relevant, understandable and accessible information, and consult with them in a culturally appropriate manner, which is free of manipulation, interference, coercion, discrimination and intimidation as well as establishment / strengthening as relevant of a GRM for all stakeholders.

3.4.2 World Bank Safeguard Tools for the TACTIC Project in Kahama Municipal Council

The implementation of each of the ESSs will be enabled through five instruments which are all part of the Operational Manual of the TACTIC and therefore mandatory and which have been developed based on the respective ESSs:

- i) Environmental and Social Management Framework (ESMF) (and subsequent ESIAs/ESMPs) for the application of the ESS1, ESS2, ESS3, ESS4, ESS6 and ESS8.
- ii) Stakeholders Engagement Plan (SEP) for the application of ESS10;
- iii) Resettlement Policy Framework (RPF) and any subsequent RAPs for the application of ESS5;
- iv) Labour Management Procedures for the application of ESS2
- v) Environmental and Social Commitment Plan (ESCP) which will describe the obligations of the borrower to apply the above instruments and other actions.

3.4.3 World Bank EHS Guidelines

The World Bank Groups Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice (GIIP). EHS Guidelines are applied as required by their respective policies and standards. These industry sector EHS guidelines are designed to be used together with the General EHS Guidelines document, which provides guidance to users on common EHS issues potentially applicable to all industry sectors. Specific guidelines which will be used is Environmental, Health, and Safety (EHS) Guidelines: Environmental Waste Management. As stipulated earlier the guidelines will be used together with the Environmental, Health, and Safety General Guidelines. The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. Application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets, with an appropriate timetable for achieving them. The applicability of the EHS Guidelines will be tailored to the hazards and risks established for the project in accordance to the proposed project activities. The circumstances that skilled and experienced professionals may find when evaluating the range of pollution prevention and control techniques available to a project may include, but are not limited to, varying levels of environmental degradation and environmental assimilative capacity as well as varying levels of technical feasibility. The applicability of specific technical recommendations will be based on the professional opinion of qualified and experienced persons.

The project proponent shall comply with the relevant requirement of environment, health and safety (EHS) of the World Bank Group (WBG). The World Bank Environmental Health and Safety

General Guidelines containing quantitative limits and good international management practices to manage potential impacts are described in **Table 9**.

Table 9: World Bank EHS Guidelines applicable

EHS Guideline	Content & Relevance to Zongomela Industrial Park Project
General EHS Guidelines (2007)	These guide performance levels and measures that are generally considered in the achievement of new facilities by existing technology at reasonable costs. Application of the EHS guidelines to existing facilities may involve establishing site-specific targets, with an appropriate timetable for achieving them.
EHS Guidelines for - Air Emissions and Ambient Air Quality, 2007	Requirements of the guidelines have been incorporated in the analysis and management measures for emissions management during construction and operation phases of the proposed facilities at Zongomela Industrial Park. This provides guiding approach to managing significant sources of emissions, including specific guidance for assessment and monitoring of impacts.
General EHS Guidelines 3 Community Health and Safety (2007)	These address project activities implemented outside of the traditional project boundaries but that are nonetheless related to the project operations, including water quality and availability, traffic safety, transport of hazardous materials, disease prevention, and emergency preparedness and response.
EHS Guidelines: Waste Management Facilities (2007)	If significant waste management activity such as incineration is included in the project scope/design basis, leading to creating a separate waste management facility, the World Bank guidelines for dedicated waste management facilities could apply.
General EHS Guidelines 1 Environmental (2007)	It covers a range of environmental aspects that apply to most industrial development projects. The subsections are air emissions and ambient air quality, energy conservation, wastewater and ambient water quality, water conservation, hazardous materials management, waste management, noise and contaminated land.
WHO Ambient Air Standards	The ambient air quality guidelines specified in the Standard have been incorporated in the analysis and development of management measures to avoid or minimize human health risks.

3.4.4 Other World Bank Instruments Applicable for TACTIC Project

- ***Environmental and Social Framework - Guidance Notes for Borrowers⁴***;

The World Bank has developed several Guidance Notes to ensure the governments (borrowers) comply with the World Bank Environmental and Social Standards. This guidance is public documents that be accessed in the World Bank website⁵.

Among the applicable guidance notes for HEET are:

- Community Health and Safety:
<http://documents.worldbank.org/curated/en/290471530216994899/ESF-Guidance-Note-4-Community-Health-and-Safety-English.pdf>
- Gender based violence:
<http://documents.worldbank.org/curated/en/399881538336159607/Environment-and-Social-Framework-ESF-Good-Practice-Note-on-Gender-based-Violence-English.pdf>

3.5 International agreements, Conventions and Treaties

International agreements, convention and treaties which are relevant to this project include:

3.5.1 United Nations Framework Convention on Climate Change (1992)

The objective of United National Framework Convention on Climatic Change (UNFCCC) is to stabilize the concentration of greenhouse gas (GHG) in the atmosphere, at a level that allows ecosystems to adapt naturally and protects food production and economic development. Article 4 commits parties to develop, periodically update, publish and make available national inventories of anthropogenic emissions of all greenhouse gases not controlled by the Montreal Protocol (by source) and inventories of their removal by sinks, using agreed methodologies. It commits parties to mitigate GHG as far as practicable. Since Tanzania is a Party to the Convention, she will have to account for all sources of GHG in her future National Communications. In this aspect, since this proposed Project is subjected to emission some amount of the GHG from its facilities-vehicles and machineries.

3.5.2 Kyoto Protocol (1997)

The Kyoto Protocol is an international agreement linked to the UNFCCC. The Kyoto Protocol binds 37 industrialised countries and the European Community to reduce their GHG emission by 5% from 1990 levels in the commitment period 2008-2012. The Protocol differs from the Convention in that while the Convention encourages industrialized countries to stabilize GHG emissions, the Protocol commits them to do so. It recognizes that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity. As a result, the Protocol places a heavier burden on

⁴ <http://www.worldbank.org/en/projects-operations/environmental-and-social-framework/brief/environmental-and-social-framework-resources#guidancenotes>

⁵ <https://www.worldbank.org/en/projects-operations/environmental-and-social-framework/brief/environmental-and-social-framework-resources#guidancenotes>

developed nations under the principle of “common but differentiated responsibilities.” It provides mechanisms to achieve this objective, namely the carbon trading, joint implementation and the clean development mechanism (CDM). Since Tanzania is not one of the 37 industrialized countries bound by the Protocol, on the CDM it is relevant to this project.

3.5.3 The convention on wetland RAMSAR

The Convention on Wetlands (Ramsar, Iran, 1971) -called the "Ramsar Convention"- is an intergovernmental treaty that embodies the commitments of its member countries to maintain the ecological character of their Wetlands of International Importance and to plan for the "wise use", or sustainable use, of all of the wetlands in their territories. Unlike the other global environmental conventions, Ramsar is not affiliated with the United Nations system of Multilateral Environmental Agreements, but it works very closely with the other MEAs and is a full partner among the "biodiversity-related cluster" of treaties and agreements.

3.5.4 Convention on Protection of Workers against Occupational Hazards in the Working Environment Due to Air Pollution, Noise and Vibration

This Convention, ratified by Tanzania in 1984, provides the framework for ensuring a safe working environment for workers. The implementation of infrastructural sub-projects will ensure that it prevents the exposure of its workers and the public from any occupational hazards by providing appropriate security and safety equipment.

3.6 Regional Agreements

3.6.1 Other relevant International Conventions Ratified by Tanzania

ILO Convention: C138 Minimum Age Convention, 1973 (Ratified by Tanzania (United Republic of) on 16:12:1998) which prohibits Child labour. ILO Convention: C182 Worst Forms of Child Labour Convention, 1999 (Ratified by Tanzania (United Republic of) on 12:09:2001). Therefore, in accordance with these Convention requirements, TACTIC Projects shall adhere to the ILO Convention, particularly in child labour employment. ILO Convention: C148 Working Environment (Air Pollution, Noise and Vibration) Convention, 1977 (Ratified by Tanzania (United Republic of) on 30:05:1983) which protects Workers against Occupational Hazards in the Working Environment Due to Air Pollution, Noise and Vibration.

3.7 Institutional Arrangement for Environmental Management

Tanzania is among countries in East Africa with an Act for environmental management legislation. The legislation, Environmental Management Act (EMA) (2004), provides a legal and institution framework that guides the implementation of the environmental management activities. The framework provides a pre-requisite for effective implementation of Environment Policy at all levels (National, Region, Council, and Village/Mtaa/Hamlet). According to the Environmental Management Act (EMA) (2004), there is the Environmental Management Committee established at the Hamlet/Village/Mtaa, Ward, Council and at National level with the responsibility for the proper management of the environment in respect of the area in which they are established. The functions and responsibility of these committees are well explained in the Act. Moreover, section 36 (1), (2) of EMA stipulates that each City, Municipal, District and Town councils shall designate

or appoint an Environmental Management Officer (EMO) who shall perform among the following functions:

- i) Advise the environmental management committee to which he/she belongs on all matters related to the environment.
- ii) Promote environmental awareness in the area he/she belongs on the protection of the environment and the conservation of natural resources.
- iii) Monitor the preparation, review and approval of Environmental Impact Assessment for local investments.

The Institutional set up as presented in the **Figure 13** explains the layers of decision making from national to Village/Mtaa/Hamlet levels

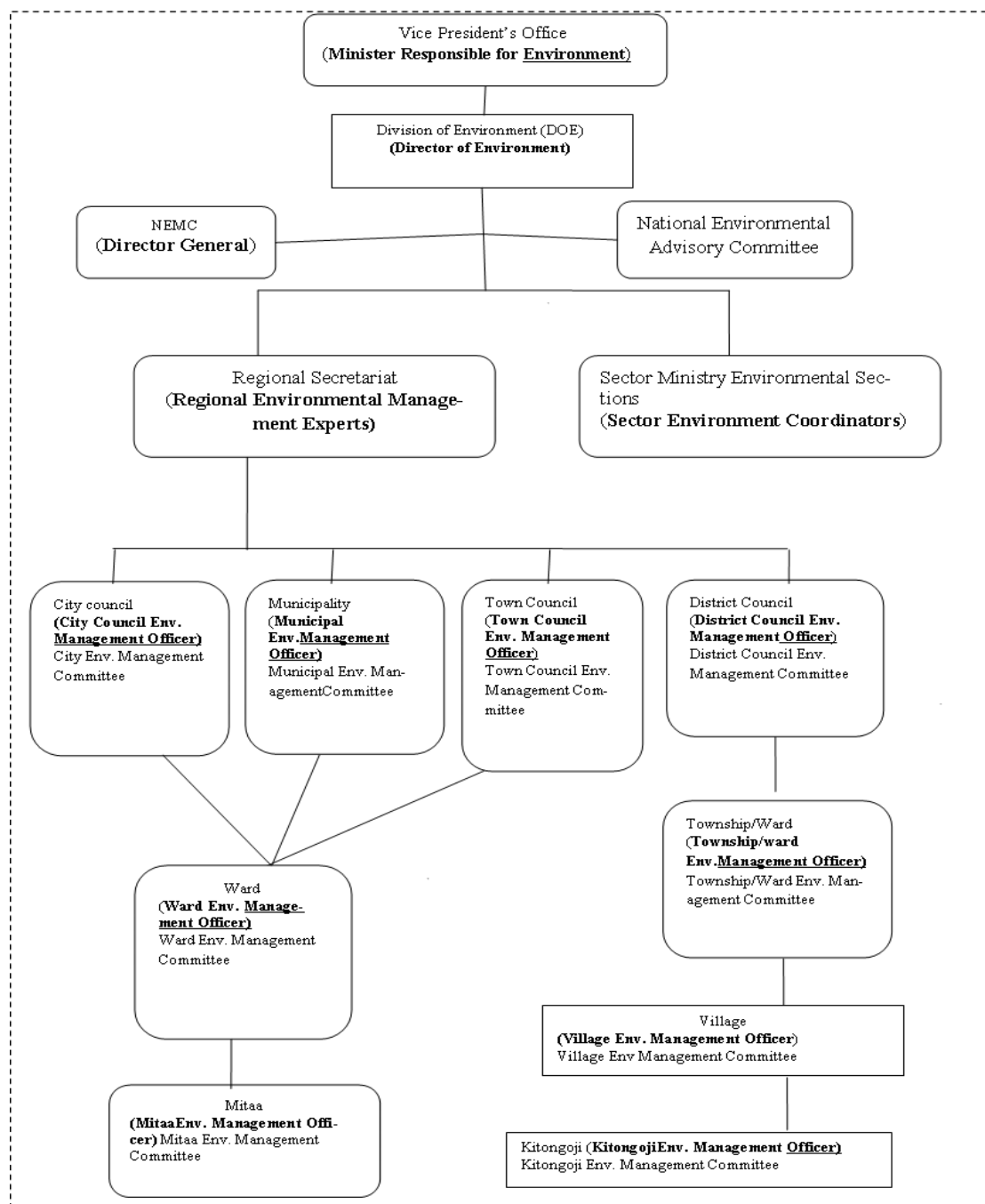


Figure 13: Institutional Set Up for Environmental Management in Tanzania Mainland

CHAPTER FOUR

ENVIRONMENTAL AND SOCIAL BASELINE DATA

4.1 Introduction

Sets out in detail the baseline data that is relevant to decisions about project location, design, operation, or mitigation measures. This should include a discussion of the accuracy, reliability, and sources of the data as well as information about dates surrounding project identification, planning, and implementation. Identifies and estimates the extent and quality of available data, key data gaps, and uncertainties associated with predictions. Based on current information, assesses the scope of the area to be studied and describes relevant physical, biological, and socioeconomic conditions, including any changes anticipated before the project commences. Takes into account current and proposed development activities within the project area but not directly connected to the project.

4.2 Geographical Location

4.2.1 Coordinates and boundary

Kahama Municipal Council was established in January, 2021, after being officially declared as a Town Council on Government Notice No. 174 and published on the 17th of June 2011 in the Local Government (Urban Authorities) Act, (CAP.288) by the Order Made under Section 5 (3). On 28th January 2021 the town council was upgraded and declared to be a Municipal Council by the late President John P. Magufuli. Kahama Municipal Council is in the North-Western plateau of Tanzania. Kahama Municipal Council which is northern western plateau of Tanzania is in Kahama District which is one of the three (3) Districts in Shinyanga Region namely Kishapu, Shinyanga and Kahama.

Kahama Municipal Council is located between latitude 30°15" and 40°30" South of the Equator and Longitudes 31°30" and 33°00" East of Greenwich on the road off to neighboring countries of DRC Congo, Uganda, Burundi and Rwanda. It is bordered by Tabora Region to its eastern part by linking to Nzega District and Msalala District Council and Geita region to its north.

4.2.2 Area and Administrative Units

The size of Kahama Municipal Council covers an area of 1520.2Km² (152,016.1 ha) of which 45,834.5 hectare is used for residential and 106,181.6 ha used for diverse economic activities including farming and livestock keeping and is administratively divided into 20 wards comprising of most of Kahama Division. However, other parts of the council cover rural area with 45 villages.

The Municipality area has 20 wards namely Kahama Mjini, Nyasubi, Majengo, Nyahanga, Zongomera, Mhongolo, Nyandekwa, Iyenze, Kinaga, Busoka, Ngogwa, Wendele, Kagongwa, Isagehe, Mondo, Mwendakulima, Kilago, Nyigogo, Mhungula and Malunga. Also has 45 Villages which are subdivided into 32 sub-villages (Streets) and each ward being a group of streets that are locally administered as a unit. Each ward has an Executive Officer and every village has its own village government and assembly.

Politically the Municipal council is within 1 electoral constituencies with 20 Wards each represented by one elected Councilor and six appointed Councilors representing special seats for women. This makes a total of 28 Councilors including 2 members of parliament. There are also politically elected leaders, 45 at the villages and 32 at sub- village levels (streets).

4.3 Agro-Ecological Zones and People

4.3.1 Climate

Kahama Municipal Council is dominated by extensive plains, gently undulating plain and flat plains which covers almost 82% of the surface. 13% of the surface is valleys (Mbuga) and Hills occupy 5% of the total surface. It receives rains in the duration of approximately 5 months, starting from late October to early May. This rainy season is characterized by two-week to one-month dry spells, being most pronounced in January and February. It receives an average rainfall between 750 to 1030 mm. Temperatures are relatively constant throughout the year, with mean daily temperature ranging from 21°C to 26°C. The proposed Park designs shall take into consideration changes of weather particularly in terms of temperature and rainfall by ensuring there is proper ventilation, minimal solar exposure, outdoor shading by trees and alternative water sources. Tree planting within the industrial park is encouraged so as to minimize extreme hot condition and prevent dust during hot and windy seasons respectively.

4.3.2 Population Size and Growth

According to the 2022 National Population and Household Census, Kahama Municipal Council had 351,957 people which are about 15.7% of the regional population (2,241,299). The male population was 172,459 while the female population was 179,498 (51.5%). The growth rate is 3.8% per annum and by 2019 Kahama Municipality was estimated to have a population of 312,349 (men 151,524 and women 160,825) with 49,436 numbers of households at the average family size of 5 persons and the life expectancy set at an average of 45 years. The age distribution for Kahama Municipal Council shows that the young population under 15 years was 49.2 percent. For the working population of the age group between 15 to 64 years the proportion was 48.7%. The high growth rate is attributed to immigration rather than to human multiplication. The proposed project is likely to lead to increased population in Kahama since people will be coming from different areas in search for employment opportunities during project implementation.

4.4 Socioeconomic Activities

4.4.1 Gross Domestic Product (GDP)

Levels of GDP per capita are obtained by dividing GDP at current market prices by the population. A variation of the indicator could be the growth in real GDP per capita, which is the percentage change in real GDP divided by the population. In the year 2014/2015 records indicated that Revenue collection and utilization for Kahama Municipal Council increased from 86% to 94.34 % in the year 2017/2018. Kahama Municipal Council GDP and Per Capital Income with Land labour and its skills, and capital including equipment, provide the main means of economic production. Kahama Municipal Council, like other councils in central, northern and lake zones, has larger livestock population, including cattle, goats, sheep and poultry and consider the second economic activity that can employ significant number of people and contributes large share to the GDP of

Shinyanga region and country at large. Unfortunately, its contribution to the regional GDP is very low. Main reason for poor performance of these sectors has been influenced by poor or traditional practice of Agriculture, livestock keeping with no regular treatment, absence of livestock infrastructure and medicine. The proposed project is likely to increase the municipality's contribution to regional GDP as a result of increased small businesses that will be established in the new Zongomela Industrial Park and other areas nearby.

4.4.2 Agriculture

Agriculture is the main source of income to the majority of households residing in Kahama Municipal Council. Most of them are engaged in rice and maize cultivation and some vegetables and fruits cultivation. Others obtain their sources of cash income from different petty businesses and some are employed in different private and public institutions. However, agricultural activities have been the key contributor to the council's per capita GDP compared to other activities in the council. Agriculture and forestry are the main sources of livelihood of the people of Kahama Municipal Council.

Kahama MC comprises a total area of 152,016.1 Ha (1,520.2km²) of which available arable land for cultivation is 71,873 Ha (47.3%) of the total land. While, suitable land for irrigation is about 4000 Ha and area under irrigation is 3.2 Ha. (0.08 %) of total suitable land for irrigation). The population is 242,038 (Census 2012) and an estimate of 323,905 (Women 157,130 (48%) and Men 166,775 (51%) by 2019 while the total number of farmers is 10630 (4.4% of total population). KMC agriculture sector contributes about 35% employment to Kahama residents and 45% revenues. The proposed project will bring positive impacts to the agricultural sector in Kahama since there will be market for agricultural products resulting to its growth.

4.4.3 Beekeeping

Though beekeeping practice is still done in traditional ways but it is another subsector which earns income to Kahama Municipal Council. Beekeeping in Kahama Municipal Council produces poor quality of bee products such as honey, glue and Bee wax due to its local mode of its production. Currently, the council has 7 beekeepers' groups, 216 modern beehives as well as 220 local beehives and 1 honey processing industry.

Currently Production and Productivity in Kahama Municipal Council honey production by June 2019 is estimated to 2670 Kg per year that fetch TSH. 10,680,000/- and 186 Kg of beeswax fetch TSH 612,000/-. Also, there is an increase/ of beekeepers within the council compared to past trend where 60 in 2015, 65 in 2016, 80 in 2017, in 2018 and 92 in 2019. In Kahama Municipal council there are only two apiaries, one is in Wendele (Ngogwa) with 110 hives and another one is in Mwendakulima (Mwendakulima) with 150 beehives. The current status of Beekeeping Reserves is as follows: (Kilago village Forest (Ngitili) with a total area of 304.32 Ha, Ngulu Village (Ngitili) at Ngongwa with an area of 330.14 Ha., Igumhwa Village Forest (Ngitili) with an area of 141 ha., Ukamba Local Authority Reserve at Bukamba. This has 1,000 Ha, Mkweni Hills Reserve at Wendele. This is under TFS and has an area of 15,744 ha, Chapulwa Forest reserve at Mwendakulima. The proposed project will have a positive impact to beekeepers in Kahama since there will be market for selling their products such as honey.

4.4.4 Mining Sector

Kahama Municipal Council plays a significant role in mineral production in the country. However, the sector has yet to contribute significantly to the council's and community economy. Kahama Municipal Council attracted a large flow of Foreign Direct Investment, mainly in the mining of gold at Buzwagi in Mwendakulima Ward (**Table 10**). Minerals are a principal source of income for many developing countries, including Tanzania. At first glance, mineral-rich economies have an advantage over those less well-endowed because minerals provide funds for rapid development and poverty reduction. Mining in Kahama Municipal Council is a famous economic activity and therefore mining sector has significant contribution to the council's economy. The mineral deposit available in the council is Gold which is in large scale at Buzwagi Gold Mine (Open ground mining), Also there is small scale gold mining activities at Mwime. However, Small-scale Diamond mines are found at Nyang'hwale where large mining companies were operating in the past (**Figure 14**). The proposed project will be positively affected since the influx of people from other areas will be customers and business owners in the industrial park which will increase the markets revenue.

Table 10: Number of large, medium and small-scale minerals by 2012

District	Type of Mineral Deposits	Small Scale	Medium Scale	Large Scale
Kahama	Gold	6	0	1
Total		6	0	1



Figure 14: Gold processing plant at Buzwagi Gold mine 7km from Kahama Municipal (Source: KMC, 2018)

4.4.5 Nature and Tourism

According to the national industry's mission statement that forms the basis of the tourism policy is develop sustainable quality tourism that is ecologically friendly to the conservation and restoration of the environment and its people's culture. Kahama Municipal Council is one of the unique destinations in the Tanzania that has yet been discovered by many. It is a land of much wonder holding an unparalleled diversity of fauna, flora and many natural features.

Tourism is of growing importance as visitors stop during their journey to use the facilities and services available in the Municipal. The existence of large number of quality and well-equipped Hotels in the Municipal also offers scenic sites for camping and rest that are attracting a growing number of tourists who come from various parts of the world to Gombe and Malagarasi western Tanzania. Such visitors include those attending conferences and workshops, and foreigners on safari and beach holidays travelling from the north to south of Africa in overland trucks. This sector will positively affect the proposed industrial park since the tourists will be among the customers and business owners.

4.4.6 Eco Tourism

To promote domestic and international tourism, most important areas identified by Government of Tanzania are development of infrastructure, product development and diversification, development of eco-adventure sports, cultural presentations, providing inexpensive accommodation, streamlining facilitation procedures at airports, human resource development, creating awareness and public participation and facilitation of private sector participation. Availability of good infrastructure such as accommodation facilities, telecommunication services, roads, banks/bureau de change services and tour operators are an important tool for the development of competitive tourism industry. Accommodation facilities are important in attracting tourists. Therefore, information about hotels, camp sites and lodges are vital for the tourists, as it helps them to choose the type of accommodation they like as well as compare the quality against prices charged. In Kahama Municipal Council the Shinyanga to Kigali and Bujumbura and DRC Congo Road ways plays a key role in the eco-tourism development. The road provides easy communication between the Council and other big commercial cities in Tanzania like Dar es Salaam and Mwanza which encourage more people to come in search of business opportunities, mining activities as well as those who come for tourism purposes. The available accommodation facilities which range from hotels to guest houses are to a large extent located at the centre of the Kahama district and the Kahama Municipal Council in general. In this regards, construction of new accommodation facilities become a pressing issue. There is also a need of increasing the number of financial services such as banks, bureau de change etc., so as to meet the higher demand of these services in the near future. In Kahama Municipal Council there are number of executive hotels and guest Houses including the following Submarine Hotel, Mongo Hotel, Buzwagi view Hotel, Pine Ridge Hotel. Presence of the industrial park will help promote eco-tourism as one of the services that is highly required to bring development by attracting tourists.

4.4.7 Industrial Development

According to the National Bureau of Statistics (NBS), enterprises are grouped into three categories according to capital outlay and number of people employed:

- Micro industries are those employing less than 50 people and with capital of less than TZS 5 million
- Small-scale industries are those with capital of more than TZS 5 million but less than TZS 200 million and employing less than 50 people
- Medium scale industries are those with capital of more than TZS 200 million but less than TZS 800 million and employing less than 100 people

- Large scale industries are those with capital of more than TZS 800 million and employing more than 100 people

Through the 2012 census, Kahama Municipal Council realized a total of 473 small scale industries of which 5 are Food processing industries and 467 milling machines and 1 honey processing industry.

In Kahama Municipal there is special zone which has been planned and allocated for small scale Industries and Industry. This zone has 2160 acres of which 500 acres have been surveyed and allocated. Development project budget trend for the Kahama Municipal for the past 2 years has been increasing and the council has allocated 2,500 acres Potential Investment Areas for small and heavy Industries at Zongomera ward. Currently Kahama Municipal Council has inspected the 5 available Food processing industries which are registered by TFDA among which 3 are medically examined (**Table 11**). The proposed project is going to promote industrial development because most of the industrial products will be sold in the industrial park for wholesale as well as retail.

Table 11: Production for 2013/14-2019/20 Crop season

Crop	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Maize	22598.25	19139.4	26683.6	12342.6	34174.6	21647.9	38,500
Rice	28096	30635.2	44607.6	21194.2	39503.4	27082.2	69,900
Bulrush millet	0	0	0	0	1	0	0
Sorghum	67.2	27.5	21.4	257.8	252.1	7.5	10.800
Cassava	5437	12339.7	4987.5	5375.4	13433.9	5995.9	24,000
Sweet potatoes	3981.5	14120	9583.8	62239.6	60875.6	27498.6	19,700
Beans	439.5	372	920.3	312.9	974	473.4	659.5
Bambara nuts	71.3	49.5	39.4	54.2	377.8	90.4	260.0
Groundnuts	3061.4	2426.9	9033.5	3184.9	5399.5	8409.2	705.36
Cotton/	575.83	134.2	108.3	125.7	287140	262057	23.37
Sunflower	441	493.9	524.8	174.2	1088.5	1038.9	795
Grams	1	2	29.4	24.5	17.5	0	-
Cowpea	5.2	409.5	857.7	206.9	682.5	1285.5	823.4
Cheakpea					96.3 tons		260.8

4.4.8 Irrigation

Kahama Municipal Council is endowed with the suitable land for irrigation about 4000 Ha out of which total area of more than 1,200 acres (485 ha.) of plain land is potential for irrigation at Malenge village, 500 ha at Bumbiti “A” Village in Mondo. Investors are welcome help Kahama MC population to move away from subsistence to a more commercial mode of production through reliable irrigated agriculture which has proved to be an essential tool for combating food shortages, and alleviating hunger and poverty in other areas. In Kahama Municipality, the basic irrigation infrastructures, required for effective provision of good agricultural yields includes: Dams, water trough, main canal, secondary canal and tertiary canal. Availability of the market for agricultural products will result to the increased need for production which will lead to the need for irrigation.

4.4.9 Livestock Sector

Apart from growing crops the residents also practice livestock keeping as an alternative source of income. Livestock is the second important economic activity for the residents of Kahama Municipality. The livestock kept are cattle, goats, pigs, sheep, donkeys and poultry. The livestock sector makes significant contribution to food security and poverty eradication at household level. Besides, the subsector is an important source of protein through meat, milk and poultry products. Livestock is the second important economic activity for the residents of Kahama Municipality. To large extent, livestock keeping is predominantly traditional and involves mostly indigenous chicken. Other livestock kept are cattle, goats, sheep, donkeys, pigs and chicken.

Although less than 0.5% of the labour force is engaged exclusively in livestock rearing in the urban areas as compared to about 1% in the rural areas of Kahama Municipality, the total economic value of this activity is significant. Traditional cattle are reared usually through free ranging in rural areas, and in the urban periphery improved dairy stock are usually stall fed. About 3.8% of the area of the Kahama Municipality is used for livestock husbandry. Men (1.1%) are more likely than women (0.8%) to be involved in Cattle keeping. Farmers are supported through the public agricultural extension and disease control services by Kahama Municipality. One of the general distinctiveness of farming in the Kahama MC is the domination of continuation farming undertaken by smallholder peasants with very diminutive commercial inclinations in their husbandry practices. Most of them use low yielding plant seeds and livestock breeds, with minimal application of yield boosting inputs such as fertilizers and disease prevention applications. Crops are cultivated on approximately 106,181.6 hectares which is suitable for agriculture. The industrial park will promote livestock keeping in Kahama since there will be market for its products such as meat, milk and chicken.

4.5 Food Crops

4.5.1 Food Security

Food security refers to a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Main food crops produced in Kahama Municipal Council are maize, cassava, sweet potatoes, sorghum, groundnut, millet and beans. Cotton and rice constitute the main cash crops. Maize is most important cereal grown. It is cultivated on about

16,480 hectares. However, due to general use of local seeds with lower productive capacity, yields are often poor than would have been the case with improved varieties. The proposed project will have a positive impact on food security because there will be market hence increased production as a result of increased demand.

4.5.2 Cash crops

Most predominant cash crop planted in Kahama MC which are income earning crops. They include cotton, tobacco and chickpea. Cotton and Tobacco are one of the most important cash crops in the Kahama Municipal Council but less now because of a fall in prices in the world market. Farmers are trying to revive production with assistance of various companies. The proposed industrial park will be a great place to sell these crops, therefore leading to more production.

4.6 Infrastructure

4.6.1 Roads

The road network is a crucial means of transportation for both goods and services. It enhances the movement from one area to another and also allows social interactions. A high-quality road network is important for connecting key areas as well as the isolated local communities, improving domestic firms' investment decisions and also determining the Council's potentiality to investments. The roads are the most important means of transportation in Kahama Municipality. In Kahama Municipality, major roads are highly passable throughout the year but collector and feeder roads are not passable especially during rainy season. The roads are affected leading to poor accessibility to various community facilities. Kahama roads are in various conditions basing on the road inventory survey done there were tarmac roads, earth and gravel roads. The proposed industrial park may be affected due to poor accessibility. On the other hand, the proposed project will facilitate Kahama MC to upgrade the roads in the areas surrounding so as to improve its accessibility.

Tarmac roads

Kahama Municipal is served by three major tarmac roads which passes through the CBD area these are: -

- Isaka road with total length of 5.25 km (**Figure 15**)
- Tabora road with total length of 6.42 km
- Lumelezi road with total length of 4.46 Km.



Figure 15: The tarmac trunk road from Isaka to Bujumbura (Rwanda) which passes outside the CBD area (Source: KMC, 2017)

The Municipality has a good road network, The Municipality has a road network of 951.52km of which 16.13 Km are tarmac, 67.88 Km are covered with gravel and 870 Km are earth roads. The current road status in the Municipality is shown in **Table 12**.

Table 12: Road Type and Condition in the Municipality

Type	Condition	Kilometers
Tarmac	Good	10.7
	Fair	02
	Bad	00
Gravel	Good	19
	Fair	26
	Bad	22.88
Earth	Good	90.05
	Fair	214.73
	Bad	870.94
Total		951.52

(Source: TARURA KMC Records, 2019)

Earth and gravel roads

The earth and gravel roads have covered large area of CBD which connects the different activities at CBD area. These roads are of great potential because they provide a good linkage and serves large community (**Figure 16**).

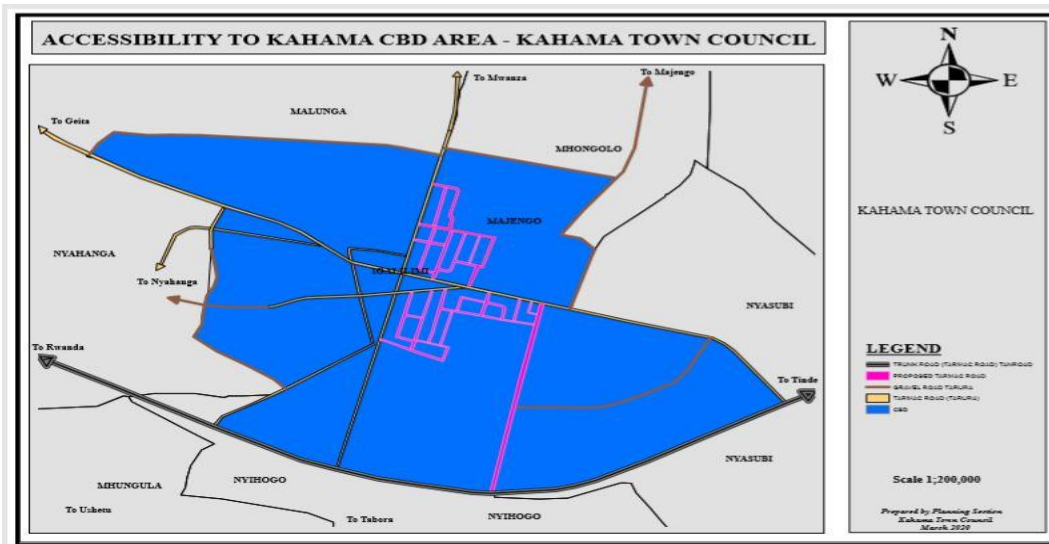


Figure 16: Road network in Kahama Municipal (Source: KMC, 2017)

4.6.2 Air Strip

The Municipal of Kahama can easily be accessed by other different modes of air, train, water and from all the major cities of the East African Community. There is an Air strip at Mwendakulima which serves visitors who usually come to Kahama Municipal. Precision Air, a private airline whose flight time is about two hours from Dar es Salaam to Kahama, is the fastest mode of transport. The flight is currently scheduled three times a week to meet the demand of the customers at an affordable price (**Figure 17**).



Figure 17: Kahama Airport (Source: KMC, 2017)

The current Mwendakulima Airstrip caters for international and local visitors who usually come to Kahama Municipal. It is located 08km from Kahama CBD with three times a week scheduled flights to meet customers demand at an affordable price. The presence of this airstrip encourages aviation industry operators and definitely cargo and passenger operating from Kahama

Municipality. The Mwendakulima airstrip has currently been serving aircraft consignment both for passengers and goods cargo that records a three times weekly flight from Precision.

4.6.3 Electricity

The Kahama Municipality receives 80% of its daily demand of electricity from main secondary feeders. Electricity supply is drawn from the national grid system. Electricity is used for commercial, domestic, institutional and industrial purposes. All wards are served with hydroelectric power from National Grid System. Electricity is one major part of energy in Kahama Municipal Council. Electricity is commonly used in Kahama Municipality and rural parts of the council. Electricity supply which is a prerequisite for proper functioning of nearly all sectors in the economy in Kahama District stimulates development, both social and economic. Like other parts of the country, TANESCO is the sole supplier of electricity in Kahama Municipal Council. A good number of institutions in the council have been connected with electricity. Number of domestic installations has each day been increasing all together with commercial segment of customers.

4.6.4 Water Supply

Kahama Urban Water Supply and Sanitation Authority (KUWASA) is the main supplier of clean and safe water in the Municipality. The sources of water are Lake Victoria, natural springs, boreholes and rain water harvesting at a small scale. The current daily water production of KUWSA is 11,087 cubic metres. It is estimated that 70% of Kahama MC is covered with 16,957 clients' connection and 70% of the population has access to water managed by KUWSA. Clients are metered and charged for water used on monthly basis. From Kahama Municipal Five-year strategic plan reveal that, the main source of water supply in Kahama is from Lake Victoria with a total length of distribution network approximately 240 km with 200km UPVC and 14km of steel pipes (**Figure 18**). The current supply of water in Kahama Municipal Council is adequate. About 84,074 households had reliable and safe sources of water by the year 2019 (**Table 13**). The proposed project will have a water use permit to obtain water from available schemes for construction activities which can result to the decreased water level if there will be over abstraction. Also, the proposed bus terminal will increase pressure on the water supply system because during all project phases it will require water for several activities. The industrial park shall have its own water source i.e., a borehole so that water is made available always and avoid putting pressure on the water supply system in Kahama Municipality.

Table 13: Number of Households with Reliable and Safe Sources of Water in Kahama Municipal Council 2015- 2019

LGA	2015	2016	2017	2018	2019
Kahama MC	60,870	64,550	65,775	80,054	84,074
Total	60,870	64,550	65,775	80,054	84,074



Figure 18: Water reservoir tanks in Isagehe, Kahama (Source: KMC, 2017)

4.6.5 Waste Management systems

Kahama Municipal Council has nine (9) collection points which are located in area where the rate is higher than the collection capacity in unplanned areas and some are just free land, and some areas there is no collection points people have tendency of throwing the waste in the soil despite the presence of collection point. 12 urban Wards are operated by community-based organization, the collection system in Kahama Municipal Council is door to door collection whereby community-based organization (CBO) is passes along the roads, household, Institutions and entrepreneurs to collect all wastes stored in plastic sacks and dustbins. The door-to-door collection is being conducted with pushcart or 'guta' (motorcycle) for transportation to the collection Point. The transportation of wastes from collection point to dumping site is conducted by hired Company where the Kahama Municipal Council cannot conduct the service due to lack of equipment.

Ward Committee and street leaders play major role in management of solid waste. Each Ward Environmental/Health Officer is responsible for coordination and management of the service by doing inspection for each street and household. Liquid waste is disposed of through pit-latrines, and septic tanks. Residents are serviced by cesspit emptier owned by the private operators. Paid for washrooms are also available at the central bus terminal and the markets. Kahama Municipal. Council like other urban areas in Tanzania is facing the Solid Waste Management (SWM) problem. The trend seems to worsen particularly in Kahama Municipal Council due to social economic activities and escalating population growth. In the year 2020 Kahama MC was estimated to have a population of 313,902 and production of solid waste was 170 tons per day while the capacity to collect is 51 tons per day (30%), and recycling capacity of 79 tons/day. The proposed project will have a proper solid waste management plan in all phases so that it does not add a burden to the existing challenge by ensuring waste is properly disposed of and where possible recycled. During the project implementation especially construction phase, the workers will be provided with proper toilet facilities that may temporarily serve them to avoid polluting the environment by open

urination and defecation. Proper sanitary facilities which include toilets and septic tanks and drains will be well designed to accommodate the needs of the Industrial Park and its users. The proponent shall ensure all liquid waste produce is disposed of or treated as guided by KUWASA.

4.6.6 Telecommunication and data transmission

Communication services that are available in the Kahama Municipality include postal services, telephones, private carriers and internet. Postal services that include handling of cargo and mail, money transfers, sale of postage stamps and Expedited Mail Services (EMS) are handled by the Tanzania Postal Corporation (TPC). Internet cafes and services are provided by Tanzania Telecommunication Company Limited (TTCL) and other private providers. There are three local radio stations namely Kahama FM, Divine FM and HUHESO FM radio. Telephone services are provided by TTCL, Tigo Tanzania Millicom International Cellular, Airtel, Vodacom, Halotel and Zantel. Some of the Municipality institutions are connected to the National Fiber Optic Network. The proposed project will have a positive impact on the telecommunication sector since there will be increased demand for communication especially during the operation phase.

4.7 Social Services

4.7.1 Health Sector

Provision of good health service is important element required for National development as it has been visualized from the council levels, poverty alleviation and other health development gains needed by all Tanzanians. To achieve this, the Government has emphasized on delivery of equitable and quality preventive, curative and rehabilitative health services at all levels. Provisions of health services in Kahama Municipal Council are still below the nation and international standards requirements. The council still has inadequate number of doctors, health infrastructure and facilities. Moreover, inadequate number of doctors limited provision of curative and preventive health services such as operations, professional assistance and advice, mother and child health facilities, diagnosis of illness due to shortage or lack of medical machines and equipment, to mention a few. This is evidenced by high rates of infant and child mortality as well as maternal mortality rate. However, health services can be improved through formulating incentives which will motivate doctors and other health workers to work in rural areas. One of the council's priorities is to construct dispensaries in every village and one health centre in every ward by both public just as guided by the national plans. Investors are highly invited to help both public and private sectors to adhere for increasing accessibility of health services to Kahama Municipal council's population.

4.7.2 Health Facilities

Kahama Municipal Council has a total number of 43 health facilities, including 2 hospitals, 5 health centers and 34 dispensaries and 2 clinics. The available health services are under ownership of the government, FBO, private and Parastatals. The number health workers provide services do attend both in and out patients of the entire population of the council and from outside the council (**Table 14**).

Table 14: In patient Top Ten Diseases/Diagnosis in KMC

S/N	Diagnosis	< 5 years		Diagnosis	5+ years	
		Admission	Death		Admission	Death
1	Normal deliveries	0	00	Normal Deliveries	99,711	223
2	Malaria severe	22,504	335	Malaria severe	55,321	661
3	Other diagnosis	2285	0	Other Diagnosis	33,090	00
4	Anemia	11,762	223	Anemia	11,590	223
5	Cardiovascular Disease	116	00	Cardiovascular Disease	22,813	22
6	Malaria Uncomplicated	6626	99	malaria uncomplicated	21,561	99
7	Pneumonia	11400	110	pneumonia	6668	44
8	Emergency surgical conditions	5564	0	emergency surgical condition	11,411	00
9	Diarrheal disease	11055	119	diarrhea disease	4412	77
10	Clinical AIDS	33	0	clinical AIDS	4456	113

(Source: TMOs Office DHIS2, 2019)

HIV/AIDS and TB

The prevalence of HIV at Kahama Municipal Council is 4.8% and large burden of PLHIV 25,871 and among them 11,326 (43.8) are on ART (HMIS data 2017). Various efforts have been in place to combat HIV by government; which include increasing HIV testing sites, to expand Care and Treatment clinics and PMTCT sites to reach many people in need of the services, HIV Viral Load testing and test and treat program so that once your diagnosed and started on ARTs however support from other stakeholders is also necessary. The prevalence of TB is 528/100000 and total number of clients diagnose to have Tuberculosis was 644 among them TB/HIV clients was 294 (45%), Health facilities providing TB services within the council is 18 (HMIS 2018). During the implementation of the proposed project, the number of victims for HIV/AIDS is likely to increase due to immigration of people from different areas interacting with native people in Kahama.

4.7.3 Education Sector

This section deals with provision of education in the council as one of the basic human rights. The system of education as set by the Ministry of Education and Vocational Training is divided into Pre- Primary, Primary and Secondary, Colleges and Universities and Vocational education. Ministry of Education and Vocational Training campaign is to have pre-primary school in every primary school. Theoretically, pre-primary education serves children aged five to six years (Ministry of Education and Culture, MOEC, 2006) although some children below age five attend pre-primary schools. The proposed project will not directly impact this project.

4.7.4 Primary Education

Primary education in Kahama Municipal Council comprises five sections namely; Statistics and Logistic, Academic, Adult Education, Special Needs Education as well as Cultural and sports section. Kahama MC primary education department has four centers for special needs education. The centers are divided into various units including visually impaired, hearing impaired, as well as dumb and albinism. The centers are located at Kahama, Nyasubi, Kishima A and Ubilimbi (**Table 15**).

Table 15: Centre for Special Needs

School	No. of Centers	No. of pupils		
		Boys	Girls	Total
KAHAMA	1	8	13	21
NYASUBI	1	13	7	20
KISHIMA A	1	7	4	11
UBILIMBI	1	3	2	5
Total	4	31	26	57

(Source: Kahama Municipal Report, 2019)

4.7.5 Number of Primary School and enrollment

Kahama Municipal Council has total of 113 whereby 80 being government primary schools and 32 private schools with a total of 94,654.00 of which 46,404 being boys and 48,250 being girls in government schools. While, in private schools the total enrollment is 6957 of which 3,594 being boys and 3,363 being girls. Also, in government pre-primary the total enrollment is 7,943 where by 3,885 being boys and 4,058 being girls. While, in private pre-primary school the total enrollment is 1,019 whereby 499 being boys and 520 being girls (**Table 16**).

Table 16: Number of primary school and enrolment

Schools	Total	Pre-Primary Enrollment			Primary Enrollment			Grand Total		
		B	G	T	B	G	T	B	G	T
GOVERNMENT	72	3012	3075	6087	38644	40615	79259	41656	43690	85,346.00
PRIVATE	23	534	510	1044	4214	4050	8264	4748	4560	9,308.00
TOTAL	95	3546	3585	7131	42858	44665	87523	46,404.00	48,250.00	94,654.00

(Source: KMC- Primary Education Department, 2020)

4.7.6 Number of Secondary Schools

Kahama Municipal Council secondary school department has a total number of 35 secondary schools. 31 of the total secondary school available are ordinary level secondary schools (form

I-IV), whereby 16 being government schools and 16 private schools. Also, KMC has 4 advanced secondary level (form 1-VI) 2 being government schools and 2 private schools (**Table 17**).

Table 17: Number of Secondary Schools in the Kahama Municipal Council

Level	Government	Private	Total
O – level (I-IV)	16	15	31
A – level (V-VI)	2	2	4
Total	18	17	35

(Source: KMC-Secondary Education Department, 2020)

4.8 Environmental Baseline Information

4.8.1 Sound Levels

Noise level measurement in the selected areas within the project site was done using Environment Test Meter, Model NO9AQ, 4 – in – 1 digital multifunction environment meter with measurement range of 35 to 130dB. The Sound level metre meets ANSI S1.4 type 2 standards and conforms to IEC 60651 type 2. Equipment accuracy is ± 3.5 dB of reading. The metre was calibrated using electrical calibration with built-in oscillator (1 kHz sine wave). On taking measurements, the metre was set to the “A” weighed measurement scale, which enables the metre to respond in the same manner as the human ear. The “A” scale is applicable for workplace compliance testing, environmental measurement, and workplace design and law enforcement. The metre was held approximately 1.5 metres above the land and at least 0.5 metre away from hard reflecting surfaces such as walls. A set of six (6) readings were taken per point and the selection of individual testing points included areas where people were working and also ensured to capture the centre of noise source as shown in Table 18. The lowest and the highest values were recorded and then compared with local standards, Tanzania Bureau of Standards (TBS). The study took place on 30th December, 2022 between 09:00 am to 16:20 pm for proposed project areas in Kahama Municipality.

Table 18: Sound Levels Monitoring Data at Zongomela Industrial Area

Date dd/mm/yy	Location	Coordinates (Degrees)	Sound level (dBA) (Accuracy ± 3.5 at 94 dBA)		
			Lowest	Highest	Average
31.12.2022	Centre of the market	S03.849639 E32.566703	62.9	64.5	63.7
31.12.2022	Centre of the Mini-bus stand	S03.848927 E32.566300	56.7	57.1	56.9
31.12.2022	Zainabu R. Telack Road	S03.849578 E32.565420	65.9	67.4	66.7
31.12.2022	Stand exit road	S03.849590 E32.566339	62.2	62.4	62.3
31.12.2022	Stand entrance Road	S03.850716 E32.567593	57.7	59.4	58.6
31.12.2022	Round Road	S03.850588 E32.563582	49.8	50.5	50.2
Tanzania Standards as per Tanzania Bureau of Standards (TBS) 70 dBA					

IFC Noise level Guidelines for Industrial and commercial receptors 70 dB(A)⁶

(Source: Consultant, 2022)

4.8.2 Combustion Gaseous Emission Concentrations (Flue Gases)

There is no official record of secondary flue gas emission data due to non-availability of a regular flue gas emission monitoring program for flue gas conditions or emissions. The main sources of air pollutant emissions are from diffuse sources such as combustion of carbon-containing fuels in a limited oxygen gas supply. Air quality was measured under this project. The samples were collected from onsite points of the project site by using Digital Gas Analyser HD4400. The present condition of the air quality is presented in Table 1 for all proposed road project sites. From the test results, it is found that the site has no gaseous contaminants of all flue gases such as Sulphur dioxide (SO₂), Carbon monoxide (CO) and Nitrogen oxides (NO/NO_x). On the other hand, flue temperature content was far below air temperature and the atmospheric environmental standards for both the residential and industrial areas thus; were within acceptable Tanzania Bureau of Standards (TBS) limits. This Environmental and Social Impact Assessment (ESIA) used the Tanzanian standards TZS 845:2019(E) Air Quality – Specification⁷ and this is one of the nine compulsory environmental standards developed by the Tanzania Bureau of Standards and collated in the National Environmental Standards Compendium. In general, the air quality standards contain the same tables of limit or guideline values as the regulations as shown on Table 19.

Table 19: Findings of Flue gases at Zongomela Industrial Park in Kahama Municipal Council

Date dd/mm/yy	Sampling point	Coordinates	Flue Temperature (°F)	Air Temperature (°F)	O ₂ (%)	CO ppm	NO ppm	NO _x ppm	SO ₂ ppm	Temperature Difference (°F)
31.12.2022	Centre of the market	S03.849639 E32.566703	77.50	82.00	20.80	0.00	0.00	1.05	0.00	-4.5
31.12.2022	Centre of the Mini-bus stand	S03.848927 E32.566300	78.40	83.70	20.80	0.00	0.00	1.05	0.00	-5.3
31.12.2022	Zainabu R. Telack Road	S03.849578 E32.565420	80.80	84.20	20.80	0.00	0.00	1.05	0.00	-3.4
31.12.2022	Stand exit road	S03.849590 E32.566339	80.60	85.30	20.80	0.00	0.00	1.05	0.00	-4.7
31.12.2022	Stand entrance Road	S03.850716 E32.567593	77.70	85.80	20.80	0.00	0.00	1.05	0.00	-8.1
31.12.2022	Round Road	S03.850588 E32.563582	81.00	85.50	20.80	0.00	0.00	1.05	0.00	-4.5

⁶ <https://www.ifc.org/wps/wcm/connect/4a4db1c5-ee97-43ba-99dd-8b120b22ea32/1-7%252BNoise.pdf?MOD=AJPERES&CVID=ls4XYBw>

⁷ <https://www.tbs.go.tz/uploads/files/list%20of%20compulsory%20tanzania%20standard%20as%20of%20september%202021.pdf>

Tanzania Bureau of Standards (TBS) Limits	-	-	-	0.01	0.00012	0.00012	0.0005	
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Source: Primary data/Consultant, 2022

4.8.3 Temperature and Relative Humidity

Temperature and Relative Humidity measurements in the selected areas within the project site were done using Environment Test Meter, Model NO9AQ, 4 – in – 1 digital multifunction environment meter with measurement range of -20°C to +750°C (-4°F to +1382°F) for temperature and 25% to 95% Relative Humidity (RH). Equipment accuracy is $\pm 3/3.5\%$ reading $\pm 2^\circ\text{C}$ (at -20°C~+200°C) and $\pm 5\%$ RH (at 25°C, 35%~95% RH) for temperature and relative humidity respectively. The metre was calibrated using electrical calibration with built-in oscillator (1 kHz sine wave). On taking measurements, the metre was set to the “(Fahrenheit degree (°F))” measurement scale for temperature and percentage for relative humidity, which enables the metre to respond in the same manner as the atmospheric conditions. These scales are applicable for workplace compliance testing, environmental measurement, and workplace design and law enforcement. The metre was held approximately 1.5 metres above the land and at least 5 metre away from hot objects. A set of six (6) readings were taken per points and the selection of individual testing points included areas where people were working and also ensured to capture the centre of project. The values were recorded and then compared with meteorological data from Tanzania Meteorological Authority (TMA) (**Table 20**). The study took place on 30th December, 2022 between 11:30am to 16:20 pm for proposed project areas in Kahama Municipality.

Table 20: Temperature and Relative Humidity Monitoring Data at Zongomela Industrial Park, Kahama Municipality

Date dd/mm/yy	Location	Coordinates (Degrees)	Temperature (°F)	Relative Humidity (%)
31.12.2022	Centre of the market	S03.849639 E32.566703	25.5	69.2
31.12.2022	Centre of the Mini-bus stand	S03.848927 E32.566300	26.1	64.8
31.12.2022	Zainabu R. Telack Road	S03.849578 E32.565420	26.8	62.6
31.12.2022	Stand exit road	S03.849590 E32.566339	28.5	68.1
31.12.2022	Stand entrance Road	S03.850716 E32.567593	26.9	62.2
31.12.2022	Round Road	S03.850588 E32.563582	26.8	57.5

(Source: Consultant, 2022)

4.8.4 Ambient Air Quality

Ambient air quality was measured using a portable device known as Environment Air quality tester ECO-12. According to the standard Q31/0120000311C003-2018. Adoption of the independently sampled high quality sensors, which can be used to detect CO, NO₂ and CO₂ in ppm, PM₁₀ in µg/m³, PM_{2.5} in µg/m³, TVOC in mg/m³, temperature and humidity in the environmental air. The study took place on 31st December, 2022 between 11:30am to 16:20 pm for proposed project areas in Kahama Municipality. The equipment was held 1.0m above the ground during measurement, in which reading were recorded at each point to represent the value of that particular point. The average measured concentration for PM_{2.5} and PM₁₀ found to range between 5 and 17 µg/m³ and between 7 and 46 µg/m³ respectively. Based on the results, the average PM_{2.5} and PM₁₀ concentrations measured at all stations were below the respective standards stipulated by TBS, WHO/IFS and Environmental Management (Air Quality Standards) Regulations, 2007 presented in **Table 21**. The average measured concentrations of Total Volatile Organic Compounds (TVOC), Carbon monoxide (CO) in ppm, Nitrogen dioxide (NO₂) in ppm and Carbon dioxide (CO₂). All the measured parameters were within the stipulated guidelines, i.e., WHO/IFS ambient air quality guidelines and safe for human health and the surrounding environment. Based on the results, the project is expected to have an impact during its implementation.

Table 21: Average values of dust levels measured at the proposed Zongomela Industrial Park project site

Location	Coordinates (Degrees)	Measured Dust Parameter		TVOC (mg/m ³)	NO ₂ (ppm)	CO ₂ (ppm)	CO (ppm)
		PM _{2.5}	PM ₁₀				
Centre of the market	S03.849639 E32.566703	5	7	0.12	0.0	263	0.0
Centre of the Mini-bus stand	S03.848927 E32.566300	11	15	0.13	0.1	298	0.0
Zainabu R. Telack Road	S03.849578 E32.565420	9	17	0.15	0.0	296	0.0
Stand exit road	S03.849590 E32.566339	17	46	0.13	0.0	315	0.0
Stand entrance Road	S03.850716 E32.567593	7	12	0.12	0.0	301	0.0
Round Road	S03.850588 E32.563582	8	9	0.14	0.0	293	0.0
The Environmental Management (Air Quality Standards) Regulations, 2007 and TBS Standards		40	60 – 90		0.1 ppm for 8 hours of exposure		90 ppm for 15 minutes of exposure
WHO/IFS Standards		25 for 24 – hour mean	50 for 24 – hour mean	0.3 – 0.5	0.3 ppm for 30 minutes	400 – 1000	90 ppm for 15 minutes

				of exposure		of exposure
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(Source: Primary data/Consultant, 2022)

4.8.5 Ground Vibrations

Ground vibrations were measured at 5 points of the proposed Zongomela Industrial Park project site that represented onsite and offsite receptors. The detached probe-type vibration meter model TA8663 was utilized to quantify the ground vibration in the study area. The meter has an accuracy of $\pm 5\%$ ± 2 digits, acceleration of 1-199.9 m/s², a wide frequency ranges of 1 Hz to 15 kHz for capturing almost all possible vibrations for workplace assessments. This meter adopts piezoelectric effect of artificial polarized ceramic for design. It is suitable for monitoring all kinds of vibrating mechanical facilities, especially the vibration measurement of rotating and reciprocating machinery. Based on ground vibrations measurements collected, the average recorded level was 0.35 mm/s (**Table 22**). The proposed project has the potential to increase the ground vibration levels from its construction activities like movements of heavy equipment and trucks, etc., as well as during operation phase due to vehicle movement and other works in the proposed industrial park.

Table 22: Ground vibration levels at the proposed Zongomela Industrial Park project site

Location	Coordinates (Degrees)	Ground vibrations (mm/s)
Centre of the market	S03.849639 E32.566703	0.1
Centre of the Mini-bus stand	S03.848927 E32.566300	0.3
Zainabu R. Telack Road	S03.849578 E32.565420	0.2
Stand exit road	S03.849590 E32.566339	0.5
Stand entrance Road	S03.850716 E32.567593	0.7
Round Road	S03.850588 E32.563582	0.3
Average		0.35
Environmental Management (Standards for the Control of Noise and Vibrations Pollution) Regulations, 2015		5 mm/s PPV at all times

(Source: Primary data/Consultant, 2022)

CHAPTER FIVE

STAKEHOLDER CONSULTATION

5.1 Introduction

In compliance to requirements of the Environmental Management Act of 2004 and its EIA and Audit Regulations including the amendments, also the requirement of the World Bank Environmental and Social Framework specifically ESS10 and the subsequent tools such as the Stakeholder Engagement Plan (SEP), the team conducted stakeholder's consultation in January 2022 in Kahama Municipal Council. The stakeholders involved were surrounding communities, district authority, government institutions such as TARURA, utility companies such as TANESCO and KUWASA, people with disabilities, youth, women and other potentially affected community members. This chapter therefore details the issues raised by different stakeholders interviewed during the audit exercise.

5.1.1 Objectives of Stakeholders Consultations

The main objectives of the stakeholders' consultation were;

1. To examine and seek views on health and safety issues from the station employees, the local and other potentially affected communities
2. Inform the local administration (District Executive Director and officers, Ward executive officer, Institutions and Mtaa Committee,) on intention of conducting environmental audit of the existing service station and collect their views on the same,
3. Provide an opportunity to all stakeholders and communities in the project area to raise issues and concerns pertaining to the service station activities

5.2 Methodology and Data Collected

Stakeholders' consultation was conducted simultaneously with the field work targeting the various groups of stakeholders (**Figure 19**). The process involved discussion with all interested and affected parties. During the exercise local community members in particular within a close proximity to the facility were consulted. Interviews, focus group discussions, physical visits and consultations were the main methods used in involving selected stakeholders. The comments were ranked based on the frequency and the action to each community reference to the action shall also be presented.



Figure 19: Stakeholders consultation in Zongomela Industrial Park

5.3 List of Stakeholders Consulted

Stakeholders' consultations were carried out to identify and respond to issues of concern to stakeholders. This process allowed the creation of a chain of communication between the project and the public. The stakeholders identified and consulted include:

- i. Kahama District Council including the District Executive Director and the entire team (legal, community development, environment, physical planning, engineering)
- ii. Kahama Water and Sewerage Authority (KUWASA)
- iii. TANESCO, Kahama Office
- iv. Association of people with disabilities
- v. Association of Traders in Zongomela Industrial Area
- vi. Representatives of Zongomela Traders
- vii. Association of vendors at Zongomela market
- viii. Association of Mama Ntilie at Zongomela market
- ix. Association of drivers at Zongomela mini bus stand
- x. Office of the Mayor of Kahama Municipal Council
- xi. Mini bus stand users
- xii. Ward office
- xiii. Mtaa office

5.4 Stakeholders' Comments

The concerns of the stakeholders are presented in **Table 23**. Some of the concerns are related to designs while others are concerned about operation of the project especially the market and mini bus stand.

Key issues raised by stakeholders were as summarized here under:

Stakeholders' categorization: It was suggested that all stakeholders should be visited and their recommendations and concern gathered to ensure that there are no complaints or grievance at later stage of project development. Issues of proof of ownership of land where these projects will be implemented was also emphasized to avoid conflicts over land ownership.

Designs to consider various climatic and social issues: It was suggested that designs of the proposed infrastructures should take into consideration various factors such as social issues concern especially those related to people with disabilities and climatic factors especially the hot seasons. People with disabilities requested that all the necessary features used by them and other disadvantaged group be included in order to make the roads user friendly for all groups. Vendors at the market emphasized the need to have open designs for the market due to hot weather.

Bus Stand and Market to accommodate all current users: Vendors and users of the bus stand as well as the market were concern about whether all current users of the bus stand and the market will be considered and able to return upon completion of construction activities. It was emphasized by users and vendors representatives that the design of the proposed facilities should consider returning all users and vendors who are currently occupying the facilities in order to avoid displacing other people.

Interaction between local communities and influx of labourers during construction should be monitored: Representatives of local communities are concerned about the impact which might be caused by the influx of labourers during construction which might lead to increased cases of violence, HIV/AIDS and social unrest. The representatives emphasized on the need for the Municipality and all other concerned stakeholders to ensure that contractors' workers and labourers are well managed to avoid any cases of social unrest within the community.

Designs to consider energy use efficiency: The stakeholders are of the opinion that designs should incorporate the concept of sustainable energy. The design should ensure that energy used is minimized and other sources of renewable energy are considered. For example, use of natural lights (use of transparent roof sheets) can be used to minimize the use of electric bulbs. Rain water harvesting can also be considered to supplement water use during deficit period.

Table 23: List of Stakeholders consulted and their concerns/ views

S/N	GROUP CONSULTED	ISSUES/CONCERNS	RESPONSE
1.	<p>Kahama Municipal Council</p> <p>- Anderson David Msumba (Municipal Director)</p> <p>- Clemence Mkusa (Municipal Urban Planning Officer)</p> <p>- Robert Kwela</p> <p>- Ibrahim Kuguru (Ag. Municipal Environmental Management Officer)</p> <p>- Flora K. Sangiwa (Municipal Planning Officer)</p> <p>Enne Moses (Municipal Architect)</p>	<ul style="list-style-type: none"> • There are title deeds for all the proposed project areas. • There are no conflicts or pending compensation issues. • The project is consistent with the masterplan/ town plan. • Local government leaders, residents and traders have been consulted and made aware of the proposed projects under TACTIC. • The proposed developments should be designed in a way that they are manageable and affordable by the Kahama residents. • Involvement and consideration of the needs of people with disabilities in the proposed projects. The challenges and deficiencies with the current infrastructure design is inclusivity. The need for people with disabilities were not considered like putting wheelchair ramps in buildings. • Work force is available to help in the project implementation. 	<ul style="list-style-type: none"> • Noted • Noted • Noted • Noted • The designs have taken into consideration. • The designs have considered inclusivity hence PwDs needs have been accommodated. • Positive
2.	<p>Tanzania Rural and Urban Roads Agency (TARURA)</p> <p>- Eng. Joab Mutagwaba (District Manager)</p>	<ul style="list-style-type: none"> • The proposed projects are known. • The project shall have a positive impact to the community of Kahama by increasing road length and accessibility thus reducing unnecessary congestions and the constructed drainage will remove flooding nuisance. • The Municipal Council, contractor and consultants should cooperate with TARURA to ensure a smooth undertaking of the projects and the office is ready to offer a helping hand and their views. 	<ul style="list-style-type: none"> • Noted • Positive • Noted

3.	Tanzania Electric Supply Company Ltd (TANESCO) - Said Hamad (District Operations Engineer)	<ul style="list-style-type: none"> • The project is known. The PIU consulted the office to let them know of the proposed projects. • The PIU consulted the office to let them know of the proposed projects and TANESCO gave them the utilities layout. • The project is likely to affect their infrastructure because there are some areas where they will be required to remove the polls and wires to give way for construction to take place. The PIU will have to notify TANESCO by letter if there will be a need for relocating utilities that may be impacted by the project and provide necessary costs for the relocation. 	<ul style="list-style-type: none"> • Noted • Noted • During implementation the proponent shall liaise with TANESCO to ensure relocation of the affected infrastructure is done smoothly without interfering with the electric supply and avoid shortage for a long time which will affect the consumers.
4.	Kahama Urban Water Supply and Sewerage Authority (KUWASA) - Josephat John (Ag. PCE)	<ul style="list-style-type: none"> • They are aware of the project. • The project shall have a temporary impact on the water utilities if there will be a need for relocation and it can cause losses if there will be no communication between the PIU and KUWASA. • The PIU shall notify KUWASA if utilities in some areas may require relocation and the budget shall be provided for the task to enable the process and smooth undertaking of the project. • The PIU needs to consult KUWASA prior construction to know of the water supply network where the project will cover and if they can be affected and what should be done. 	<ul style="list-style-type: none"> • Noted. • The proponent shall liaise with KUWASA to ensure all the affected water infrastructures are timely relocated and cover the cost for that to ensure the project does not affect the water consumers in the area.

5.	<p>People with disabilities</p> <p>-Mbwana Karata (Vice Chairperson CHAWATA) –</p> <p>-Marco Kanjiwa (Chairperson SHIVYAWATA) –</p>	<ul style="list-style-type: none"> • They are aware of the project. • The roads should have cable stones for easy use by PwDs and Storm water drainage should be covered. • The proposed buildings should have wheelchair ramps for easy access. • Important signs, there should be a translator for the deaf, Braille/tactile system for the blind in buildings and roads to render easy use for them. • Make available space/frames for the PwDs to carryout businesses. Space for their bajaj for business and shops. • They face challenges with the current bus stand since it is small and the floors are dusty and poorly managed. • Road education and awareness to the drivers of the vehicles on PwDs road signs and help them reduce accidents. • Consider the participation of PwDs in the project through providing employment opportunities whether temporary or permanent for the works they can perform. 	<ul style="list-style-type: none"> • Noted. • The proponent will ensure that is taken into consideration. • The designs have incorporated that. • The proponent will make sure of that. • The proponent shall take that into consideration to ensure the project is inclusive. • The proposed minibus stand will be paved hence such problems will be eliminated. • To be taken into consideration. • The proponent shall ensure inclusive participation by ensuring employment of PwDs during project implementation.
6.	<p>Local Government Leaders (Dodoma Ward and Mtaa leaders)</p> <p>- Renatus Numbi</p> <p>- Dominic Caspary</p>	<ul style="list-style-type: none"> • The local government leaders know about the project. • The land is owned by the government and there are no pending compensation issues/conflicts. • The design of infrastructure of the park should be sustainable and which conforms to the life standards/ status of the residents for which it is designed. • There are so many youths who are ready to participate in the construction of the park and its infrastructure. 	<ul style="list-style-type: none"> • Noted. • Noted. • The proponent shall take that into account. • The proponent will provide employment opportunities to the youths during implementation.

		<ul style="list-style-type: none"> • The greatest fear of the people is the delays during the project implementation. • There is a need for regulating movements/migration of people to ensure security and safety of the local people. • There is available space (buffer zone) for temporary relocation of the present services to give way for the implementation of the project. • The contractor has to be consistent with the project plan and designs. All infrastructure should be in accordance to the design. • There are some cases of GBV and Sexual harassment where women especially food vendors (mama lishe) being abused once they request for payments of services provided. • The project schedule of work should be made known to the people in the area, so that they are aware and not affected and agree to give way for the works to take place smoothly. • Park floors and pavements should be well designed and constructed by using good and sustainable materials. • Construction materials should be obtained from the local area/vendors. 	<ul style="list-style-type: none"> • The proponent will make sure the project is implemented as scheduled. • The proponent will make sure of that. • Noted. • The proponent will make sure of that. • The proponent will make sure these cases are avoided during project implementation. • The proponent will communicate with local leaders to help inform the residents close to the project area of the ongoing project activities and how they will be affected and protected. • This is considered. • Upheld.
7.	<p>Leaders of the association of traders</p> <p>- Renatus Numbi (Chairperson)</p> <p>- Gerald Egwaga (Secretary)</p> <p>- Meckson R. Wapalila (Assistant Secretary)</p>	<ul style="list-style-type: none"> • They know about the project. • There should be monetary services (ATMs and possibly banks). • There should be a police station within the area. • There should be a Health Care Centre within the park. 	<ul style="list-style-type: none"> • Noted. • Considered. • Taken into consideration. • Taken into consideration.

	<ul style="list-style-type: none"> - Benjamin R. (Stand Chairperson) - Tembo Rashid (Machine Owners – Chairperson) - Deogratias Ishengoma (Timber sellers – Chairperson) - Hilda Robert (Coordinator) - Hezron Bushesha - Emmanuel John 	<ul style="list-style-type: none"> • Upgrade the bus stand by putting sustainable infrastructure such as well constructed roads and streetlights. • Toilets should be enough for the users and of great quality designs which people of all status/ age can use while prioritizing people with special needs. • There should be enough frames which the traders and bus booking agencies can rent at affordable prices and make all the important services available for the users of the park. • There should be space for food and fruit supply services in the area. • The roads are rough and have many potholes making it uncomfortable for users during rainy season. 	<ul style="list-style-type: none"> • All that has been considered in the proposed project's designs. • Considered. • Upheld. • Considered. • Once upgraded, such nuisance shall be avoided.
8.	<p>Representatives of traders and vendors, representatives of passengers, taxi drivers, bajaj, bodaboda, machingas, and other users</p> <ul style="list-style-type: none"> - Paul Ndalawa - Dominic Gaspary - Mary Tito - Hassan Ramadhan - Dennis Mugarula - Abdallah Mohammed - Felister Daudi - Hadija Tabil - Samson Shosha - 	<ul style="list-style-type: none"> • They area ware of the project. • There should be enough and specific parking for all types of vehicles and transport facilities (that is mini buses, buses, taxis, bajaj, bodaboda and passengers' cars upon arrival and exiting). • The roads in the bus stand should be big enough for 2 vehicles going on different directions. • There should be entrance and exit ways for the vehicles. • There should be proper drainage systems for stormwater management. • There should be properly designed sewage and wastewater management systems in the area. • There should be offices for microfinance agencies. • There should be posts that show direction and names of specific spaces for the services being provided. 	<ul style="list-style-type: none"> • Noted. • The proponent will make sure of that. • The designs have considered that. • Considered. • The designs have incorporated that. • The industrial park shall have properly designed toilets with septic tanks for wastewater management. • The proponent shall take that into consideration. • Taken into consideration.

		<ul style="list-style-type: none"> • There should be a check point for the vehicles in the area to ensure safety and security of the passengers. • Road diversions should be properly designed to avoid accidents. • The area is prone to the windstorms hence the roofs and general design needs to take that into account to avoid future impacts to infrastructure and people. • The general design and construction of the park and its infrastructure should take into account the soil type of the area since it is prone to floods. • There should be controlled access to the industrial park by putting chains and stopping posts where necessary such as entrances and exits. 	<ul style="list-style-type: none"> • It will be available. • Upheld • The proponent shall ensure the roofs are designed with resilience to weather calamities. • The designs will be in such a way that the park will not be affected by floods. <p>The proponent will ensure that is done so that safety and security are maximized in the park.</p>
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CHAPTER SIX

IMPACT ASSESSMENT AND EVALUATION

6.1 Environmental and Social Risk Classification of the project as per the World Bank ESF

Environmental and social risks are rated as **Substantial** due to environmental and social impacts likely to be caused by project activities. The WB ESS 1 to 10 except ESS 9 will all be applicable to assess and provide mitigation measures for the identified impacts. The main impacts of the proposed projects will emanate from the physical construction activities. No major land use change is expected because these activities will be implemented within the Kahama Municipal Council in existing land uses. Kahama Municipal Council already have a master plan therefore this project will finance implementation of activities which are already pre-determined within their areas. The cumulative impact of the works and presence of contractors and machinery on the project sites is unknown at the moment, but careful supervision will be needed to avoid accidents, loss of cultural assets and potential conflicts with local communities. Other potential impacts are related to (i) waste generated at construction sites which can pollute land and water bodies (cement mixing areas, metal, wood and paint residues, diesel, used electronics equipment and other residues); open pits in the soil can cause accidents; (ii) food residues can attract disease causing organisms; (iii) cutting of trees to use as building material (although this will not be allowed and construction materials will be supplied with the authorized vendor); (iv) road accidents; amongst others, (v) Health and safety issues especially during construction of Zongomela Industrial Park.

Review of designs and architectural drawings will include E&S aspects in order to increase safety and reduce negative environmental effects and increase sustainability of the works, which will require strong willingness by the Kahama Municipal Council and the PORALG to implement the changes in case the proposed mitigation measures need significant changes. Safety aspects specially to deal with the impacts of earth quakes are important to be considered and quality assurance guaranteed. Other potential environmental and social risks and their mitigation measures are elaborated in the relevant section of the appraisal summary. This ESIA for Zongomela Industrial Park provides for initial risk assessment and classification based on the available documentation and data. Implementation of the project activities will be positive and urgently needed.

6.2 Impacts Identification

Identification of impacts was followed by prediction or estimation of the magnitude, extent and duration of the impact in comparison with the situation without the project. The matrix method was used in order to be able to predict whether impacts are likely to occur as well as their scale, the initial reference or baseline data prior to the project was determined, and the future changes forecasted with or without the proposed project. The impact evaluation was based on experts' knowledge as well as checklists.

The significance of impacts was tested using the following criteria:

- i. The magnitude and likelihood of the impact and its spatial and temporal extent;
- ii. The likely degree of recovery of the affected environment;
- iii. The value of the affected environment;
- iv. The level of public concern; and
- v. Extensiveness over space and time (magnitude);
- vi. Intensiveness in concentration or in proportion to assimilative capacity;
- vii. Exceedance of environmental standards or thresholds;
- viii. Level of compliance with environmental policies, land use plans, sustainability strategy;
- ix. Level of adversity and seriousness in affecting ecologically sensitive areas;
- x. Level of adversity and seriousness in affecting heritage resources, other land uses; communities and/or indigenous peoples, traditions and values.

The impacts were further rated at a scale of “-3” to “+3” through “0” as follows:

+3	High positive impacts
+2	Moderate positive impacts
+1	Minor positive impact
0	No impacts
-1	Minor negative impact
-2	Moderate negative impacts
-3	High negative impacts-

The team focused on significant positive and negative impacts that were rated -2, -3 and proposed mitigation measures.

6.2.1 Impact Rating Criteria

Seven criteria were used to determine the significance of the impacts in the Matrix, these include;

- **Spatial Scale**-The spatial dimension encompasses the geographical spread of the impacts regardless of whether they are short term or long term. **Table 24** describes the ratings used in the Simple Matrix as far as spatial scale is concerned.

Table 24: Spatial Rating

International (I)	Trans-boundary
National (N)	Within country
Regional (R)	Within Region
Local (L)	On and adjacent to site

- **Temporal Scale**-Temporal boundaries refer to the lifespan of impacts. **Table 25** describes the ratings used in the Simple Matrix.

Table 25: Temporal Rating

Short-Term (ST)	during construction
Medium-Term (MT)	Life of project
Long –Term (LT)	Residual impacts beyond life of project

- **Phase-** During which phase of the construction is the impact likely to occur. The phases included Mobilization, Construction, Demobilization and Operation.
- **Reversibility of the impact-** Every impact was checked if its effect can be reversed or not. Letter R was used to denote reversible impacts while IR was used to denote Irreversible impacts
- **Cumulative Impacts-** These are impacts that cause changes to the environment that are caused by an action in combination with other past, present and future human actions.
- **Residual Impacts-** These are long term impacts which go beyond the lifetime of the project.

Table 26 shows Impact Correlation Matrix for the proposed construction.

Table 26: Impact Correlation Matrix for the proposed construction

S/ N	Impact	Project activities and phase															Impact Rating				
		Construction/Mobilization/Demobilization phase					Operation Phase							Decommissioning phase							
		Site clearance and demolition	Transportation of materials	Trench excavations and casting of	Construction of the superstructure and installation of services	Landscape activities	Running the Buildings	Liquid waste handling	Solid waste handling	Energy provision	Maintenance works	Presence of Auxiliary facility and Boundary	Water provision	Demolition of structures	Removal of solid	Termination of Temporary	Spatial Scale	Temporal Scale	Reversibility	Cumulative Effects	Residual Impact
1.	Job Creation and employment opportunities	+1	+1	+3	+3	+2	+2	+1	+1	0	+1	+1	0	+2	+1	+1	R	LT	R	✓	
2.	Increased market opportunities and sources of income	0	0	0	0	0	+3	0	0	0	0	0	0	0	0	0	R	MT	R	✓	
3.	Increased Revenues to local authorities				+2		+3	0	0	0	0	0	0	0	0	0	N	MT		✓	
4.	Increased level of crimes	0	0	0	-2		-2	0	0	0	0	0	0	0	0	0	L	LT	R	✓	
5.	Prevalence of Communicable diseases	0	0	0	-2		-2	0	0	0	0	0	0	0	0	0	L	LT	R	✓	
6.	Exploitation of borrow pits/quarries and other natural resources	0	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	L	ST	R	✓	✓
7.	Disadvantages related to the management of solid wastes from demolition	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	L	ST	IR		

S/ N	Impact	Project activities and phase															Impact Rating				
		Construction/Mobilization/Demobilization phase					Operation Phase							Decommissioning phase							
		Site clearance and demolition	Transportation of materials	Trench excavations and casting of	Construction of the superstructure and installation of services	Landscape activities	Running the Buildings	Liquid waste handling	Solid waste handling	Energy provision	Maintenance works	Presence of Auxiliary facility and Boundary	Water provision	Demolition of structures	Removal of solid	Termination of Temporary	Spatial Scale	Temporal Scale	Reversibility	Cumulative Effects	Residual Impact
8.	Income to local suppliers and service providers	0	0	0	+3		+3	0	0	0	0	0	0	0	0	0	R	LT	R	✓	✓
9.	Increased skills and impart knowledge to local communities	0	0	0	+2	0	0	0	0	0	0	0	0	0	0	0	R	LT	I R		✓
10.	Occupational Safety and Health impacts	0	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	L	LT	R		
11.	Community Health, Safety and Security	0	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	L	ST	I R		
12.	Gender discrimination	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	L	ST	I R		
13.	Child labor	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	L	ST	I R		

S/ N	Impact	Project activities and phase															Impact Rating				
		Construction/Mobilization/Demobilization phase					Operation Phase							Decommissioning phase							
		Site clearance and demolition	Transportation of materials	Trench excavations and casting of	Construction of the superstructure and installation of services	Landscape activities	Running the Buildings	Liquid waste handling	Solid waste handling	Energy provision	Maintenance works	Presence of Auxiliary facility and Boundary	Water provision	Demolition structures	Removal of solid	Termination of Temporary	Spatial Scale	Temporal Scale	Reversibility	Cumulative Effects	Residual Impact
14.	Impairment of air quality due to dust	-1	-2	-2	-2	-1	0	0	0	0	0	0	0	-2	-1	0	0	0	0	0	
15.	Dust and Noise pollution	-2	-2	-2	-2	-1	-1	0	0	0	-1	-1	0	-2	-1	0	L	ST	R		
16.	Wastewater management problems	0	0	-1	-3	-1	-3	0	0	0	0	0	0	0		0	L	LT	R	✓	
17.	Erosion of Exposed Surfaces	-1	-1	-1	-1	-1	-2	0	0	0	0	0	0	0	0	0	L	ST	R	✓	
18.	Solid waste management problems	-2	0	-2	-3	-2	-3	0	0	0	-1	-2	0	0	0	0	0	ST	R	✓	
19.	Loss of vegetation	-2	0	-1	-2	-1	0	0	0	0	0	0	0	0	0	0	L	LT	R		

S/ N	Impact	Project activities and phase															Impact Rating				
		Construction/Mobilization/Demobilization phase					Operation Phase							Decommissioning phase							
		Site clearance and demolition	Transportation of materials	Trench excavations and casting of	Construction of the superstructure and installation of services	Landscape activities	Running the Buildings	Liquid waste handling	Solid waste handling	Energy provision	Maintenance works	Presence of Auxiliary facility and Boundary	Water provision	Demolition structures	Removal of solid	Termination Temporary	Spatial Scale	Temporal Scale	Reversibility	Cumulative Effects	Residual Impact
20.	Construction vibration	-1	-1	-1	-2	-1	0	0	0	0	0	0	0	0	0	0	L	ST	I R		
21.	Increased revenue	0	0	0	+1	0	+3	0	0	0	0	0	0	0	0	0	N	LT	R	✓	
22.	Increased commercial and social activities around project locations.	0	0	0	0	0	+3	0	0	0	0	0	0	0	0	0	L	LT	R	✓	
23.	Increased pressure on social services and utilities	0	0	-1	-1	0	-3	-3	-3	-3	-1	-2	-3	0	0	0	L	M T	R	✓	
24.	Health and safety risks due to fire hazards	0	0	0	0	0	-2	0	0	-2	0	0	0	0	0	0	L	LT	R		
25.	Incidence of Diseases	0	0	0	-2	0	-2	0	0	0	0	0	0	0	0	0	L	LT	R	✓	✓

S/ N	Impact	Project activities and phase															Impact Rating				
		Construction/Mobilization/Demobilization phase					Operation Phase							Decommissioning phase							
		Site clearance and demolition	Transportation of materials	Trench excavations and casting of	Construction of the superstructure and installation of services	Landscape activities	Running the Buildings	Liquid waste handling	Solid waste handling	Energy provision	Maintenance works	Presence of Auxiliary facility and Boundary	Water provision	Demolition structures	Removal of solid	Termination of Temporary	Spatial Scale	Temporal Scale	Reversibility	Cumulative Effects	Residual Impact
26.	Water pollution	0	0	0	0	0	-2	-2	-1	0	0	0	0	0	0	0	L	LT	R	✓	
27.	Increased storm water generation and overflow	0	0	0	-2		-2	0	0	0	0	0	0	0	0	0	L	LT	R		✓
28.	Loss of employment and revenues	0	0	0	0	0	0	0	0	0	0	0	0	-3	-2		L	LT	I R		
29.	Population Influx	0	0	0	-1	0	0	0	0	0	-1	0	0	0	0	0	L	ST	I R		
30.	Loss of scenic quality	-2	0	0	-1	0	-1	0	0	0	0	0	0	-2	0	0	L	M T	R		
31.	Loss of aesthetic value due to haphazard disposal of demolished waste	0	0	0	0	0	0	0	0	0	0	0	0	-3	-2	0	0	0	0		
32.	Dust and noise pollution from demolishing works	0	0	0	0	0	0	0	0	0	0	0	0	-3	-2		L	ST	I R		

S/ N	Impact	Project activities and phase														Impact Rating					
		Construction/Mobilization/Demobilization phase					Operation Phase						Decommissioning phase								
		Site clearance and demolition	Transportation of materials	Trench excavations and casting of	Construction of the superstructure and installation of services	Landscape activities	Running the Buildings	Liquid waste handling	Solid waste handling	Energy provision	Maintenance works	Presence of Auxiliary facility and Boundary	Water provision	Demolition of structures	Removal of solid	Termination of Temporary	Spatial Scale	Temporal Scale	Reversibility	Cumulative Effects	Residual Impact
33.	Loss of revenue to KMC and the government	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	N	LT	I R		

6.3 Project Alternatives

Consideration of project alternatives is crucial in ensuring that the developer and decision-makers have a wider base from which they can choose the most appropriate option. The following alternatives have been considered and are examined hereunder:

6.3.1 No project Alternative

The no project alternative entails retaining the current status quo (No construction of the proposed office building). Adopting this option would mean avoiding most of the negative effects associated with the presence of the Zongomela Industrial Park and missing all the positive benefits such as benefits to communities resulting from employment, improved health and hygiene, increased income to KMC etc.

6.3.2 Alternative Site

The option of using another site apart from that of the proposed one (existing) was also considered. However, the Proposed site was observed to have the following advantages over others;

- The site is owned by KMC, (No need to buy a new piece of land).
- It is currently used for the same purpose, so customers are used to it.
- The plot is located on a favourable piece of land; it is at the CBD area.
- Availability of all necessary utilities such as electricity and water supply network.
- Good road network, shall make it easily accessible.

6.3.3 Energy Alternative

The use of other alternative energy sources apart from power from the National grid and diesel generators were considered. As it is the case in most of developing countries, supply of electricity from national grids is not reliable as it mostly originates from hydroelectric power generators, which depend on rainfall frequency, intensity and pattern. On the other hand, diesel generators which are mainly used during power interruptions, emit a lot of greenhouse gases especially when they are run for a long time. Solar energy was considered and the design team shall explore the feasibility of using this alternative.

6.3.4 Technology and Building Materials Alternatives

Construction technology involves the choice of building materials and the technique and means used to erect a building. As with the park design process, cautious consideration of contextual conditions is crucial to developing appropriate construction technologies. In addition, any selected technology must be constantly reviewed and, if necessary, upgraded during the construction process. A number of construction technologies were considered. The following criteria was used to select the most suitable technology options for this building;

- The use of locally available, low-energy-consumption building materials, especially those produced with renewable energy sources;
- The use materials from sustainable production chains (e.g., avoid use of timber from savage deforestation);
- The use non-toxic materials; and
- The use materials easily dismantled (and recyclable as building materials or energy sources).

6.3.5 Design Alternative

The proposed project will involve construction of multi-functional building that will provide availability of adequate and conducive place for business. This is the appropriate design given the nature of the use and the available space. Also, the National Human Settlement Policy encourages multi-storey buildings against horizontal expansion as strategy for space minimization. Prime land is becoming a scarce commodity and therefore optimal use is encouraged.

6.3.6 Collection, Treatment and disposal of Sewage

Two alternatives was considered for wastewater collection and disposal which includes the use of offsite sanitation or onsite sanitation. Onsite sanitation includes treatment and disposal of liquid wastes on site (i.e., Septic tanks etc) while offsite sanitation means collection of wastewaters from the site for treatment and disposal outside of the site (i.e., Sewerage system). The off-site sanitation (sewerage) was disqualified due to the following reasons;

- There is no sewerage system near the project area.
- It is very costly to construct a sewerage system and wastewater treatment plant.

6.3.5 Water Alternative

The option of using another water source was considered apart from that from KUWASA. Water boozers shall be used to supply water from the dams in Bijampola, Zongomela at time any inconvenience during project implementation.

CHAPTER SEVEN

POTENTIAL ENVIRONMENT AND SOCIAL RISKS AND IMPACTS AND THEIR MITIGATION MEASURES

7.1 Introduction

This chapter takes into account all relevant environmental and social risks and impacts of the project. It includes the environmental and social risks and impacts specifically identified in ESS2-8, and any other environmental and social risks and impacts arising as a consequence of the specific nature and context of the project, including the risks and impacts identified in ESS1, paragraph 28.

7.2 Potential Social Impacts during the Preparatory Phase of Zongomela Industrial Park

7.2.1 Positive social impacts

Job Creation and Increased Income to Local Communities

During this phase people shall be employed by the contractor to do mobilization works such as construction of camp sites, quarrying and material extraction and transportation activities. This shall increase the income to all those who have the opportunity to be employed by the contractor.

7.2.2 Negative Social Impacts

Disruption of Economic and Social Activities and Services

The proposed project areas might be used by people for cultivation, livestock keeping and beekeeping, to mention few. Land acquisition for the proposed project will force people to find other areas to get similar services.

Mitigation measures

- Awareness rising to community within the project core area; and
- Inclusion of local leaders (Ward/sub-ward chairpersons/executive officers or /and councilors.
- Development of RAP as per RPF including livelihood restoration measures.

Damage to Cultural Heritage

Inappropriate siting of facilities as well as construction (excavation) activities could result in damage to cultural heritage. While internationally and nationally protected sites are well documented and can be avoided this may not be the case with locally important sites.

Mitigation measures

- Implementation of the chance finds procedure as per the WB guides
- Screening of potential construction sites to identify cultural heritage.
- Engagement with local leaders and communities to understand the location of locally important cultural heritage (as part of screening).

7.3 Potential Environmental Impacts during the Preparatory Phase (Site Selection and Design)

Exploitation of Borrow Pits/Quarries and Other Natural Resources

Extractions of water, construction materials from both authorized borrow pits and quarries on government land, communal land and on private-owned land are associated with rampant degradation with no efforts of restoration/re-vegetation.

Mitigation measures

- Exploitation of construction materials will be from the authorized source only;
- Restoration of the borrow pits/quarries after use constituting levelling the area and seeding or planting of trees and/or grasses will be done in association with local government (natural resources department) and local environmental NGOs. If appropriate the levelled area will be left for natural re-vegetation;
- Re-use of the excavated soils and demolition rubbles as part of the sub-base material;
- Construction of underground water reserve tank and introducing rainwater harvest system; and
- Extraction of underground water resources.

Contamination and /Impaired Quality of Receiving Body – Land and Water

Main sources of construction waste are cleared vegetation and top-soil (overburden) and domestic waste from quarries. During quarrying activities, various type of wastes will be generated including solid and liquid wastes. The wastes may contaminate land or be washed into local surface and ground water resources and impair the quality of these receiving bodies.

Mitigation measures

- Efficient collection and disposal system based on the principles of reduction, re-use and recycling of materials, shall be instituted at project areas;
- To reduce the cost of the project, much of the excavated soil and rubble materials will be reused as initial filling materials where levelling of runway, taxiway and apron is required;
- Introduction of waste disposal bins, warning notices, posted at strategic points;
- No, on site burial or open burning of solid waste shall be permitted;
- Wastes not suitable for incinerations and general municipal waste dumping (e.g., Batteries, plastics, rubbers and tires) shall be removed for recycling, treatment, and/or disposal by licensed contractor as appropriate; and
- Instructions to contractor to put on his/her methodologies for handling hazardous waste such as oils, lubricants and non-combustible waste during bidding process.

7.4 Potential Social Impacts During Construction Phase

7.4.1 Positive Social Impacts

Jobs Creation

The construction activities will be envisaged to create more employment opportunities to local people. The project components expect to employ many workers from the locality and it is expected that more jobs will be directly connected with construction of the infrastructure.

Enhancement measures

- As part of the bidding requirements the contractor shall be encouraged to employ local, unemployed yet willing to work hard, manpower to the extent viable subject to a maximum of 50% unskilled labour. This will ensure that local people are more benefited out of the project;
- Employment will be on the basis of non-discrimination / equal opportunities for both genders as well as free of other forms of discrimination on the basis of individual characteristics;
- Contractor shall provide on job skills and training to workers; and
- Local communities shall be encouraged by the APIUs to produce quality goods and services at the project site through early engagement of likely requirements.

Income to Local Suppliers and Service Providers

The proposed project will need construction materials and other services in respective project region. Materials needed for this project is very large. This is good news to suppliers of building materials as well as those who will provide food and waste collection services.

Enhancement measures

- Ensure monitoring of labour standards among contractors, sub-contractors, workers and service providers; and
- Kahama Municipal Council to design appropriate means of collecting revenues.

Impacts on Knowledge

Whilst the operations related to constructions of concrete structures and installation of electrical wiring system and equipment are well known to local experts, the equipment and technology might be new to most practicing local engineers and consultants. The project activities will therefore benefit local experts in updating their knowledge and have opportunity for practical learning by participating in the whole process.

Enhancement measures

- Contractor shall provide on job skills and training.

7.5 Potential Negative Social Impacts during Construction

Occupational Safety and Health Impacts

On a daily basis, construction workers face dangerous employment conditions. Even though construction workers are trained and know basic safety measures, accidents can still happen. The risks taken every day during regular construction work make it difficult for job sites to remain accident-free. Accidents on site could be caused by defective or collapsing scaffold, electrocutions, falls, falls from ladders, and defective machinery such as forklifts, conveyors, hoists, cranes, malfunctioning tools and other equipment. Accidents can result in serious injuries or death. In case, construction is extensive, the potential significance of the risk to health and public safety will depend on the size of the population and the workers exposed and the degree of exposure. Workers permanently on the site will be exposed to air pollution throughout the construction period. Work accidents during construction work are quite common. This is due to the presence and handling of hazardous equipment and harmful building materials. It is therefore required that before the construction activities, there is need for the materials to be well inspected and harmonized to the occupational health and safety standards.

Mitigation measures

- Appropriate working gear (such as nose, ear mask and clothing) and good construction site management shall be provided by the contractor;
- Adequate training of contractors' workers on OHS and on proper use of PPE will be provided including but not limited to induction, tool-box talks (daily or weekly depending on activities) and 6-month refresher training sessions.
- During construction the contractor shall ensure that the construction site is fenced and hygienically kept with adequate provision of facilities including waste disposal receptacles, sewage, firefighting and clean and safe water supply;
- A well-stocked First Aid kit (administered by medical personnel) shall be maintained at construction site by the contractor. The medical personnel shall also be responsible for primary treatment of ailments and other minor medical cases as well as providing some health education to the workforce;
- Reporting mechanisms for the public to register concerns or complaints regarding perceived risks to their health and safety due to the construction operation;
- Developing a detailed health and safety plan and training all contractor staff on the plan.
- Emergency contact details in the event of an accident shall be provided by workers to the contractor.

Labour and Working Conditions

Contracted workers and those employed in the supply chain are at risk of being subjected to poor labour practices by their employers this may include lack of contracts, irregular pay, working long hours, lack of breaks etc. In addition, the use of child labour in the supply chain (e.g., the production of gravel is known to occur in Tanzania and will be avoided. Women are also at risk of being discriminated against in terms of employment opportunities by contractors. There is also a risk of sexual exploitation of women by their employers/ contractors which could include demands for sexual activities in exchange for recruitment, keeping their job etc. by male supervisors.

Due to technological developments and investment in labour saving equipment, the skilled and non-skilled workforce will be needed. The skilled construction workers will be imported to the area of construction and will reside in labour camps. A smaller number of local low-skilled jobs may be envisaged. These will include protection and guarding of the construction companies' properties. Low skilled workers will be hired around the project jurisdiction if necessary. Labour camps will be the responsibility of the contractor under the supervision of the consultant and APIUs. In order to ensure that the labour camps comply with the national law and ESS4 contractors will be required to prepare camp management plans as well as codes of conduct for workers and compliance will be mandatory for all workers. Other measures for the protection of and operation of the workers camp will be as narrated in ESS2 as described in this ESMF and subsequent LMP.

Mitigation measures

- The project will develop Labour Management Procedures to guide the employment of all workers.
- Contractors will be required as part of the bidding documents to develop camp management plans and codes of conduct for workers,
- The contractor shall be encouraged to employ local, unemployed yet willing to work hard, manpower to the extent viable subject to a maximum of 50% unskilled labour. This will ensure that local people are more benefited out of the project;
- All workers will have contracts with terms and conditions that are consistent with national labour laws and policies as well as ESS2.
- Workers will have access to a specific worker grievance mechanism in line with ESS2, which will be documented in the LMP.
- Contractors will be required to apply equal opportunities/ non-discrimination to the employment of workers and not discriminate on the basis of gender or any other personal characteristics.
- Contractors will be required to ensure that no children are employed on the site and have in place measures to verify the age of workers. Child under 14 are prohibited from working while children aged 14-18 can only take on light work (which generally excludes work on construction sites).
- All workers must have an employment contract, be paid for their work and have the right to resign if they wish. Forced labour will be explicitly prohibited.
- Selection of companies in the supply chain will involve due diligence to avoid the use of companies which are involved in child labour.
- The project will develop a GBV Action Plan which will include prevention and response measures. This will include codes of conduct, training and capacity building, awareness raising, access to referral pathways etc.

Community Safety – Social Conflict

It is expected that the increased number of workers and higher concentration of residents near construction sites will have an impact on local communities. Uncontrolled movement of workers will affect residents around the settlements. Also, the construction of the project shall definitely be accompanied by in-migration of job seekers and opportunistic businesses and speculators. This will bring many people in the project areas. This will increase social interactions amongst the construction workers and local communities. The presence of workers increases the risk of

SEA/SH (GBV) towards members of the community in particular female students who may be present on campus. Such risks are known to occur on construction projects.

Entry of a temporary labour force into an area could cause different negative impacts to the local communities including conflicts between local community members and newly arrived people due to the socio-cultural differences and other issues. The situation when temporary workers come from other regions and they are from different social and cultural backgrounds could easily create conflicts with the local social environment. Due to this, workers must receive training and sign a labour code of conduct in order not to create conflicts with the local community.

Influx of temporary workers may have a potential increase in crime in the community. This may be experienced during the construction period if mitigation measures are not introduced. With an increase in construction activities and the possibility of job seekers arriving, it may be more difficult to identify strangers in the community. There may also be negative issues that need to be managed such as increases in local prices, increased rents, prostitution or alcohol consumption associated with labour influx or increased incomes of local workers. It is expected that contractors will hire staff to provide security for their camps and other properties. Increased presence of security personnel can lead to community health and safety risks associated with any inappropriate use of force, GBV(SEA/SH) and intimidation of the community.

Mitigation Measures

- Maintain good security in the area with signage like “No employment at the moment”, to keep away job seeker to avoid unnecessary people in project sites
- Local workers will be hired to the extent possible to minimize influx
- Workers will be required to sign worker codes of conduct.
- Contractors will need as part of their C-ESMP to include camp management requirements
- Ongoing engagement with local stakeholders including relevant authorities on construction activities
- Ensure that all stakeholders are aware of the grievance redress mechanism and have access to the same.
- GBV Action Plan will be developed to prevent and respond to project related GBV risks associated with the community.
- The PIU will ensure that contractor (i) make reasonable inquiries to verify that the direct or contracted workers retained to provide security are not implicated in past abuses; (ii) train them adequately (or determine that they are properly trained) in the use of force, and appropriate conduct toward workers and affected communities; and (iii) require them to act within the applicable laws of Tanzania.

Community Health – Communicable Disease Transmission

The construction of the project shall definitely be accompanied by in-migration of job seekers and opportunistic businesses and speculators. This will increase social interactions amongst the construction workers and local communities. The presence of a large number of workers can give rise to an increased spread of communicable diseases. This among other factors may also produce an inherent increased risk of transmission of sexually transmitted diseases, HIV/AIDS and other contagious diseases taking into consideration that the project will be implemented within the town

council. In addition, the increase in disease like COVID-19 associated with the entry of a temporary labour force into community could also occur.

Mitigation measures

- In order to prevent more HIV/AIDS infection, during the implementation phase, the project shall include information education and communication component (IEC) for workers and the community in its budget. This will help to raise more awareness on HIV/AIDS and means to suppress its incidence.
- The contractor shall deploy locally available labour as practically possible
- A safety, health and environment induction training shall be conducted to all workers, putting more emphasis on HIV/AIDS and communicable diseases.
- Staff shall be encouraged the use of preventive measures like condoms by availing condom dispensers.
- Contractors will be required as part of the ESMP to include measures to demonstrate how they will work in a Covid-19 secure manner where relevant to minimise transmission risks.
- Worksites will be well maintained to avoid the creation of breeding sites for vectors. This will include to avoid the construction of small pools of water (mosquitos), waste (rodents) etc. which contribute to diseases transmission (water will be stored in containers).
- Contractors will have access to potable water and adequate sanitation facilities to prevent disease transmission.

Community Health – Accidents and Injury

During the building works, the risks related on public safety and the personnel increase. The building works will induce possible harmful effects on public safety. The traffic related to construction will contribute to reduced road safety especially on local roads where some contractor's facilities are located, especially where the traffic passes through settled areas and towns located close to the road. The traffic to construction site will depart from the public roads. Residents from local settlements on these haulage roads will be exposed to increased possibilities for accidents and injuries. Traffic consisting of heavy vehicles and machinery is especially risky. The sources of the effects to public are identified in the **Table 27** and could occur along transportation routes or as a result of the community entering construction sites. Children can be at particular risk of such impacts if they are unaware of project risks.

Table 27: Sources of the harmful effects on health and safety

Type of harmful effect	Sources of the threat
Accident risk (falls, trips, road traffic accidents, etc)	<ul style="list-style-type: none"> • During excavation work • Movements and operations of heavy equipment • Access to danger zones • Transport, handling and storage of the materials • Concrete batching and mixing plant • Modification made to the known plans of route
Indirect health risk	<ul style="list-style-type: none"> • Environment Pollution • Contamination of water or food

Mitigation measures

- Maintain good security in the area with signage like “No employment at the moment”, to keep away job seeker to avoid unnecessary people in project sites
- Develop and implement an emergency response plan including spill response and train workers on the same;
- Institute good site practices including prevent public access to the construction site by securing equipment and demarcate excavate, using warning signs with appropriate text (local language) and graphics programs;
- Institute traffic management and safety programme including, training and testing of heavy vehicles operators and drivers, enforcement of speed limits, maximum loading restrictions and compliance with all Tanzania transportation law and standards
- Undertake stakeholder engagement with local communities to inform them of activities on the site and associated risks.

7.6 Potential Environmental Impacts During Construction Phase

Impacts on Air Quality

Construction activities have potential to emit dusts and noxious gases such as CO₂, CO, NO_x, SO₂, VOC and CH₄. Vehicles and equipment's with internal combustion engines have potential to emit noxious gases. Construction works that are likely to generate dusts are mainly related to the movement of materials and machinery and construction work. When dust is exceptionally fine and when the populations resident undergoes an exposure prolonged and persistent (such as in proximity of a career) there are risks of attacks of the public health. Potential sources of dust at the site and off site are summarized in **Table 28**.

Table 28: Project activities and Impacts

Activity	Source of production of dust
On-site building work producing dust and gaseous emissions	
Clearance and terracing of the site	Earthworks Initial soil spraying after excavation. The movement of construction traffic and movement of materials Stored materials subjected to wind action
Excavation	The important sources are: The movement of traffic of construction The handling and the storage of waste The excavation and the transport of materials and potential storage on the site.
Building Foundations	The important sources are: Foundation excavation The movement of construction traffic The handling and the storage of waste The excavation and the transport of materials and potential storage on the site.

Activity	Source of production of dust
Building Works	Movement of traffic of construction. Potential of a certain strongly localized harmful effect if the completion of work requires “smoothing and sanding” of the wall to obtain a desirable completion.
Auxiliary work -	
Off-site building work producing dust	
Main court	Any movement of traffic on unpaved roads Surface Materials brought by the wind
Aggregate mixing unit	Stored materials Input of the handling of the materials Filtering and another process of materials Handling of materials/loading output Traffic congestion
Tool maintenance course	Materials of surface brought by the wind Traffic of construction
Sites of borrow	Clearing the site Excavation Stored materials Material loading

With regard to the gaseous emissions, the sources of atmospheric emissions associated with construction activities are mainly from units of construction and the possible generators, by evaluating these sources, the following conclusions can be drawn:

- The majority of the sources are mobile and will generate dispersed emissions and in a temporary way;
- The majority of the emissions will be generated starting from the concentrations of activities which are rather far away from the sensitive receivers; and
- The level of the emissions of the precursory pollutants and the atmospheric pollutants will vary from day to day, according to the type of the activity, but even if the impact is very limited in time, it does not remain about it less than it is subjected to a factor of expansion in space with knowing the weather conditions. Of this fact the intensity of the impact of the building site on air pollution especially by the suspended particles is evaluated like average.

Mitigation measures

Impairment of air quality due to emissions

- Equipment shall be maintained in good running condition, no equipment to be used that generates excessive black smoke;
- Enforce vehicle road restrictions to avoid excess emissions from engine overloading, where practical switching off engines will be done when not in use;
- There will be routine inspection of equipment;
- Trucks transporting materials shall be fully covered; and
- Turn off engines to reduce idling.

Impairment of Air Quality Due to Dust

- Protect stockpiles of friable material subject to wind through wetting;
- Cover loads with friable material during transportation;
- Restrict speed on loose surface roads to 30Km/hr during dry or dusty conditions; and
- Douse with water of roadways and work sites to reduce dust when necessary.

Impacts Through Noise

During construction works, the noises come mainly from the units of building site (power picks, mechanical shovels, cranes, concrete batching and mixing plant etc), trucks and semitrailers charged to transport materials as well as use of explosives (career of massive rock). The extent of the nuisance will depend on the spatial organization of the site and mainly the location of borrow pits, as well as the crushing plant, concrete plants and other noisy machines compared inhabited areas.

Mitigation measures

- Vehicles carrying construction materials shall be restricted to work during day time only;
- Machine operators in various sections with significant noise levels shall be provided with noise protective gear; and
- Construction equipment shall be selected, operated and maintained to minimize noise.

Impacts Through Vibration

Construction activity can result in varying degrees of ground vibration, depending on equipment and Method Employed. Vibration will be produced by construction vehicles, plant and machinery during delivery of materials, processing of materials, and actual construction work. The Construction activities that typically generate the most severe vibrations are blasting and impact pile driving for foundation. Due to an increase in activities and number of operational vehicles, the impacts vibration will cause disturbance to neighbours and physical damage to properties near the construction site.

Mitigation measures

- Impact pile driving shall be avoided where possible in vibration sensitive areas; and
- Vibratory rollers and packers shall be avoided.

Disadvantages Related to the Management of Wastewater

The types of wastewaters generated during construction activities include sewage, gray water and process water. Sewage effluent from camps and associated buildings will be produced in the sanitary facilities provided and collected on site. Septic waste produced in scattered sites will also pose a problem to human health. This will be particularly severe if the waste is not collected directly and / or is released directly into the wild without any treatment. Gray sewage will pose less of a direct problem to human health but will be produced in large quantities in the camps. Hunting and process water will be generated from batching plants, equipment maintenance centers and ordinary sites. Wastewater discharge in the natural environment can pollute

environment and causing unhygienic sanitary conditions and nuisances to the human perceptions. Types and sources of wastewater are shown in **Table 29**.

Table 29: Types and sources of waste water

Type	Source
Sewage	Works Camp
	Offices
	Other elements of the main camp
	Remote secondary facilities
	Sites
Gray water	Works Camp, cooking, personal and clothes washing
	Offices/Other camps
Hunting and process water	Oil spills
	Aggregates and process plants
	Equipment maintenance centers
	Ordinary sites

Mitigation measures

- Wastewater shall be properly treated in the Septic Tank Before disposal into the Soak Away Pit within the site;
- Contractor shall be instructed to put on his/her methodologies for handling hazardous waste such as oils, lubricants and non-combustible waste; and
- Training on waste management shall be done to all personnel, operators and services providers.

Disadvantages Related to the Management of Solid Wastes

Main sources of construction waste are cleared vegetation and top soil (overburden), scrape metals, asbestos, remnant of timbers and domestic waste from construction crews. During construction activities, various type of solid wastes will be generated including solid wastes from food in cafeteria and offices. The wastes may contaminate land or be washed into local surface and ground water resources and impair the quality of these receiving bodies. Other associated impacts include flies and increased bird population (attracted by food waste).

Mitigation measures

- The contractor shall have adequate facilities for handling the construction waste; and
- Topsoil shall be stock piled and used for reclamation or re-vegetation practice at the site during landscaping.
- Hazardous waste such as asbestos will be handled with the designated and registered vendor by the National Environmental Management Council (NEMC).

Erosion of Exposed Surfaces

Inadequate compaction and resurfacing compounded by rain, trampling, vegetation clearance etc. may cause erosion and consequent sediment load in runoffs. This is mostly likely to happen if construction is undertaken during the months of rain seasons -heavy rains.

Mitigation measures

- The construction will be as per engineering design and procedure of which a maximum requirement of compaction strength is achieved during the construction. That is maximum dry density (MDD) specified in the design manual by consultant;
- Maintain gravel fill and/or re-vegetate around the structures;
- Unnecessary ground clearance and sensitive re-alignments shall be avoided;
- Directing flow to properly designated channels;
- All excavation works shall be properly backfilled and compacted; and
- Most of construction activities will be done during dry weather.

Landscape and Visual Impacts

Like any development, there is a 'zone of visual intrusion' from which it can be seen. These refer to the impacts of landscape change on people: on the views that people have from their homes, offices, footpaths, cars as they drive past etc. Construction activities shall affect the landscape by removing existing landscape features in place such as trees and replacing them by concrete and gravel surface. If operated at night, the lights will lead to the increase of light pollution. The following components of the landscape can be affected by development:

- Physical factors: geology, landform, microclimate, drainage, soil, ecology; and
- Aesthetic factors: proportion, scale, enclosure, texture, colour views as well as sounds

However, the proposed project components can also change the overall character of an area to make it look harder and more urban.

Mitigation measures

- Light pollution can be reduced by keeping lighting (e.g., of parking lots) to the minimum levels needed for safety, and through the careful choice of light fixtures such as the use of flat-glass lanterns in car parks; and
- Locating parts of the development further away from viewers.

Loss of Scenic Quality

Scenic quality deterioration will occur due to stock piling of construction materials and discoloration of plant leaves and houses in the vicinity around the proposed site due to windblown dust. Excavation works as well as presence of construction vehicles, plant and equipment will also add to scenic quality deterioration. Scenic quality deterioration will also occur off-site, at the sources of construction materials, the quarries and sand mines. If these are not made well, they may become an eyesore. Scenic quality deterioration can destroy the economic and aesthetic value of public and/or private property including land. Scenic quality degradation effects will be significant, short term and direct. They will, in spite of everything, be manageable given proper site operation and prior warning as well as issuance of site operation guidelines.

Mitigation

- Tree planting in the market after construction.
- Backfilling and rehabilitation of quarries.

7.7 Potential Social Impacts During the Operation Phase

The following social impacts have been identified during project preparation. However, following development of the Social Impact Assessment, LMP and GBV Action Plan for the Project these impacts will be revisited and updated where relevant.

7.7.1 Positive Social Impacts

Increase of Revenue to Kahama Municipal Council

Kahama Municipal Council will increase number of businesses which in return will increase revenues through rent and revenue. This will increase financial standing of the town council which will lead to efficient running of the council.

Job Creation

Jobs generated by operations of project components can be divided into two (2) categories: direct and indirect jobs; their volume depends strongly on the level of operational activities. Direct jobs are those related to operational services, cleanliness, stationeries, catering and commercial activities. Indirect jobs are those created by the positive impact institutions to economic sectors. These are agriculture, livestock, energy and water sector. The ripple effect (or catalyst) on the entire regional and national economy is also the origin of the creation of 'indirect' jobs.

Enhancement measures

- Employment will be on equal opportunities/ non-discrimination for both genders and on the basis of any personal characteristics.

Increased Commercial and Social Activities Around Project Locations

Construction of the proposed project components is anticipated to attract more businesses in a way that create vibrant businesses within project respective areas. Also, it will cause a growth of the existing businesses around the project location.

Enhancement measures

- Good security within the project area and area of influence.

7.7.2 Negative Social Impacts

Increased Incidences of Diseases and Ill Health

The concentration of a large number of people within the proposed project area could contribute to increased levels of communicable diseases, which facilitate the spread of diseases such as Sexually Transmitted Diseases (STDs), HIV/AIDS, Covid 19 and other ailments.

Mitigation measures

- A safety, health and environment induction course shall be conducted to community members and workers, putting more emphasis on HIV/AIDS, which has become a national disaster;
- The project shall include information education and communication component (IEC) in its budget. This will help to raise more awareness on HIV/AIDS, and means to suppress its incidence;

- Environmental sanitation systems shall be improved; and
- Follow all measures outlined to prevent spread of Covid 19 such as leaving a minimum distance of 1m between workers, washing of hands while entering and leaving the site, wearing of masks, and provision of facilities for frequent checkup to reduce new cases. Hand washing facilities will be provided at site.

Increased Pressure on Social Services and Utilities

The presence of the buildings has the potential to increase pressure on social services and utilities such as electricity and water. The demand may strain the existing service delivery system in one way or the other. The increase of population is due to employment opportunities will definitely strain the existing social services.

Mitigation measures

- Use of water conservatively by instituting technologies (e.g., self-lock water tape) and awareness raising notices to users, etc.;
- Construction of underground water reserve tank and introducing rainwater harvest system;
- Extraction of underground water resources;
- Alternative measures like use of solar power, drilling a borehole at site, water recycling shall be explored and implemented if found feasible. For instance, use of energy savers bulbs shall be given high priority; and
- Use of air conditioning shall be kept to a minimum and maintenance of the cool indoor environment using natural ventilation system shall be strongly explored during the design process.

Risk of SEA/SH at the market and bus stand

Women are at risk of SEA/SH while conducting their activities in the market and bus stand. This can include sexual acts from male counterparts, sexual assault, verbal sexual harassment amongst others. SEA/SH may affect women working in market areas and bus stands negatively. The identification of SEA/SH risks during operation will be considered further as part of the GBV Action Plan.

Mitigation measures

A GBV Action Plan will be drafted, approved and implemented which will include the following:

- a) Assess the SEA/SH risks associated with the project based on existing data and input from key stakeholders. This will include identification of risks to workers and communities during construction as well as risks to women in project areas.
- b) Map out GBV prevention and response actors at the levels of district and the market/bus stand.
- c) Define the GBV requirements and expectations in the bid documents including codes of conducts (to be signed by workers), training, awareness raising for workers and the community, GBV responsive GRMs and approach to GBV case management.
- d) Define the GBV measures needed to protect women including to develop GBV policies to address SEA/SH, training and awareness raising, GBV responsive GRMs, educator/ staff codes of conduct (to be signed), referral pathways etc.

7.8 Potential Environmental Impacts During the Operation Phase

Water Pollution

This pollution will be mainly a result of sanitation system (Septic tank system) that will be used during project operation. This is due to the fact the proposed project will increase number of students with time. Onsite sanitation systems always cause groundwater pollution due to infiltration of the effluent during disposal. Also, surface water is at risk of pollution due to drainage of contaminated impervious surfaces. In this case, the main pollutants include solid matters, floating and macro waste, heavy metals and organic matters. During the rainy season, the surface waters will drain the pollutants directly towards the natural discharge system if the project does not envisage pre-treatment of rain water. Thus, the risk of water degradation is assessed as important, which may have an indirect impact on the water table too.

Mitigation measures

- The developed Surface Water Quality Program and a Spill Prevention and Response Plan will be used to manage and mitigate the pollution of surface and ground water on the proposed project sites. The ESMP describes the measuring and monitoring activities and tracks actions taken to manage surface and ground water discharges;
- Septic tank and soak away shall be designed in such a way waste treatment is achieved by 100% before disposal to the authorised disposal sites;
- Minimize oil spillage;
- Discharge and treat foul drainage and sewage; and
- Pass run off through oil interceptors.

Storm Water Generation and Overflow

The proposed project components will generate a lot of storm water due to presence pavements, concrete surfaces and building roofs. The structures will tend to compromise the infiltration capacity of the land surface hence rendering water free to the environment. The storm water generated might have impacts on structures downstream as well as being a factor for soil erosion and poor water quality.

Mitigation measures

- The design of storm water drainage will be given a high priority;
- Rainwater harvesting will be used encouraged in proposed project sites; and
- The design shall consider enough greeneries in the project site.

Health and Safety Risks Due to Fire Hazards

Buildings are very prone to fire hazards because of different types of combustible materials and machines, which are used and installed, respectively. Electrical fault is by large the main culprit in fire accidents in buildings in Tanzania. The components of a fire are fuel (combustible substance), heat and oxygen. Unless all three are present fire will not occur. Fire can cause the following effects:

- Loss of lives;
- Serious Injuries;
- Loss of properties etc.

Mitigation measures

- Adequate number of portable fire extinguishers shall be placed at strategic locations;
- Good housekeeping shall be maintained at all sites to reduce the fire risk;
- The design of buildings shall strictly adhere to the Fire Safety Standards;
- Fire detectors and sprinkler system shall be installed in the buildings; and
- The proponent shall insure buildings against fire Hazards.

7.9 Potential Social Impacts During Decommissioning Phase

Loss of Employment and Revenues

The people employed by the project will lose their jobs. This will have significant impact on these people and their families. Other dependents of the project, such as suppliers of various services (e.g., Security Company) will lose the market. Also, the KMC will be loose revenue in case of the decommissioning of the project, the revenue generated will cease. This impact is considered negative, long term and of moderate significance.

7.10 Potential Environmental Impacts During Decommissioning Phase

Loss of Aesthetics Due to Haphazard Disposal of Demolished Waste

In the event of future rehabilitations and upgrading, the buildings may need to be demolished necessitating disposal of demolished waste. Haphazard disposal may cause contamination/impaired quality of receiving body – especially land, and water resources.

Mitigation measure

- The debris resulting from the demolition will either be transported by a licensed waste transporter for dumping at an approved site or used as base material for new construction work;
- All the necessary health and safety measures will be implemented including provision of personal protective equipment such as, safety harnesses, helmets, gloves, respirators, safety shoes, coveralls, goggles and ear protectors; and
- Restoration of the affected land will involve the filling in of any open pits and grading the land to its natural contours, then planting appropriate tree species and under cover vegetation to hold the soil in place and to prevent flooding.

Dust and Noise Pollution from Demolishing Works

In the event of future rehabilitations and upgrading, the building needs to be demolished necessitating disposal of demolition waste. The noise pollution and air quality will be most affected during the demolition work with the emission of dust particles from machinery like excavators, electric grinders and mixer. The impact receptors are likely to include site workers and neighbours. The substances which will most significantly contribute to air pollution, will be Particulate Matter. Particulate matters may cause health hazards when inhaled in significant amounts and can also reduce the visibility. Most of those dust particulates will come from dust particulates which themselves come from the concrete rubbles and blocks.

Mitigation Measure

In the event of dust generation during decommissioning dust suppressors and blockers will be used such as water and fencing of the site during works to avoid dust from spreading to nearby areas.

Loss of Revenue to the Government

As discussed above both town and Central government will be receiving revenue from the project. In case of the decommissioning of the project, the revenue generated will cease.

Mitigation Measure

In case of lost revenue from the project due to decommissioning the government will have to look for alternative source of revenue or increase some of the revenues such as fuel, drinks and levies to compensate for the lost revenue from the project. The government may introduce new sources of revenue to ensure that the amount collected is not affected.

7.11 Environmental and Social Management Plan (ESMP)

The ESMP provides general guidance for the management of environmental and social impacts, which will be identified from specific sites environmental and social assessments. Once the specific sites are identified, implementing institutions in collaboration with the NPIU will conduct screening using procedures outlined in this ESMF. The results of the screening will guide the way impacts will be assessed and mitigation measures designed. For sub-project which will require EIA (as a result of screening), separate ESMPs will be prepared (as part of ESIA) of which C-ESMPs will be derived from at a later stage. Whereas project whose screening result will not necessitate the preparation of ESIA, the project will ask the contractor to prepare C-ESMP directly. The general Environmental and Social Management Plan (ESMP) for the identified impacts is presented in **Chapter 8**.

CHAPTER EIGHT

ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

8.1 Introduction

Plans for the implementation of mitigation measures for the proposed project are provided in this chapter. The Plans indicate institutional responsibilities, time to take the action and estimated costs. The proposed costs are only indicative, the proposed development should proceed with the suggested changes, and the developer will work out on actual costs and include them in the overall cost of the project. Based on the EMA, (URT 2004), NEMC is required to ensure compliance of all the agreed conditions for authorization. The measures are given in **Table 30**. Kahama Municipal Council is committed to implement the mitigation measures suggested by the Environmental and Social Impact management Plan (ESMP).

8.2 Implementation of the Management Plan

The environmental and social mitigation measures incorporated in the detailed engineering design shall be handed over to the contractor during construction period. The Contractor shall take stock of the contents of the Environmental and Social Management Plan of the Project. The contractor shall implement the ESMP during the construction period under close supervision of firm representing Kahama Municipal Council.

Table 30: Environmental and Social Management Plan

Phase	Potential Impacts	Management/Mitigation Measures	Target Level	Responsibility of Direct Supervision	Responsibility of Mitigation	Annual Cost (TSH)
MOBILIZATION	Dust emission due to site clearance	-Water spray shall be used -Fence the site to minimize wind effects, -Cover all spoil materials while at site	As per TZS 837 Parts 1, 2 and 3	Contractor	Kahama Municipal Council, Contractor and Consultant	3,000,000
	Vegetation clearance	To mitigate the impact during mobilization, the vegetation clearance shall be only for those hinder project implementation and after construction trees planting programme shall be initiated	Minimal vegetation clearance	Contractor	Kahama Municipal Council, Contractor and Consultant	3,000,000
	Noise pollution due to demolition	-Regular maintenance of all used machine-like full dozer -Site mobilization works will be on day time only not otherwise -The site will be fenced by iron sheet before levelling -Noise protective gear will be provided to workers	As per TZS 837 Parts 1, 2 and 3	Contractor	Kahama Municipal Council, Contractor and Consultant	3,000,000

Phase	Potential Impacts	Management/Mitigation Measures	Target Level	Responsibility of Direct Supervision	Responsibility of Mitigation	Annual Cost (TSH)
	Occupational Health hazards	<ul style="list-style-type: none"> -Apply water spray to all area where dust emission is high -All used trucks will be serviced regularly their engines -Cover all stockpile found at site -Any trucks used for transporting waste from site will be covered -Provide safety gears to demolition crews like safety boots, uniform etc 	Zero health hazards	Contractor	Kahama Municipal Council, Contractor and Consultant	10,000,000
CONSTRUCTION PHASE	Flooding influenced by the drainage pattern of the area	<ul style="list-style-type: none"> -The natural stream coming from the northeast will be directed through box culvert to its natural path at the south. -The road designs considered provision of trapezoidal closed ditches under sidewalk to collect surface storm water from roads and direct water flows to the natural streams at the south of project site. 	Zero floods' hazards	Contractor	Kahama Municipal Council, Contractor and Consultant	As per BoQ
	Impacts associated with transportation of construction materials	<ul style="list-style-type: none"> -Trucks used for transporting construction materials shall be covered on top -All trucks used shall be regularly serviced their engine, 	As per TZS 837 Parts 1, 2 and 3	Contractor	Kahama Municipal Council, Contractor and Consultant	3,000,000

Phase	Potential Impacts	Management/Mitigation Measures	Target Level	Responsibility of Direct Supervision	Responsibility of Mitigation	Annual Cost (TSH)
	Occupational health and safety of construction workers	-Use water sprinklers to suppress excessive dust during construction; -Provide and enforce use of appropriate protective gears such as boots, helmets, masks and gloves to workers -Adhere to OSHA guidelines to avoid accidents at the work place -Provide First Aid facilities and train some workforce on emergency response measures. -Establish health and safety regulations, and formulating preventive measures for accidents and other human health and safety hazards.	OSHA regulations and OSHA Act of 2003	Contractor	Kahama Municipal Council, Contractor and Consultant	20,000,000
	Dust from the movement of Construction Equipment	-Use of water sprinklers to suppress dust on unpaved area within project site	As per TZS 837 Parts 1, 2 and 3	Contractor	Kahama Municipal Council, Contractor and Consultant	5,000,000
	Noise from Movement of Construction Equipment	-Routine maintenance of equipment for optimal performance -Fencing the project site with iron sheet	As per TZS 837 Parts 1, 2 and 3	Contractor	Kahama Municipal Council, Contractor and Consultant	5,000,000
	Pollution of surface water sources due to spoils materials	Removal of all debris Compaction and surfacing	No debris left at site	Contractor	Kahama Municipal Council,	5,000,000

Phase	Potential Impacts	Management/Mitigation Measures	Target Level	Responsibility of Direct Supervision	Responsibility of Mitigation	Annual Cost (TSH)
					Contractor and Consultant	
	Potential of spread of HIV/AIDS and other STIs to the construction crew and local communities	-Sensitize workers on dangers of HIV/AIDS -Collaborate with NGOs to ensure Voluntary Counselling and Testing programs are established	All workers and local communities are sensitized on issues of HIV/AIDS	Contractor	Kahama Municipal Council, Contractor and Consultant	50,000,000
	Health hazards to workers due to poor management of hazardous waste	-Generated cut pieces of iron sheets, steel bars and a like shall be collected into a designed area for temporary hazardous waste storage while waiting to be collected by authorized dealers for disposal.	Zero injuries	Contractor	Kahama Municipal Council, Contractor and Consultant	3,000,000
	Pollution due to mismanagement of solid waste	-Ensuring proper design of systems for collection, transportation and disposal of solid wastes -Ensuring availability of sufficient waste bins at appropriate locations -Sorting of solid waste shall be done at source -Constructed chamber shall be paved and roofed	No pollution	Contractor	Kahama Municipal Council, Contractor and Consultant	3,000,000
	Pollution due to mismanagement of domestic wastewater	-Installation of a movable toilet or construction of temporary toilets and bath to be used during construction, -Emptying of provided toilets will be done to avoid overflow	Zero pollution	Contractor	Kahama Municipal Council, Contractor and Consultant	3,000,000

Phase	Potential Impacts	Management/Mitigation Measures	Target Level	Responsibility of Direct Supervision	Responsibility of Mitigation	Annual Cost (TSH)
	Vibration due to construction and installation activities	-All noise activities should be undertaken during day time -Neighbours and workers should be informed the day of installation of machines which might cause vibrations.	5 mm/s PPV at all times as per noise and vibration regulation, 2015	Contractor	Kahama Municipal Council, Contractor and Consultant	4,000,000
	Sexual exploitation and abuse and Gender inequity in employment opportunities	-Implementation of the Gender Action Plan (GAP); -Jobs will be equitably distributed to both women and men as long as they qualify rather than based on gender to allocate jobs. Employment records disaggregated by sex will be kept by the contractor and easily accessed by the monitoring and supervising team; -livelihood support strategies will be extended to the vulnerable groups and their income levels monitored closely during the implementation process;	No sexual exploitation and abuse and No gender inequity	Contractor	Kahama Municipal Council, Contractor and Consultant	10,000,000
OPERATION PHASE						
	Pollution of surface water source due to mismanagement of domestic wastewater	Ensuring proper design of septic tank and soak away system -Ensuring routine maintenance of storm water drainage system -Ensure septic tank is emptied frequency to reduce overflow of liquid waste	No liquid waste overflowing	Proponent	Kahama Municipal Council, Contractor and Consultant	4,000,000

Phase	Potential Impacts	Management/Mitigation Measures	Target Level	Responsibility of Direct Supervision	Responsibility of Mitigation	Annual Cost (TSH)
	Pollution due to mismanagement of domestic solid waste	<ul style="list-style-type: none"> -Ensuring proper design of systems for collection, transportation and disposal of solid wastes -Ensuring availability of sufficient waste bins at appropriate locations -Design waste collection chambers for collecting waste before transported to dump site 	No pollution	Proponent	Kahama Municipal Council, Contractor and Consultant	3,000,000
	Fire-break out and Safety Systems	<ul style="list-style-type: none"> -Portable fire extinguishers shall be put in place in all strategic areas -Firefighting system incorporating water hydrants shall be installed including fire detection alarm system to avoid the risk of fire break out. -Fire assembly area shall be designated in the project area 	zero fire break outs	Kahama Municipal Council	Kahama Municipal Council, Contractor and Consultant	5,000,000
	Spreading of HIV/AIDS and other STIs	<ul style="list-style-type: none"> -Raising awareness of the dangers of the HIV/AIDS to workers, lessors and visitors, -Support voluntary HIV counseling and testing. 	Reduce spreading of STI	Kahama Municipal Council	Kahama Municipal Council, Contractor and Consultant	2,000,000
	Pollution due to mismanagement of tannery wastewater	-Generated wastewater from a tannery factory shall be collected into a designed effluent treatment plant incorporated with constructed wetland	No pollution	Kahama Municipal Council	Kahama Municipal Council, Contractor and Consultant	5,000,000
	Soil erosion due to runoff effects	-Proper backfilling and resurfacing of the constructed area	No soil erosion	Kahama Municipal Council	Kahama Municipal Council,	4,000,000

Phase	Potential Impacts	Management/Mitigation Measures	Target Level	Responsibility of Direct Supervision	Responsibility of Mitigation	Annual Cost (TSH)
		-Stabilize the soil by applying light compaction, -Planting of trees and grass on bare land at project site.			Contractor and Consultant	
	Water and soil pollution due to poor handling of chemicals or spills	-All users of chemicals must be familiar with guidelines and laws governing chemical spills. -All chemical wastes must be disposed of in accordance with laws. -Initiate the program of control the spills, contain the spills and clean up the spill once any chemical spillage occurs. -Provide recommended PPEs to everyone who deals with chemicals. -Paving the area where chemicals are stored. -Ensure that spill kit with recommended facilities shall be available at project site.	No water or soil pollution	Kahama Municipal Council	Kahama Municipal Council, Contractor and Consultant	4,000,000
	Gender based violence and harassment	-Strict implementation of the council policy on Gender and HIV/AIDS issues including utilization of the existing structure and system for management of gender-related issues within the Institute;	No gender violence	Kahama Municipal Council	Kahama Municipal Council, Contractor and Consultant	3,000,000
DECOMMISSIONING	Loss of aesthetic value due to abandonment of structures	-Either demolish the structures or undertake major rehabilitation in an environmentally sound manner -To restore the environment into its original appearance.	Minimum to zero pollution of environment	Kahama Municipal Council	Kahama Municipal Council, Contractor and Consultant	16,000,000

Phase	Potential Impacts	Management/Mitigation Measures	Target Level	Responsibility of Direct Supervision	Responsibility of Mitigation	Annual Cost (TSH)
	Noise and dust pollution from demolition	-Apply water spray for dust control, -Fence the area with iron sheets -Cover all demolition wastes at site -Service all machines used	As per TZS 932:2006 and TZS 837 Parts 1, 2 and 3.	Kahama Municipal Council	Kahama Municipal Council, Contractor and Consultant	6,000,000
	Loss of Employment	-Prepare workers for forced retirement by providing skills for self-employment, and wise investment of the retirement benefits, -Ensure that all employees are members of the Social Security schemes, -Consider redeploying employees in other projects of the proponent.	The retrenchment to go as smoothly as possible	Kahama Municipal Council	Kahama Municipal Council, Contractor and Consultant	5,000,000
	TOTAL					168,000,000

8.3 Environmental and Social Monitoring

Monitoring refers to the systematic collection of data through a series of repetitive measurements over a long period of time to provide information on characteristics and functioning of environmental and social variables in specific areas over time. There are four types of monitoring that are also relevant to this EIA.

- **Baseline monitoring** – the measurement of environmental parameters during a pre-project period and operation period to determine the nature and ranges of natural variations and where possible establish the process of change.
- **Impact/effect monitoring**: involves the measurement of parameters (performance indicators) during establishment, operation and decommissioning phase in order to detect and quantify environmental and social change, which may have occurred as a result of the project. This monitoring provides experience for future projects and lessons that can be used to improve methods and techniques.
- **Compliance monitoring**: takes the form of periodic sampling and continuous measurement of levels of compliance with standards and thresholds – e.g., for waste discharge, air pollution.
- **Mitigation monitoring** aims to determine the suitability and effectiveness of mitigation programme, designed to diminish or compensate for adverse effects of the project.

To ensure that mitigation measures are properly done, monitoring is essential. **Table 31** provides details of the attributes to be monitored, frequency, and institutional responsibility and estimated costs. These costs are only approximations and therefore indicative. Costs that are to be covered by the developer should be included in the project cost.

Table 31: Social and Environmental Monitoring Plan for proposed roads, market and mini bus stand at Zongomela industrial area

Environmental Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility for monitoring	Annual costs estimate (Tsh)
Pre-construction Phase								
Air Quality	Dust (PM ₁₀)	Once	Project sites	g/Nm ³	<i>Micro-dust Pro (TZS 837 Part 3)</i>	<0.25	Proponent	3,000,000
Noise Baseline	Noise level	Once	Project sites	dBA	<i>Noise Level Meter</i>	<55 (Day Time) <45(Night Time)	Proponent	3,000,000
Construction Phase								
Air Quality	Dust (PM ₁₀)	Once per month	Project sites	g/Nm ³	<i>Micro-dust Pro (TZS 837 Part 3)</i>	<0.25	Contractor/ Proponent	4,000,000
Noise pollution	Noise level	Once per month	Project sites	dBA	<i>Noise Level Meter</i>	<55 (Day Time) <45(Night Time)		5,000,000
Employment opportunity	Percentage of local construction labourers	Three times a year	Project sites	Number of local people employed in the project	Records, inquiries and observation	>50	Proponent/ Contractor/ Supervising firm/ Ilembo ward leaders	4,000,000
Safety and health risks	Number and type of safety	Twice a year	Project sites	Number of safety	Records, injuries and inspection		Contractor/ Proponent	4,500,000

Environmental Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility for monitoring	Annual costs estimate (Tsh)
	equipment such as mask, helmet gloves and ear plugs. Health and sanitation facilities in site.			measures provided		-		
Waste Management	Solid and Liquid waste collection facilities	Once a week	Project sites	Presence of Skip bucket and Septic Tank System	Observations	At Least 1 Skip bucket and Septic Tank System for each site	Contractor/ Proponent	3,500,000
Soil erosion	Soil erosion	Once per Month during dry season and weekly during rainy season	Project Sites	Area eroded	Observations and measurements	No erosion at all	Contractor/ Proponent	4,500,000
Vibrations	Vibrations	Once per year	Project sites	Number per minute	Observations and Measurements		Contractor/ Proponent	5,000,000
Demobilization phase								

Environmental Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility for monitoring	Annual costs estimate (Tsh)
Air Quality	Dust (PM10)	Once	Project sites	mg/Nm ³	<i>Micro-dust Pro (TZS 837 Part 3)</i>	<0.25	Contractor/ Proponent	3,000,000
Noise pollution	Noise level	Once	Project sites	dBA	<i>Noise Level Meter</i>	<55 (Day Time) <45(Night Time)		4,000,000
Waste Management	Solid and Liquid waste collection facilities	Once a week	Project sites	Presence of Skip bucket and Septic Tank System	Observations	At Least 1 Skip bucket and Septic Tank System	Contractor	4,500,000
Operation phase								
Safety risk due to fire	Awareness and Signage number of fire extinguishers	Once a year	Project site	Number of safety measures provided	Records, injuries and inspection		Proponent/ OSHA	3,500,000
Waste Management	Solid and Liquid waste	Everyday	Project site	Presence of Waste Collection Point for the hotel	Observations	At least 1garbage collection point for the hotel buildings	Proponent	3,500,000

Environmental Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility for monitoring	Annual costs estimate (Tsh)
				Hotel connected to the septic tank and soak away pits		Wastewater septic tanks properly functioning		
Total monitoring costs								55,000,000

Source: Consultant Analysis, January, 2022.

8.4 Stakeholders Consultation during Implementation

During Project implementation, engagement activities will be undertaken in relation to project activities. At this stage a number of structured and formal meetings, focus group discussions, community meetings, one to one interview, distribution of information (pamphlets) and site visits will be conducted. The timing for the conducts of the meetings will be determined by the progress of the project implementation and when seems necessary to invite stakeholders for their comments and observation. However, the sharing of information and progress with stakeholders will be subject to scrutiny with regards to the kind of information to be shared and how the same will be communicated to both stakeholders, PAPs and OIPs. Furthermore, at this stage, the Kahama Municipal Council will ensure equal and effective participation from project preparation to implementation stages. To ensure stakeholders' views and concerns are well captured, the Municipal will have different methods of collecting information based on their needs i.e., disadvantaged or vulnerable groups.

8.5 Grievances Redress Procedures

The project will establish or strengthen the GRM mechanism at the Kahama Municipal Council which will be adopted by the contractor undertaking the construction of Zongomela industrial area. This is the response to one of the concerns raised during stakeholder consultation.

8.5.1 Purpose

A Grievance Redress Mechanism (GRM) is necessary for addressing the legitimate concerns of the project affected persons. Grievance handling mechanisms provide a formal avenue for affected groups or stakeholders to engage with the project on issues of concern or unaddressed impacts. Grievances are any complaints or suggestions about the way a project is being implemented, and they may take the form of specific complaints for damages/injury, concerns around resettlement and compensation, concerns about routine project activities, or perceived incidents or impacts. The stakeholder engagement process will ensure that the PAPs are adequately informed of the procedure. The GRM is designed with the objective of solving disputes at the earliest possible time, which will be in the interest of all parties concerned and therefore, it implicitly discourages referring such matters to a tribunal/court for resolution.

8.5.2 Principles

A functional GRM has to be established and/or strengthened at Kahama Municipal Council in order to ensure grievances emanating from the project implementation activities are reported and raised accordingly. GRM is necessary for addressing the legitimate concerns of the project affected persons (PAPs). In addition, GRM provide a formal avenue for affected groups or stakeholders to engage with the project on issues of concern or unaddressed impacts. In the interest of all parties concerned, the GRMs are designed with the objective of solving disputes at the earliest possible time. Such mechanisms are fundamental to achieving transparency and voicing PAPs' concerns about overall project activities.

8.5.3 Construction GRM

This will be administered by the contractors and will address grievances associated with the construction of the bus terminal.

Step 1: Submission of Grievances

The affected person shall file their grievance to the GHO, which will be recorded in writing. The grievance note should be signed and dated by the aggrieved person. A grievance can be submitted to in a number of ways as follows:

- through suggestion box (which will be in accessible locations including at construction site).
- during regular meetings held with stakeholders;
- through the Local Consultative Forums established in the affected locations;
- during informal meetings;
- through communication directly with management – for example a letter addressed to site management/ institution; and
- email, what's app messages and telephone (where appropriate).
- all complaints about abuse in service, potential corruption must be channeled to proper authorities no more than 5 days after the complaint is received.

Step Two: Logging the Grievance

The CGC keeps records of all complaints received, whether and how the CGC resolved them. Once a grievance has been received it must first be logged in the grievance database register by the CGC. A sample grievance logging form should be provided. Anonymous grievances will be accepted recognizing that this may limit the possibility of investigation and resolution. Those who collect grievances will be trained on how to collect grievances related to GBV in the appropriate manner (see below).

Step Three: Providing the Initial Response

The person or community or stakeholder that lodged the initial grievance will then be contacted within 2-3 days to acknowledge that CGC has received the complaint. This response will either accept or refute responsibility for the grievance. This notification will include details of the next steps for investigation of the grievance, including the person/department responsible for the case and the proposed timeline for investigation and resolution which will depend on the severity of the incident. In some cases, it may be necessary to provide an immediate response to avoid further harm while more detailed investigations are undertaken e.g., in the case of fatalities, workplace accidents, community safety pollution of natural resources, conflict with communities etc.

Step Four: Investigating the Grievance

The CGC will aim to complete investigation within two weeks of the grievance first being logged. Depending on the nature of the grievance, the approach and personnel involved in the investigation will vary. A complex problem may involve external experts for example. A simpler case may be easier, and quicker to investigate. The CGC will involve the aggrieved person/people in this investigation, where possible, to ensure participation. The CGC will continually update the aggrieved on the progress of the investigation and the timeline for conclusion. Unless highly complex, the investigation will be completed within 14 days, although efforts should be made to complete this process faster.

Step Five: Communication of the Response

The CGC will outline the steps taken to ensure that the grievance does not re-occur and any measures needed to resolve the complaint. The response will be communicated within 1 day of the resolution being determined.

Step Six: Complainant Response

If complainant is satisfied then SGC will seek their sign off from the complainant and determine what if any follow up is needed to monitor the implementation of the resolution. The resolution will be implemented promptly. This may happen at the time the resolution is proposed or within a timeframe agreed between the CGC and complainant but ideally within 5 days.

Step Seven: Grievance Closure or Taking Further Steps if the Grievance Remains Open

Once the measures have been implemented to the complainant's satisfaction the grievance will be closed. If, however the grievance still stands then the CGC will initiate further investigation and determine the steps for future action. Once all possible redress has been proposed and if the complainant is still not satisfied then they will be advised of their right to appeal to the next level as outlined above. If the grievances cannot be resolved at the Kahama Municipal Council project implementing level or PIU at PORALG, the complainant will be advised of their right to legal recourse.

8.6 Capacity Development and Training

8.6.1 Training Needs to Environmental and Social Specialists and Other Project Staff

For successful implementation of the E&S issues, capacity enhancement through training will be done to institution project team. The training can be in the form of the whole project staff or Training of Trainers (TOT), and it can be in the form of short or long workshop. This training will ensure that the project specialists are able to manage and monitor the environmental and social aspects of project activities. The workshop will take place in early stages of TACTIC project implementation. The workshop can be conducted by an external consultant with substantial knowledge on the environmental management requirements for Tanzania, including World Bank ESF and its ESS requirements. Other relevant staff members of Kahama Municipal Council can be included in the training in order to widen the familiarization of the E&S issues of the project.

However, before selection of specific trainings that will be conducted, training need assessment will be conducted to identify gaps of knowledge, skills and abilities for KMC employee who will be involved in implementation of E&S related activities, given the fact that it is their first time to implement WB financed project. The gap between existing capacity and required one for successful implementation/supervision of environmental and social related actions will be used for identification of specific training. Thus, key training areas can include, but not limited to the following;

(a) Environmental and Social assessment process:

- Screening process;
- Impact prediction and identification;
- Formulation of mitigation measures;

- How to prepare terms of reference for environmental and social impact assessment;
- How to integrate environmental and social management considerations in project design and preparation of contract documents for constructions;
- Reviewing, approving ESIA's;
- Formulation of environmental and social management plan;
- Public participation in ESIA process; and
- Monitoring and reporting of project implementation.

(b) Environmental and Social policies, procedures and guidelines:

- How to incorporate Environmental and social policies and legislation according to the nature of project;
- World Bank Environmental and Social Standards (ESS);
- Review of ESIA and ESMP; and
- Collaboration with relevant institutions.

(c) Occupational Safety and Health issues:

- Hazard identification
- Hazard assessment and management
- Risk assessment and management
- Emergency preparedness plan and Response
- Risks and crises management
- Stakeholder engagement and grievance management, including in relation to the worker grievance mechanism, for the social and environmental staff.

(d) Other key topics on environmental and social issues:

- How to prepare Environmental and Social Management System;
- How to screen projects; appraise and approve ESIA's;
- How to review of environmental and social screening and assessment process;
- How to supervise and report the implementation of the project components;
- How to create baseline information prior to project implementation;
- Environmental pollution;
- Waste management; and
- Protection of water resources against pollution.

(e) Capacity building for GRM focal persons and members of the Grievance Redress Integrity Committee (GRIC)

Focal persons (Grievance Handling Officers - GHOs) and members of the Grievance Redress Integrity Committee (GRIC) of the eligible Institutions will have to get trained on the use of GRM guide which include grievances handling, reporting and escalation to the respective authorities. The guide has to be prepared in a manner that GRM could capture and report Sexual Exploitation, Abuse and Harassment (SEAH) and Gender Based Violence cases. In order to ensure optimal utilization of the GRM by the PAPs at work places, publicization and sensitization on the existence of GRM is mandatory and has to be done by the responsible institution.

CHAPTER NINE

DESIGN MEASURES

9.1 Introduction

In the course of collecting information there were some of the concerns which are critical for consideration during designs. ESIA is meant to identify impacts and mitigation measures but some of them are always addressed by the design features.

9.2 Project Design

9.2.1 Key Priority Features During Design

The proposed facilities at Zongomela industrial park should consider sustainable environmental and social management. The design should come up with a sustainable built environment by considering key issues like use of energy, use of water, use of materials and resources, use of site, and also consider people with disabled.

Reduction of floods around Zongomela Industrial Park

There was a concern from stakeholders that the Zongomela Industrial Park always flood water during rainy season. Adequate drains should be designed to collect water from the whole area and channel it to the proper receiving bodies.

Maintaining Aeration within the market and bus stand facilities due to warm climates

Stakeholders are concerned of the closed design of the market and mini bus stand which will not allow adequate flow of air. The two facilities will accommodate large number of people at once therefore it is important for them to be well ventilated.

Improve interaction of users of mini bus stand and the market due to their close proximity and interdependency

The two facilities are very close to each other. Their design should ensure that there is a smooth flow of users from the mini bus stand to the market and vice versa. The two facilities should not be designated separable.

Efficient Use of Water

The design should consider efficient water consumption in all phases of the proposed infrastructures. Fresh water consumption could be reduced by the installation of water efficient equipment given. Sustainable solution for efficient water use includes installation of water saving fixtures i.e water efficient flush and flow fixtures. During operation the old and leaky parts of the water supply within the facilities should also be replaced with new equipment.

Easy to clean surface will reduce water consumption, floors in the two facilities can be chosen from materials that are easy to clean and that use minimal amount of water during cleaning. Considering design that will allow rain water harvesting will improve water use efficient at the mini bus stand and the market. Rain water harvest can provide water during dry season.

Efficient use of Site.

To use a site efficiently, it is necessary for designers to understand how humans will interact with the proposed market and mini bus stand environment given their close proximity. In order to maintain the natural environment, unnecessary cutting of tree in an area where construction will not take place must be prevented. A building unit should be integrated with its site; this adds to the architectural quality and human wellbeing.

Consider People with Disabilities

Proposed project Designer should consider people with disabilities in all the facilities. The following issues should be considered during design: ramps, stair lift (where necessary), an elevator (if in multiple floors), bathing barriers should not be installed, toilet for the people with disability to be installed, hand rails in key areas should be installed and simplify access. Roads should have cable stones for easy use and those drains should be covered to avoid accidents from people with disabilities.

CHAPTER TEN

COST BENEFIT ANALYSIS OF THE PROJECT

10.1 Introduction

This section addresses financial analysis, economic analysis of the project and an extended cost-benefit analysis for the proposed project. However, lack of information on aspects such as cost and units for various materials that will be used in the construction process, cost of rent per square metre of floor area, overall running costs, cost of labour, etc. (cannot be disclosed at this stage as they are required to be confidential in accordance to the Procurement Act) have prevented a detailed cost benefits analysis to be undertaken. Therefore, what is presented in this section is rather an indicative and elementary description of the costs and benefits. It is based on the indicative costs for implementation of mitigation measures as well as the cost of monitoring.

10.2 Benefits related to the project

Several benefits are associated with the proposed development both at local and national level in terms of revenue generation and the multiplier effects associated with linkages with local and national economy. The proposed project will generate employment opportunities during construction and operation phases, which may be filled by local people with relevant skills. This opportunity will be supporting government initiatives to create employment opportunities for Tanzania and to meet the target per year as targeted by the current Government. Also apart from employment opportunities, the project will provide availability of adequate and conducive working space. Notwithstanding that at the moment salaries are yet to be specified, it is envisaged that from employment, workers will get incomes, which will improve their quality of life and perhaps improve their lifestyles. However, employment opportunities and the salaries provided will extend beyond the workers and benefits as many people as possible, including several dependants. There shall be a need for putting in place deliberate policies that would compel the contractor to employ local labour with the requisite skills and experience.

The project will also generate revenue to Kahama Municipal Council and the Government (TRA) in the form of rents, taxes and levies including VAT.

10.3 Costs related to the project

The estimated costs for implementing enhancement measures, impact management as well as monitoring process as outlined in **Chapters 8** is about **TSH 168,000,000 and TSH 55,000,000** respectively. Since some of the impacts will only to be realized during construction phase, the costs for these will also be short term, especially if mitigation measures are fully implemented.

CHAPTER ELEVEN

DECOMMISSIONING

11.1 Introduction

As decommissioning will take place in the remote future, the specific conditions for mitigation are generally inherently uncertain. In view of this, specific mitigation measures pertaining to environmental impacts of decommissioning works cannot be proposed at the moment with a reasonable degree of certainty. A Detailed decommissioning plan that takes environmental issues into consideration shall be prepared by the developer prior to the decommissioning works. Should it be done, decommissioning may entail change of use (functional changes) or demolition triggered by change of land use. Therefore what is presented here is just a Preliminary Decommissioning Plan which give light to what shall be done if the need for decommissioning arise.

11.2 Preliminary Decommissioning Plan

This Section provides a brief outline of the works required to demolish the Proposed bus terminal on the site incase it happen. This Plan will be used as a reference document that provides the framework to ensure that demolition activities on the site do not adversely affect the health, safety, traffic or the environment of the public and neighbouring properties. The Contractor will be required to prepare a detailed Demolition Plan and Construction Management Plan to the satisfaction of the Proponent and relevant Authorities prior to the commencement of works on site.

11.2.1 Type of facilities to be Demolished

The facilities to be demolished within the bus terminal shall be generally constructed with load bearing masonry walls with steel or timber framed roofs and metal roofs. The bus terminal will be generally constructed off a concrete slab on ground, presumably with strip and pad footings.

11.2.2 Demolition Methods

It is anticipated that the Contractor will prepare a detailed Demolition Plan prior to the commencement of work on site, however, the indicative demolition methodology will be as follows:

- The strip out and removal of non-structural elements will be undertaken utilising manual labour and small plant including – bobcats, 3-5t excavators and dingo type loaders.
- The materials will be removed from site using small to medium sized trucks.
- The structures will be demolished using larger plant and equipment including 15-40t hydraulic excavators. These machines will be equipped with rock breakers, pulverisers and the like which would be used in a sequential manner.
- This engineer will be engaged to provide further engineering advice in relation to temporary support or backpropping of the structure during demolition.
- During the demolition process erosion control measures will be established. These will include treatment of dust and potential discharge into stormwater systems.

11.2.3 Materials Handling

Materials handling will be by mechanical plant (including excavators and bobcats) loaded into trucks (bogie tippers and semi trailers). The debris will be carted offsite to an approved waste facility or recycling centre.

The contractor shall submit a Demolition Waste Management Plan to Kahama Municipal Council which outlines the objectives of:

- maximisation, reuse and recycling of demolition material
- minimisation of waste disposal
- evidence of implementation for specified arrangements of waste management

On-site storage of reusable materials will occur at Site. Recycling and disposal containers will also be accommodated at this location for collection vehicles. Hazardous materials will be treated separately. A hazardous materials inspection will be undertaken by an accredited consultant and a report issued. Hazardous materials will be removed in accordance with EMA 2004. A final clearance report will be provided by the hygienist which will include the provision of tip dockets from waste centres.

11.2.4 Proposed Sequence

The Contractor will be required to prepare the following documentation prior to the commencement of demolition and/or excavation works:

- Dilapidation Survey
- Construction Waste Management Plan
- Demolition Management Plan

In principle, the demolition process is undertaken in the reverse sequence as construction. Essentially, internal finishes will be stripped out. Services will then be removed including airconditioning, pipework and conduit. The facades will be removed where necessary and the structure will then be demolished using the larger plant and equipment. It is estimated that it will take 3 months to demolish and clear the site.

11.2.5 Protective Measures

An A Class hoarding will be erected around the perimeter of the construction site prior to the commencement of demolition works. Additionally, wherever the risk arises of material falling into public areas, overhead protection will be provided in the form of a B Class hoarding. At this stage, it is anticipated that a B Class hoarding will be established on the Victoria frontage. Scaffolding will be erected to facades where materials could fall in excess of 4m. The scaffolding will be clad with chainwire and shade cloth to enclose debris and dust onto the site. During the demolition, dust control measures will be used to minimise the spread of dust from site. The Contractor will have a senior representative on site at all times to ensure compliance with the safety guidelines and agreed work methods.

11.2.6 Traffic Management

The management of construction traffic during the decommissioning phase will be subject to the provision of a detailed traffic management plan. This plan will be prepared by the Contractor for the various stages of demolition. During demolition, all traffic will be held within the site boundaries. The site will remain closed to pedestrian traffic and will be generally manned by security.

11.2.7 Occupational Health and Safety

A detailed OH&S Policy will be provided by the Contractor prior to work commencement. A detailed Site Safety Plan will be prepared for the specific project.

11.2.8 Environmental Management Plan

A detailed Environmental Management Plan will be provided by the Contractor prior to the commencement of the work.

11.2.9 Potential Impacts and Mitigation Measures

Dust and Noise Pollution

The demolition activities for the remained part (foundation structure) shall be accompanied with emission of a lot of dusts since the demolition works are expected to be carried out by conventional method using mechanical breakers and jackhammers. However, alternative methods of demolition including explosive techniques can be used.

Mitigation Measures

- Water sprinkling shall be applied to open earth to reduce dust emission.
- Trucks transporting construction materials shall be covered if the load is dry and prone to dust emissions.
- The demolition area shall be fenced by iron sheets; this will prevent the dust at the ground to be picked up by the wind.
- Community notification shall be undertaken where appropriate where work is likely to cause dust impact on the public and nearby residents.
- Sound construction equipment, with noise sinks, shall be used
- Machine operators in various sections with significant noise levels shall be provided with noise protective gear.
- Construction equipment shall be selected, operated and maintained to minimize noise.

Increased Waste

A lot of demolition waste is expected as a result of the demolition of the bus terminal and its facilities. These shall include blocks, concrete, reinforcements, pipes etc. Most of the block materials shall be salvaged and recycled.

Mitigation Measures

- All materials which can be reused shall be reused
- Materials that cannot be reused shall be sent to the authorized dumpsite

11.2.10 Costs for Undertaking the Mitigation Measures

The cost for undertaking Mitigation measures during decommissioning is estimated to be **TSH 75,000,000.**

CHAPTER TWELVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

12.1 Summary and Conclusions

The findings from this environmental and social impact assessment report can be summarized as follows:

The project is generally accepted at the community, district, regional and national levels, based on its potential socio-economic benefits. The potential long-term social and economic benefits that the project is likely to bring are much greater than the negative impacts that can be managed to acceptable levels.

All key stakeholders for should be involved at all stages of the project.

The project will not trigger involuntary resettlement and compensation-related issues since it will be implemented within the planned areas.

The design, construction and operation of the proposed facilities and support infrastructure should fully consider the needs of the PWDs. The gender requirements (gender-responsive design, construction, operation and maintenance), health and safety standards and conformity to national and international standards/guidelines underpinning the KMC requirements.

The negative impacts of concern are: disturbances from elevated levels of construction noise and vibrations on during construction; air emissions impact from dust and exhaust fumes during construction; occupational health and safety hazards in all phases of the project; accidental contamination of surface and groundwater resources; exposure to HIV/AIDS and new transmission; and workplace sexual harassment and violence against women & vulnerable segments.

The significant positive impacts of concern are: employment and income generation opportunities in phases of the project; income to surrounding petty traders, materials/equipment suppliers and service providers during construction and operation phase; revenue generation to local government and agencies;

Given the above findings, it can be concluded that the proposed project activities from design, construction to operations stage will have manageable/ reversible negative impacts on the biophysical and social-economic environments, provided that the proposed mitigation measures are appropriately implemented. In this way, the project will have minimal environmental, socio-economic, and cultural concerns that would inhibit its implementation and development. It is anticipated that the project will potentially result in more positive than negative impacts in the long term.

Subsequently, the report's findings support the development and operation of the proposed project because the KMC and other responsible parties implement the mitigation and enhancement measures recommended in this report. KMC is responsible for ensuring the overall implementation of the proposed ESMP and EMP and conducting periodic environmental monitoring and audits.

12.2 Recommendations

This EIA report recommends that the proposed project be allowed to proceed on condition that the proponent implements the ESMP proposed in this report as appropriate and any other conditions imposed by NEMC, WB and other relevant authorities.

APPENDICES

Appendix I: Terms of References

Environmental and Social Impact Assessment of the Upgrading of Minibus stand, Market and Access Roads (3km) in Zongomela Industrial Park on Plot No. 646, Block “A” located at Zongomela Mtaa, Zongomela Ward, Kahama Municipality in Shinyanga Region.

1. INTRODUCTION

The detailed scope for undertaking Environmental and Social Impact Assessment is intended to guide the Consultant to address relevant environmental and social issues during the assessment process. Among others, the EIA shall be conducted in accordance with the requirements of the Environmental Management Act (2004). The Consultant shall do everything necessary to meet the objectives of the services and not less than the following task that should be undertaken during the Environmental and Social Impact Assessment. In the process of consultation (Scoping process) with relevant stakeholders like environmental authorities, the Consultant may further be required to finalize the TOR according the agreement with these stakeholders.

2. SCOPE OF WORK

Task 1: Description of the Proposed Project

The Consultant shall provide a brief description of the relevant parts of the project using maps of appropriate scale where necessary and include the following information: -

- Project justification;
- Location;
- General layout, size, and capacity;
- Area of influence of the Project
- Pre-construction activities
- Construction activities
- Schedule of project activities
- Staffing and support;
- Facilities and services
- Operation and maintenance activities
- Life span

Task 2: Description of the Environment

Assemble, evaluate, and present baseline data on the relevant environmental characteristics of the study area. Include information on any changes anticipated before the project commences. Modify the lists below to show the critical information for this project category or which is relevant to it. Environmental characteristics of the study area shall be presented on a map to facilitate the understanding of the study area:

- (a) Physical environmental: This shall cover geology; topography; soils; climate and meteorology; physical structures at site, utilities and services available.
- (b) Biological environment: All flora and fauna present at the project site (if any).

- (c) Socio-cultural environmental; population, land use; planned development activities community structure; goods and services; recreation; public health; Gender issues and HIV/AIDS, Cultural/ historic properties and attitudes to the project.

Task 3: Legislative, Policies, Administration Framework

Describe the pertinent regulations and standards governing environmental quality, health and safety, protection of sensitive areas, protections of endangered species, siting, and land use control at international, national regional and local levels. The Consultant shall undertake a review of policies, legislation and administrative framework within which the environmental management of the proposed construction of the bus terminal and its facilities will be carried out. The following and any other relevant legislation and policies shall be reviewed: -

- Environmental Management Act No. 20 of (2004), Cap. 191
- The Urban Planning Act (2007)
- The Water Supply and Sanitation Act No. 12 of 2009
- Occupation Health Safety (2003)
- Employment and Labour Relations Act No. 6 Of 2004
- Engineers Registration Act and its Amendments 1997 and 2007
- The Contractors Registration Act (1997)
- The Architects and Quantity Surveyors Act (1997)
- The HIV and AIDS (Prevention and Control) Act of 2008
- The Local Government Laws (Miscellaneous Amendments) Act (1999)
- The Tanzania 2025 Development Vision
- Environmental Impact Assessment and Auditing Regulations (2005)

Apart from country policies and legislation the World Bank Environmental and Social Framework (ESF) which describes ten (10) Environmental and Social Standards (ESS) will also be used. The ten ESSs as per the WB ESF are: ESS 1: Assessment and Management of Environmental and Social Risks and Impacts; ESS 2: Labor and Working Conditions; ESS 3: Resource Efficiency and Pollution Prevention and Management; ESS 4: Community Health and Safety; ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement; ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; ESS 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities; ESS 8: Cultural Heritage; ESS 9: Financial Intermediaries; and ESS 10: Stakeholder Engagement and Information Disclosure. Given the nature of activities of this project, with the exception of ESS 9: Financial Intermediaries almost all the ESSs will be relevant.

Task 4: Stakeholders Involvement

Assist in coordinating the ESIA with other government agencies, in obtaining the views affected groups, and in keeping records of meetings and other activities, communications, and comments and their disposition. Establish the views of the public with regards to the potential impacts of the proposed construction of the bus terminal. Identify the different groups of stakeholders, and then use the most appropriate method to establish their views. Particular attention shall be paid to the disadvantage groups (e.g., children, the elderly and women) that may be affected by the proposed construction of the bus terminal.

The Consultant shall undertake an open and transparent consultation process to ensure that the views of interested and affected parties are and approximately incorporated in the project design.

Task 5: Analysis of Alternatives to the Proposed Project

Describe alternatives that were examined in the course of developing the proposed project and identify other alternatives, which would achieve the same objectives. The concept of alternatives extends to siting, design, technology selection, construction techniques and phasing, and operating and maintenance procedures. Compare alternatives in terms of potential environmental and social impacts; capital and operating costs; suitability under local conditions; and institutional, training, and monitoring requirements. When describing the impacts, indicate which are irreversible or unavoidable and which can be mitigated. To the extent possible, qualify the costs and benefits of each alternative, incorporating the estimated costs of any associated mitigating measures. Include the alternative of not constructing the project to demonstrate environmental and social conditions without the project. Various environmental and social criteria should be developed to select the best alternatives.

Task 6: Identification, Analysis and Assessment of Potential Impacts

The Consultant shall identify, analyze and assess environmental and social impacts of the proposed construction of bus terminal stand. The Consultant shall distinguish between positive and negative impacts, direct and indirect impacts, and immediate and long-term impacts. Identify impacts that are unavoidable or irreversible. Wherever possible, describe impacts quantitatively, in terms of environmental components affected (area, number), environmental and social costs and quality of available data, explaining significant information deficiencies and any uncertainties associated with the predicted impacts.

The assessment should focus on the potential for negative environmental and social impacts caused by planned and unplanned (spontaneous) Air and noise pollution; Safety and health risks and increased pressure on social services and utilities. The significance of impacts of the proposed construction of bus terminal shall be assessed, and the basis of this assessment shall be specified. The consultant should take into consideration existing by-laws, national and international environmental standards, legislation, treaties, and conventions that may affect the significance of identified impacts. The consultant shall use the most up to date data and methods of analyzing and assessing environmental and social impacts. Uncertainties concerning any impact shall be indicated.

Task 7: Mitigation Measure

The consultant shall suggest cost-effective measures for minimizing or eliminating adverse impacts of the proposed construction and operation of the bus terminal. The costs of implementing these measures shall wherever possible be estimated and presented. If compensation is recommended as one form of mitigation, the Consultant shall identify all the names and physical addresses of people to be compensated.

Task 8: Environmental and Social Management Plan (EMP)

The Environmental Management Plan focuses on three generic areas: implementation of mitigation measures, institutional strengthening and training, and monitoring. The consultant shall prepare an Environmental and social Management Plan, which will include proposed work programme,

budget estimates, schedules, staffing and training requirements and other necessary support services to implement the mitigation measures. Institutional arrangements required for implementing this management plan shall be indicated. The cost of implementing the monitoring and evaluation including staffing, training and institutional arrangements must be specified. Where monitoring and evaluation will require inter-agency collaboration, this should be indicated.

Identify institutional needs to implement environmental assessment recommendations. Review the authority and capability of institutions at local, regional, and national levels and recommend how to strengthen the capacity to implement the environmental and social management and monitoring plans. The recommendations may cover such diverse topics as new laws and regulations, new agencies or agency functions, inter-sectoral arrangements, management procedures and training, staffing, operation and maintenance training, budgeting, and financial support. Prepare detailed arrangements to monitor the implementations of mitigating measures and the impacts of the project during construction and operation. Include in the plan an estimate of capital and operating costs and a description of other required inputs.

3. REPORTING

The ESIA reports should be concise and limited to significant environmental Issues. The Main text should focus on findings, conclusions, and recommended actions supported by summaries of the data collected and citations for any references used in interpreting data. Detailed or uninterpreted data are not appropriate in the main text and should be presented in appendices or separate volume. Unpublished documents used in the ESIA may not be readily available and should also be assembled in appendices. Organized the ESIA may not be readily available and should also be assembled in appendices. In organizing the ESIA reports according to the outline in the Environmental Impact Assessment and Audit Regulations (2005). The main report contains separate an Executive Summary both in English and Swahili.

4. STAFFING

The Consultant should employ an Environmental Impact Assessment Expert (registered), environmental analyst, architect and Sociologist to carry out the EIA study. In addition, the Consultant may wish to absorb other supporting staff to facilitate efficient expedition of the work.

Appendix II: NEMC Letter for TOR Approval



THE UNITED REPUBLIC OF TANZANIA

VICE PRESIDENT'S OFFICE
UNION AND ENVIRONMENT

NATIONAL ENVIRONMENT MANAGEMENT COUNCI (NEMC)



In reply please quote:

Date: 13th June, 2022

REF. No. HE.145/205/102/1

Municipal Director,
Kahama Municipal Council
P. O. Box 472,
Kahama.

REF: SCOPING REPORT AND TERMS OF REFERENCE FOR THE ENVIRONMENTAL IMPACT ASSESSMENT FOR THE UPGRADING OF ZONGOMELA INDUSTRIAL PARK LOCATED AT ZONGOMELA MTA, ZONGOMELA WARD, KAHAMA MUNICIPAL, KAHAMA DISTRICT, SHINYANGA REGION.

Kindly refer to the above heading.

This is to acknowledge receipt of the Scoping Report and Draft Terms of Reference (ToRs) for undertaking an Environmental and Social Impact Assessment(EIA) of the aforementioned project. Your project has been assigned with Project Number **EC/EIA/2022/3517** and you are kindly requested to refer this number in any future correspondences with the Council.

The Terms of Reference were reviewed and found to be generally adequate and therefore can be used to guide the Environmental and Social Impact Assessment(EIA study for the named project. Thus, these Term of Reference are approved. However, you will be required to ensure that:

1. You will be required to consult all relevant stakeholders (TANROAD, TARURA, OSHA, FIREAND RESCUE FORCE, LGAs, nearby communities) and there should be an evidence that they have been consulted by signing against their names; In addition their concern must be taken on board in this study;
2. Site layout plan showing location of all project components in relation to the project area indicating plot ratio and coverage;

Lake Victoria Zone Office, 6th Floor, PSSSF Front Wing, Kenyatta Road, P.O Box 11045,Mwanza,
Phone: +255 28 2541679 ; Mobile:+255 737988999; Fax: +255 28 2541679
Email Address: nemcmwanza@nemc.or.tz Website: www.nemc.or.tz

3. Provide physical contact of project proponent and environmental expert. Ensure the exact name of the registered expert appear on the cover page of the document;
4. Emergence preparedness and response plan to ensure the health and safety of the workers and neighboring communities during the project life cycle;
5. Clearly describe management of hazardous waste specifically that resulted from solar panels;
6. Describe management of solid and liquid waste at the site (if any);
7. Use specific and most recent data on physical, biological, socio-economic and cultural environment;
8. The report should describe to what extent the project complies to policies and legislations that are relevant to the project;
9. Ensure that copies of relevant permits and licences from relevant authorities related to your activities are included in the final report. These include but not limited to (TANROAD, TARURA, FIRE AND RESCUE FORCE, OSHA, **Land ownership/contract documents**);
10. Issues concerning handling of hydrocarbons (e.g.; greases, spillages, waste oils) especially from generators (if are in place) should be taken care in the report;
11. Provide detailed activities to be carried out with its associated environmental stress during project operation and decommissioning phases;
12. Sources and quantities of water and power to be used should be clearly described;
13. Finally, you will be required to submit to NEMC 15 copies of the EIS for review.

In this regard, you are required to pay to the Council the project brief review process charges as it will be indicated in the Electronic generated Invoice. Note that the review cost which will be provided excludes transport costs of three Officers to and from the project site which has to be incurred by the project proponent.

Should you need additional information or clarification on this matter, please, contact us through Tel. No. **+255 733 697244**.

Yours sincerely,



Jarome Kayombo
Zonal Manager


Cc: Rosemary Nyirenda

Lake Victoria Zone Office, 6th Floor, PSSSF Front Wing, Kenyatta Road, P.O Box 11045, Mwanza,
Phone: +255 28 2541679 ; Mobile: +255 737988999; Fax: +255 28 2541679
Email Address: nemcmwanza@nemc.or.tz Website: www.nemc.or.tz

Appendix III: Certificate of Right of Occupancy

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF LANDS, HOUSING AND HUMAN SETTLEMENTS DEVELOPMENT

Telegrams: LANDS
Telephone: 2121241-9
In reply please quote:
Ref. No. LR/T 4204




LAND REGISTRY,
P.O Box 1191,
Dar es salaam.
Date: 28 Jul, 2022

KAHAMA MUNICIPAL COUNCIL
P.O Box 472
KAHAMA
Sir/Gentlemen/Madam,

RE: TITLE NO: 4204 LAND OFFICE NO: 1188028
PLOT NO. 646 BLOCK A AT ZONGOMELA

I have the honour to enclose herewith duplicate of the Certificate of Title Numbered as above please.

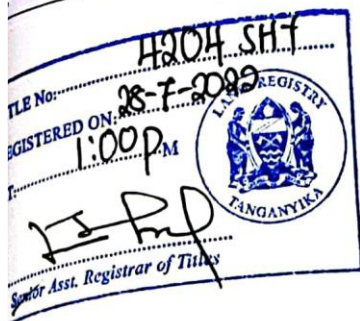

REGISTRAR OF TITLES

Copy to: Commissioner for Lands
Your LD File No: LD/KMC/15674 refers

(Under Section 29)

Date of Issue:
Title Number: 42045H1
Land Office Number: 1479550-1188028
Land: PLOT NO. 646 BLOCK "A" ZONGOMELA KAHAMA TOWNSHIP

Term: NINETEEN NINE YEARS



Land Form No. 22.



THE UNITED REPUBLIC OF TANZANIA

THE LAND ACT, 1999
(NO. 4 OF 1999)

CERTIFICATE OF OCCUPANCY

(Under Section 29)

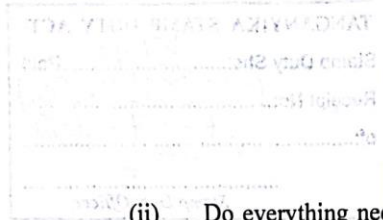


Title No. 4204 SHY
L.O.No.1188028
LD.KMC/15674

The 28th day of July Two thousand and twenty two

THIS IS TO CERTIFY that KAHAMA MUNICIPAL COUNCIL, Established by the Local Government (Urban Authorities) Act, Cap.288 read together with GN.No.620 of 2021 having Registered Office in Kahama of P.O.Box 472, Kahama (hereinafter called "the Occupier") is entitled to the Right of Occupancy (hereinafter called "the Right") in and over the land described in the Schedule hereto (hereinafter called "the Land") for a term of **Ninety nine (99)** years from the first day of **July, two thousand and twenty two** according to the true intent and meaning of the Land Act and subject to the provisions thereof and to any regulations made thereunder and to any enactment in substitution thereof or amendment thereof and to the following special conditions:-

1. The Occupier having paid rent up to the thirtieth day of June, 2023 shall hereafter pay rent of shillings **Five thousand (5,000/=)** only a year in advance on the first day of July in each of the term without deduction PROVIDED that the rent may be revised by the Commissioner for Lands.
2. The Occupier shall:-
 - (i) Be responsible for the protection of all beacons on the land throughout the term of the Right. Missing beacons will have to be re-established at any time at the Occupier's expenses as assessed by the Director responsible for Surveys and Mapping.



- (ii) Do everything necessary to preserve the environment and protect the soil and prevent soil erosion on the land and do all things which may be required by the authorities responsible for environment and to achieve such objective.
- (iii) Maintain on the land buildings (hereinafter called "the buildings" in permanent materials designed for use in accordance with the conditions of the Right and which conform to the building line (if any) decided by the **Kahama Municipal Council** (hereinafter called "the Authority").
- (iv) At all times during the term of the Right have on the land buildings as approved by the Authority and maintain them in good order and repair to the satisfaction of the Commissioner for Lands (hereinafter called "the Commissioner").
- (v) Not erect or commence to erect on the land buildings except in accordance with building plans and specifications which shall have been first approved by the Authority.

3. **USER:** The land and the buildings ~~to be~~ erected thereon shall be used for Bus Station purposes only. Use Group 'P' use classes (a) as defined in the Urban Planning Act (Use Classes) Regulations, 1960 as **amended in 2018**.

- 4. The Occupier shall not assign the Right within three years of the date hereof without the prior approval of the Commissioner.
- 5. The Occupier shall deliver to the Commissioner notification of disposition in prescribed form before or at the time the disposition is carried out together with the payment of all premia, taxes and dues prescribed in connection with that disposition.
- 6. The President may revoke the right for good cause and in public interest.

KAHAMA TOWNSHIP

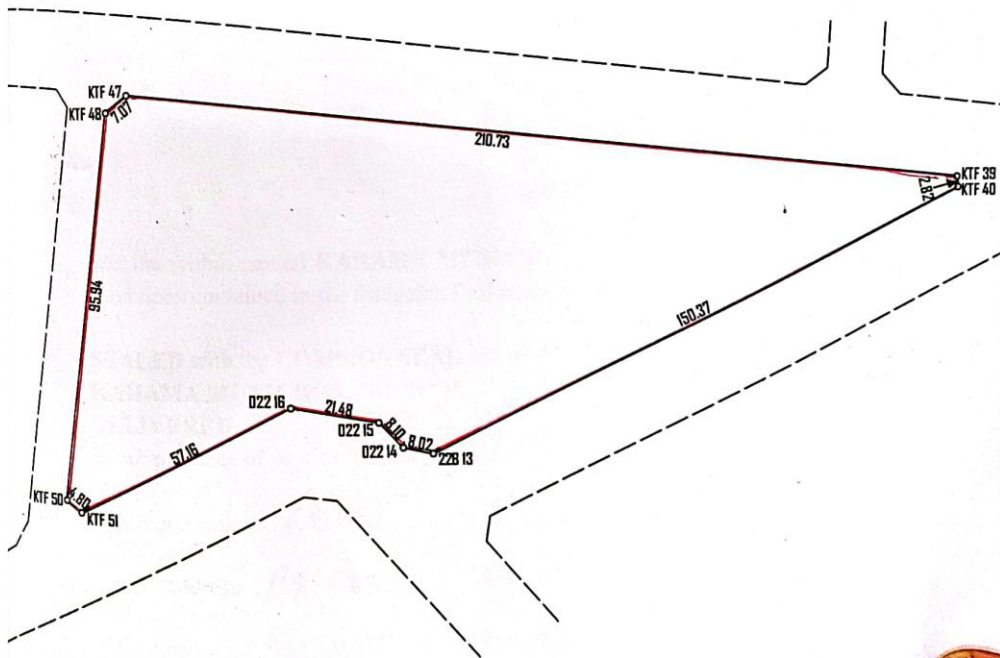
Locality.....ZONGOMELA.....

Block....."A".....

Plot No.....646.....

L.O No.....1179550-1188028 45m/RLS

Area.....1.27 Ha.....



This Plan Prepared In accordance with Registered Plan No.....117593.....is approved for the purposes of Land Registration Act.
 Director of surveys and Mapping.....*[Signature]*..... Date. 19. 04. 2021
 Surveys and Mapping Division, Ministry of Lands, Housing and Human Settlement Development,
 Dodoma.

The issue of this plan implies no guarantee
 admission of title by the government.

SCHEDULE

ALL that Land known as Plot No. 646 Block 'A' situated at Zongomela in Kahama Township containing One point two seven (1.27) hectare shown for identification only edged red on the plan attached to this Certificate and defined on the registered Survey Plan Numbered 117593 deposited at the Office of the Director for Surveys and Mapping at Dodoma.

Given under my hand and my official seal the day and year first above written.



ASST. COMMISSIONER FOR LANDS

We, the within named KAHAMA MUNICIPAL COUNCIL hereby accept the terms and conditions contained in the foregoing Certificate of Occupancy.

SEALED with the COMMON SEAL of the said)

KAHAMA MUNICIPAL COUNCIL)

DELIVERED.....)

in our presence of us this 26th day of July, 2022)

Signature:)

Postal Address: P.O. Box 472 Kahama)

Qualification: Municipal Director)

Signature:)

Postal Address: P.O. Box 472 Kahama)

Qualification: Mayor)

Appendix IV: Participants list at Zongomela Industrial Park meeting

ORODHA YA WADAU WALIOSHIRIKI KATIKA MAJADILIANO KUHUSU UJENZI NA UBORESHAJI WA
MIUNDOMBINU WILAYANI KAHAMA

STAKEHOLDERS CONSULTATION FOR THE PREPARATION OF ENVIRONMENTAL AND SOCIAL IMPACT
ASSESSMENT, STAKEHOLDER ENGAGEMENT PLAN, RESETTLEMENT ACTION PLAN AND DESIGN DRAWINGS
OF THE PROPOSED INFRASTRUCTURE CONSTRUCTION IN KAHAMA TOWN COUNCIL

TAREHE NA MUDA / DATE AND TIME: 7:20 - 8:00 am SIKU/DAY: 13/01/2022

PARTICIPANTS LIST

No	Jina / Name	Cheo / Position	Namba ya Simu / Tel. Number	Anuaniyabarua pepe / Email Address	Sahihi / Signature
1.	Anderson David Msembe	Municipal Director	074272727		<i>[Signature]</i>
2	Clemence -B. Mhisa	MuPO	0762052282	kabwemkuse@yahoo.co.uk	<i>[Signature]</i>
3	ROBERT KWELA	MEDO	0767398906	kwebroter@yahoo.co.uk	<i>[Signature]</i>
4	IBRAHIM KUGURU	AS mitno	0764663572	kugurinhani@gmail.com	<i>[Signature]</i>
5.	FLORA K. SANGWA	MUPO	0755002364	fsangwa@yahoo.com	<i>[Signature]</i>
6.	Enne Moses	Arch	0714204255	yvonnemoses@gmail.com	<i>[Signature]</i>

ORODHA YA WADAU WALIOSHIRIKI KATIKA MAJADILIANO KUHUSU UJENZI NA UBORESHAJI WA
MIUNDOMBINU WILAYANI KAHAMA

STAKEHOLDERS CONSULTATION FOR THE PREPARATION OF ENVIRONMENTAL AND SOCIAL IMPACT
ASSESSMENT, STAKEHOLDER ENGAGEMENT PLAN, RESETTLEMENT ACTION PLAN AND DESIGN DRAWINGS
OF THE PROPOSED INFRASTRUCTURE CONSTRUCTION IN KAHAMA TOWN COUNCIL

TAREHE NA MUDA / DATE AND TIME: 9:00 am - 3pm SIKU/DAY: 13/01/2022 Thursday

PARTICIPANTS LIST

No	Jina / Name	Cheo / Position	Namba ya Simu / Tel. Number	Anuaniyabarua pepe / Email Address	Sahihi / Signature
01	Dr. Juma RA KUTASTARA	District Engineer TITAN	0786-211592	dr.kakara@titan.gov.tz	<i>[Signature]</i>
02	Said Hamud	Ag. District OP Engineer	0767-202357	said.hamud@titan.gov.tz	<i>[Signature]</i>
03	Joseph John	Ag. PCE - KAHAMA	0754-272025	josephjohn2@gmail.com	<i>[Signature]</i>
04	Mbwana Karati	Makamu M/Kiti CHAWATA	0764685253	mbwanakarati@gmail.com	<i>[Signature]</i>
05	Marco Nkanjiwa	Mwenyekiti SHINYAWA	0755047015	shinyawakahama@gmail.com	<i>[Signature]</i>

MAHUTHURIO!

12-01-2022

JINA

WADHIFA

SIMBA

SATINI

1	PENAFIS Numbi	Mwaka TEU	0786850580	Rumbi
2	Gerald Egurga	Katibu	0765777880	
3	PAUL NDALAWA	MJUMBE	0763886062	Ang
4	DOMINIC GASPPA	MJUMBE	0767683111	Ang
5	Mary Iino	MJUMBE	0783607691	Ang
6	Hassan Pemachia	MJUMBE	0759449267	Ang
7	Brown Samiir	MJUMBE	0765726132	Ang
8	KWELU RZ	MJUMBE	0767398906	Ang
9	A-MITAMU MOGELA	MJUMBE	0782-550533	Ang
10	HILDA ROBERT	MJUMBE	0751435941	Ang
11	HERMAN EMANUEL	MJUMBE	0753773856	Ang
12	DENNIS MUGARULA	MJUMBE	0754040471	Ang
13	Abdullah Mohamed	MJUMBE	0767-676762	Ang
14	EMBERTY RASTID	MJUMBE	0759297282	Ang
15	DEGRATIAS KHEPGOMA	MJUMBE	0767537049	Ang
16	HEIRON BUSHEHA	MJUMBE	0754575850	Ang
17	Emmanuel John	MJUMBE	0752206244	Ang
18	FERISTER DAUDI	MJUMBE	0756144170	Ang
19	HADISA JABIL	MJUMBE	0769587582	Ang
20	SAMSON SHOSHA	MJUMBE	0782210030	Ang
21	MECKSOP R-WAPALIA	MJUMBE	0752575847	Ang
22	CHRISPIN A- ICISENGO	MJUMBE	0762815574	Ang
23	Inno Hosen	MJUMBE	0714204255	Ang
24	Judith Kachura	MJUMBE	071761142	Ang
25	Magdalena L. Mlowe	MJUMBE	0718628672	Ang

Appendix V: Health and Safety Management Plan

1.1 General

The project shall be implemented in compliance to labour laws in Tanzania, in particular, the Occupational Health and Safety Act (2003). Clauses to protect the health and safety of workers shall be included in the contract documents for implementation stage. All personnel are expected to comply fully with health and safety law and the associated approved codes of practice. Contractors are, in addition, to be aware of and pay due attention to guidance issued by the Health and Safety Executive as well as that issued by trade bodies and authorities, which constitute industry 'best practice'. Method and policy statements submitted for these works will be reviewed by the Site Project Manager and Safety Adviser to ensure that these standards are met. On such occasions that they fail to meet the standard they will be returned for amendment action.

1.2 Health and Safety Management System

1.2.1 Safety Training and Promotion

The aims of safety training programmers are:

- To update the safety awareness and technical skills of person in the field of application.
- To orient new employees to working environment.
- To identify and rectify hazards and convey the same to the workforce.
- To prepare the persons to select appropriate safety measure contain any unforeseen hazards/emergency situations.

To achieve the above aims, following types of training shall be conducted at the site level:

1.2.1.1 Health and Safety Induction Training

New or reassigned employees shall be given Health& Safety induction training pertaining to Health& Safety management and general safety rules and procedure, site specific Health& Safety rules and their responsibility and accountability in safety performance. Health& Safety induction shall be given to all categories of personnel at site by Health& Safety Manager. Health& Safety induction shall be recorded in the prescribed format. All employees shall acknowledge such training by signing relevant document.

1.2.1.2 On the Job Training

Based on the trade, individuals are given On the Job training. These trainings shall be focused on the safe ways of working in a particular trade including hazards involved. This shall be conducted by the foremen/supervisors in collaboration with Safety personnel and trainees' performance after the programme shall be assessed to evaluate the effectiveness of the training. All risk assessment and related knowledge shall be done by the Health & Safety Manager.

1.2.1.3 Refresher courses

Refresher courses shall be conducted to update the skill and safe methods of work for a particular job. This shall be conducted periodically for welding/cutting, plant and equipment operation, defensive driving and hazards in electrical installation.

1.2.1.4 Tool Box Talks

In addition to the formal training mentioned above, toolbox talks shall be conducted every day before the commencement of the job. TBT shall be designed to highlight relevant safety and individual health issue to the workforce to raise their level of awareness. Such meeting shall recall the risk assessment report and defects reported on previous performance. These shall be prepared and presented by the Supervisor/Foremen.

All trainings that are carried out shall be formally recorded on dated and signed by attendees and the copies shall be kept with the project safety focal point.

1.2.1.5 Safety Promotion

Safety Promotion schemes shall be developed and implemented at site to promote safety awareness amongst the workforce. Individuals with best safety performance shall be recognized and rewarded. A safety suggestion scheme shall be implemented at site to encourage the workforce to come up with good safety practices and suggestions for improving working condition. The best suggestion shall be selected and the person shall be rewarded. Health& Safety posters and banners including HIV/AIDS shall be displayed around the worksite to raise the awareness among the workforce. The posters shall be prepared in English and Swahili languages.

1.2.2 Safety inspection and Follow up Actions

Contractor's Health& Safety Manager along with supervisory staff shall carry out frequent inspection with the focus on safety aspects at site and prepare reports of inspection. The frequency of inspection shall be determined by site activities and general conditions. However, the inspection shall be conducted at a minimum of once a week. Where high – risk activities are being carried out inspection shall be done at least once daily.

The inspection reports shall be discussed with the site managers and various sub – contractors (if any). In addition to these, the site staff will accompany the Engineer and other staff of Consultant for their site safety inspection.

Remedial action to rectify any deficiency identified or unsafe practices discovered during the safety inspection by developer shall be implemented immediately.

1.2.3 Reporting of Accidents, incidents & Investigation and Accident Statistics

Tanzania laws on incident reporting and investigation procedures shall be adhered. Such law requires reporting to the Chief inspector of Occupational Safety and Health Authority (OSHA) all lost time injuries (LTI) within twenty-four hours from the time of incident. Contractor will play this role to ensure that local requirements are followed. As per Contract Agreement the Contractor shall notify the Consultant and developer within 48 hours or as soon as reasonable possible after the occurrence of any accident which has resulted in damage or loss of property, disability or loss of human life, or which has or which could reasonably be foreseen to have a material impact on the environment and shall submit to the Consultant and developer no later than 28 days after the occurrence of such an event in the agreed format, a summary report thereof. All incidents including near misses shall be reported to the Consultant, regardless the potential of the incident.

All the incidents shall be investigated to find out the root causes and to prevent the recurrences of the same kind of incidents. If the consultant asks for the detailed investigation and the findings

shall be submitting to the consultant. The methodology for the incident investigation shall be “Find out the facts, not the faults”.

Incident data, if properly collected and analysed, indicates the trend and can show where and how problems arise. A monthly safety performance report of the project shall be included in the Monthly Progress Report after the end of each month.

1.2.4 Hazard Identification and Risk Assessment

The purpose of the hazard identification and risk assessment is to identify all potential hazards and associated risks during construction. The contractor will take relevant measures to control all critical, high and moderate hazards. Low potential hazards will be totally eliminated. General risk assessment of this project has already been done and submitted to the relevant parts per Tanzania’s Occupational Safety and Health Laws.

Depend on the severity of hazards we will be able to take necessary preventive and control measure to mitigate the hazards. Prior to the commencement of any activity, detailed hazard identification shall be done by the site supervisory staff with the assistance of Health & Safety Manager and the hazards shall be communicated to the whole team deemed to execute the task. The hazards analysis done shall be produced to consultant for approval and mitigating measures shall be taken up to their satisfaction. Risk assessment shall be done per Occupational Safety and Health Act, number five of 2003.

1.2.5 Industrial Health and Hygiene

Hazards to health on a construction industry can arise from the use of a number of materials, substances and process if they are not properly controlled. Some of the more serious risks are caused by the inhalation of dust, toxic fumes, exposure to high temperature, noise, vibration, radioactive substances, ergonomic hazards etc.

IMC and Contractor shall be responsible for maintaining health working conditions for all employees and sub – contractors. If it is not possible to remove the cause of harm, then suitable and sufficient Personal Protective Equipment (PPE) shall be provide to those who could be affected.

1.2.1.1 Hazardous substances

Material Safety Data Sheet (MSDS) of all hazardous materials that are used on site (if any) shall be obtained. An inventory shall be kept of all such materials with the relevant MSDS and shall be available for the inspection of consultant. An assessment shall be conducted in relation to the intended usage of the hazardous substances on site and adequate precautionary and control measures shall be taken according to the assessment. Such MSDS shall be available for inspection from Tanzania Health and Safety law enforcer. An assessment shall be conducted in relation to the intended use of the hazardous substances on site and adequate precautionary and control measures shall be taken according to the assessment.

1.2.1.2 Heat

Illness due to heat comprises a wide range of problems from minor inconvenience to critical medical emergency and death. The functioning of the thermoregulatory system of the body gets upset, (balance between heat gain and heat loss), which results in the subsequent loss of salt and

water. This takes the following forms like heat rashes; heat cramps; heat exhaustion and heat stroke. Following precautions shall be taken against heat stress.

- Wear light, airy clothes.
- Drink plenty of water even if you do not feel thirsty.
- Wear sunglasses/balaclava while working outside.
- New employees shall give adequate time to acclimatize with the hot environment before deploying to the work site.

1.2.1.3 Dust

Dust control will be initiated prior to any activity in dusty condition. Such control will adopt but not limiting to de-dusting procedures. In case of unavoidable dust emissions, introduction of PPEs will be adopted. In any case no personnel shall be exposed directly to harmful airborne contaminants of Silica, Rust (ferrous oxide), Blasting grit, Asbestos, Glass wool & Paint solvent mist. Water sprinkling system shall be adopted to control the dust on all identification areas of the Project.

1.2.1.4 Noise

The Contractor shall comply with the applicable Tanzanian laws, orders and regulation concerning the prevention, control and abatement of excessive noise. Industrial deafness is caused by over exposure to high levels of noise from plant, machinery or construction processes. No employees shall be exposed to noise dose that exceeds 85 dB (A), unless they are wearing suitable hearing protectors, which effectively reduce the sound level at the user's level to or below 85 dB (A). Consideration shall be given first to reducing the noise level at source.

The precautionary measures for the exposure limits shall be as follows:

- 80 to 85 dB (A) – Provide hearing defenders with proper training to use them.
- 85 dB (A) – Signposts shall be erected to inform all employees and public that usage of ear defenders is mandatory in the area.
- 115dB (A) – No exposure to steady noise irrespective of hearing protection.
- 135 dB (A) – No exposure to impulse noise irrespective of duration of hearing protection.

1.2.1.5 Vibration

Vibration causes health hazards in two ways;

- Vibration of body parts due to hand held tools like concrete vibrator, plate compactor, jackhammer, hand drill, hand grinder etc.
- Vibration of the whole body experienced while traveling in vehicle and operating equipment like dozer, grader, roller etc.

Excess vibration will result in discomfort to the worker, which leads to a decrease in efficiency and finally causes damage to health. Vibrating equipment shall be equipped with proper handles to prevent causing any impact on the operator. Personnel shall be given intermittent rest or shall be changed and replaced frequently.

1.2.1.6 Sanitary Facilities

Adequate sanitary conveniences will be provided in strategic point of the workplace. Such conveniences are lavatories, showers, and washbasins. Such facilities shall be kept clean and in good working condition at all times. Domestic wastes shall be collected per environmental management plan and Environmental Guidelines.

1.2.6 Personal Protective Equipment (PPE)

PPE protects the employee from identified non-eliminated hazards at the site. Personal protective equipment safeguards the employee from the identified hazards so which he is exposed. PPE is the last line of defense for employee protection. PPE does not and cannot eliminate hazard, it can only prevent or reduce exposure to hazards and reduce the severity of the consequent injury.

All employees of the contractor shall be provided with necessary PPEs and ensure that the contractor and sub – contractor personnel are also properly protected by appropriate PPE. Such provision will be free of charge. Employees shall be trained by line supervisors for the correct utilization of the PPE. Individuals shall not be allowed to work if they are not equipped with the appropriate PPE. Suitable signboards shall be kept in work area indicating the potential hazards (e.g., noise, radiation etc.) and PPE that is required to be worn in that area/for that activity, in applicable languages and visual signs. The signage will be in Kiswahili and English languages and posted in visible areas.

1.2.7 First Aid Facilities

All accidents, which involve personal injury, whether it is minor or major, shall be given medical treatment and report to concerned Supervisor. A first aid station shall be set up at the site office and a trained first aider will be in charge of the station. All injury cases, except minor injuries shall sent to medical centre present within the Kahama Municipal Council (IMC) for treatment. In case of an accident with personal injury doctors will attend such person in a prescribed hospital. Only ambulance will be allowed to transfer the casualties. Adequate number of first Aid boxes will be fixed in strategic points where employees will be notified the nearest location of the same, telephone number of Emergency control room will be also displayed. Adequate number of first Aid boxes shall be available site. There shall be one trained first aider in a group of 20 persons. First aid boxes shall be frequently inspected by the trained first aider and updated.

The Contractor shall comply with the Government medical or labour requirements at all times and provide, equipment and maintain base dressing stations where and at all times have trained first aider for attending minor injuries.

1.2.8 Fire Prevention and Fighting Facilities

Construction sites premises are very prone to fire hazards because of different kind of combustible material used in all the above places. The components of a fire are fuel (combustible substance), heat and oxygen. Unless all three are present fire will not occur. A fire hazard evaluation shall be conducted all the project sites and camp to identify the fire risk at each location. Depend upon the risk factors fire prevention and fighting system shall be provided and maintained.

Following steps shall be taken to implement fire prevention system at our project premises.

- All the employees shall be education about the fire hazards, firefighting methods and precautionary measures specific to this project.
- Adequate number of portable fire extinguishers shall be placed at strategic locations.
- All employees shall be demonstrated the operation of portable fire extinguishers.
- Good housekeeping shall be maintained at all sites to reduce the fire risk.

1.2.9 Road safety management

This project as relies heavily on road transport. Analysis shows that road accidents contribute a major portion of total accidents in such construction projects. To avoid road accidents, the following measures shall be adopted during the execution of project;

- A transport coordinator shall be appointed to control the movement of vehicles and equipment and he shall be responsible for safe and smooth deployment of fleet.
- All drivers and operators shall possess a valid Tanzania license for the types of vehicles being driven or machinery operated.
- All vehicles shall be kept in a plot with good conditions and preventive maintenance system shall be followed.
- An in-house training on defensive driving techniques and safe tipping operation shall be imparted to all drivers before allotting vehicles to them.
- The drivers shall follow all traffic rules and regulation of Tanzania.
- Over speeding shall not be allowed at any case and if observed do so disciplinary actions shall be taken against the defaulter.
- Drivers shall not allow working more than 8 hours shift period. The shift period includes loading, unloading, waiting and driving time.
- No vehicle shall be allowed to drive after consuming alcohol/drugs, some medicines, under fatigue or when sick or ill.
- Nobody is allowed to drive if under the influence of alcohol or drugs.
- Drivers shall wear necessary PPEs while driving.
- A driver forum shall be constituted and shall meet once in a month or immediately after an incident to discuss the general safety issues as well as specific leaning points from incidents.
- Only one person shall direct the driver/operator
- Beware signage shall be established on public institutions' entrances

1.2.10 Traffic management plan

This project involves movement of heavy traffic both at the site and outside the Site. All drivers are instructed to strictly follow the minimum speed of 20 KPH at the site. Adequate sign boards will be placed at the relevant location and flag man will be assigned whenever necessary. Anybody found violating the traffic rules will be punished.

1.2.11 Sub-Contractors

Subcontractors are treated as integral part of the contact and subject to the same standard of treatment as that of main contractor's employees in all matters pertaining to Health& Safety. List of subcontractors shall get approved by developer prior to their deployment in the project.

On arrival of Subcontractor's employees, Health& Safety Manager shall conduct induction program. Sub-contractor employees shall participate in all Health& Safety activities along with Contractor's personnel working under the Contract.

1.2.12 General Safely Rules

All personnel working at site always shall strictly follow following Health& Safety rules:

- Never take their eyes off the job, pay attention to what you are doing.
- Shall be on the lookout for hazardous conditions that could lead to an accident.
- Shall pay attention to what you are doing.
- Shall be in a continuous observation of hazardous conditions that could lead to an accident.
- Shall report all first aid injuries, lost time accidents and near misses immediately to their supervisors.
- Shall wear proper uniforms and other personal protective equipment necessary for the job that they have to do.
- Shall ensure that they have the right tools and equipment for the job.
- Check the tools condition before using it.
- Shall always use provided personal protective equipment like overall, helmet, goggles, shoes and balaclavas etc.
- Shall know the location of the nearest fire extinguisher first aid box.
- Shall always keep work place clean and tidy.
- Shall not play with fire. Smoking in 'No Smoking' area only.
- Shall not interfere with overhead electrical supplies and appliances.
- Shall observe all warning signs, labels and hazard notices.
- Shall not overtake and over speed vehicles in high traffic areas. Shall observe all speed limits and traffic controls.
- Shall not use unstable material/platform for working, climbing and standing purpose.
- Shall not abuse toilets and welfare facilities provided for their use.
- Shall always take care when lifting load. Keep straight back and bent knees
- Shall not keep any material or obstacle in access ways or exit path.
- Shall not operate cranes over or in the close proximity of power lines.
- Shall take sufficient water and fluid regularly during hot and humid weather conditions.
- Safety is everybody's responsibility.

1.3 Safety in Various Construction Activities

1.3.1 Excavation

Excavation is one of the important phases of the construction activity. Any insufficient attention to the safety aspects may cause of accident, therefore we shall take utmost care in planning and executing all excavations. The following precautionary measures shall be followed:

- The area to be excavated shall be inspected thoroughly by a competent person for any underground services or structures.
- It shall be ensured that a person having good knowledge and experience supervises all excavations.

- All mechanical excavations shall be carried out only in the presence of an authorized banks man.
- The integrity of excavation and supports shall be inspected prior to the commencement of work on daily basis.
- No soil or other materials shall be stored close to the sides of the excavation and at least 1m clearance shall be provide for storage and dumping of excavated materials.
- Edges of excavations shall be barricaded to prevent falling of persons and materials.
- If vehicular traffic is allowed near to the excavation, contractor shall provide adequate lighting, warning signs and concrete blocks painted with reflective paints.
- Excavations exceeding 1m shall be demarcated with solid barricades plus warning tapes. The rest shall be barricaded with warning tapes.
- Where there is a possibility of ingress of water then pumping sumps shall be established with pumps being readily available for use and additional ladders placed for use in the event of emergency evacuation.
- Adequate means for entry and exit shall be provided for excavations over 1.5m and it shall be either ramp or ladder.
- All the personnel engaged shall be made aware about safe digging practices, hazards in the operation and emergency procedures.
- Adequate number of strong and stable temporary crossing with handrails shall be provided for personnel.

1.3.2 Reinforcement Steel Work

Reinforcement steel work is an essential part of any construction phase. The activity involves unloading, bar bending, cutting and fixing of bars in position and people's unsafe acts. The main hazards are handling hazards, working with machinery, using of electricity, falling of material on body and taken.

- Loading and unloading of steel shall be done by proper lifting equipment lifting tackles and under proper supervision.
- All persons handling steel bars shall be provided with necessary PPE required for the job.
- The lengthy steel bars shall be stored in safe manner to avoid in tripping hazards and protruding hazards. Proper signage shall also be provided.
- Bar cutting machines and bending machines shall be in good working condition and provided with emergency stop switches and necessary guards. Both the machine shall be placed in such a way that the operation on it shall not create any danger to nearby workers.
- The electrical connections to the machine shall be done by electrician by providing appropriate circuit breakers and proper earthing after conducting risk assessment.
- Persons deployed for cutting and bending shall be trained and instructed about the job and its inherent hazards.
- The work area shall be kept clean and steel cut pieces will be kept separate.
- Adequate number of works shall be deployed to handle and fix the steel.
- The tools used for fixing the steel in place shall be inspected regularly and maintained properly.
- If the steel fixing work is at height or in an excavated pit/trench, safety measures shall be taken in accordance with the accordance with the particular procedure.

1.3.3 Concreting

This includes shuttering, formwork, de-shuttering and concreting. The main hazards are falling of objects; struck by object, falling of persons from height, crush injuries and impact injuries, ergonomic related, tripping and slipping. The following practices shall be adhered to ensure the safe operation in these activities.

- The persons deployed on work shall be given a safety induction related to the job. They shall participate in the risk assessment.
- The persons deployed on work shall have well experience and provided with all tools in good working condition.
- Handling, erection and dismantling of heavy shuttering shall be done with proper lifting equipment under close supervision.
- Required PPE shall be provided to all persons engaged in the job.
- The workers shall be informed about the hazards of the activity.
- The area shall be barricaded to prevent the entry of unauthorized persons and visitors.
- Hand tools shall be inspected on daily basis.
- There shall be effective communication between the crew members while erecting and dismantling the shuttering.
- Good housekeeping shall be maintained all over the area.
- Formwork for the concreting shall be inspected by a competent person, prior to the pouring.
- The concrete pump shall jack-up properly and park at firm and level ground.
- Two persons wearing reflective jackets shall be deployed to hold the concrete pouring pipe.
- Always look for overhead electrical cables while parking the concrete pump.
- Temporary platforms shall be provided on steel work for people to stand while working at the area.
- Tipping shall be away from overhead power lines

1.3.4 Material Handling

1.3.4.1 Mechanical Handling

Lifting equipment and lifting gears shall be inspected per Occupational Safety and Health Laws of this Country and should be used for handling of construction materials. All lifting equipment shall be checked and ensured that they are in good operating condition and free from defects. All lifting equipment and tackles shall have valid third-party certificate. Inspection intervals shall be as per Tanzania laws and safety regulations. Inspection and certification shall be done from Tanzania's approved competent authority which is Occupational Safety and Health Authority (OSHA). Color coding system for lifting equipment shall be followed. All lifting operations shall be done by experienced persons and supervised by competent persons. In case of tandem lifting only the Project Manager shall authorize such lifting. The following safe practices shall be adhered in all mechanical lifting operation. The following safe practices shall be adhered in all mechanical lifting operation.

- All lifting equipment and tackles shall be maintained in good operative condition.
- Every dangerous and rotating parts of lifting equipment shall be guarded.
- Care shall be taken to avoid the overloading lifting equipment and tackles.

- All lifting operation shall be performed under the supervision of an experienced and trained supervisor.
- Signalman with reflective jacket shall be deployed with the lifting equipment.
- Only one signalman shall direct the operator
- Proper communication shall be maintained between the operator and signalman during the operation.
- Wind speed shall be taken into consideration before lifting and if it exceeds the safe limit all lifting operation shall be ceased.
- Extreme care shall be taken while working near overhead power lines and safe distance shall be maintained.
- Toolbox talks shall be conducted before lifting operation for prevention of incidents.
- Only the project Manager shall authorize tandem lifting.

1.3.4.2 Manual Handling

Correct manual lifting and handling procedures can prevent back injuries and strains that account for a major portion of all industrial injuries. Before handling any material, its weight, size, shape and physical characteristics are to be seen and further action shall be taken accordingly. Following are the measures to prevent the incidents during manual handling.

- Load to be lifted shall be assessed for its weight, shape and size.
- Load shall be sized up and assistance sought if necessary.
- Proper method and posture of lifting shall be adopted.
- Load being carried shall not obstruct the view in front.
- Do not change position of load while moving.
- Slipping and tripping hazards shall be taken care of.

1.3.5 Working at Height

1.3.1.1 Scaffolding

Proper scaffolding and working platform shall be provided to work at height. All scaffolds shall be designed by a competent person and shall be made of good and standard materials. Prior to use, all scaffolds shall be subjected to the inspection of consultant and shall get approval. All persons involved in the erection and dismantling of scaffold shall be trained and experienced for the same. No persons other than the supervisor involved shall be permitted to be upon any part of an incomplete scaffold.

- All personnel shall be provided with necessary PPE.
- Persons with vertigo shall not be allowed to work at any height.
- All poles, planks and general materials used for scaffolding shall be kept in good condition and be inspected by a competent person on each occasion before being issued from stores.
- As long as the scaffold is in use, supervisor concerned shall inspect it daily before allowing persons to work on it and satisfy himself that the scaffold is complete and is fit for use.
- Subsequent to rain or heavy wind, the scaffolding supervisor shall inspect all scaffolds prior to restart the work.
- All working platforms shall be close boarded and all boards shall be lashed and secured.

- Handrail and toe board shall be provided for all scaffolds and the planks shall be tied to the ledgers properly.
- Scaffolds shall be supported adequately wherever possible
- Always ensure that no loose items and materials are left at height that may fall on person working or passing beneath.
- In case of mobile towers, the height shall never exceed three times the length of the shortest side and there shall be only one working platform on a mobile scaffold.
- The mobile tower shall only be moved by pulling or pushing the base and the working platform shall be clear of men and materials when the tower is being moved.
- The wheels of mobile tower shall be turned outwards and brakes shall be on and locked before use.
- Diagonal bracing shall be fitted on all lifts on all sides and cross bracing shall be fitted at the base and every alternative lift of an independent tower scaffold.
- Adequate ladders shall be provided for the access to and egress from the scaffold.

1.3.1.2 Ladders

- All ladders shall be factory made and of sound construction.
- Wooden ladders shall not be used with the scaffold.
- If the work is being done in and around electrical equipment and/or cables only wooden (non-conductive) ladders shall be used.
- Ladders shall not be painted.
- Ladders shall be secured properly at top and base.
- Ladder shall be extended for at least one meter above the landing.
- Ladders shall not be used as working platform or part of load bearing component of a scaffold.
- The base to height ratio of ladder shall be maintained as 1:4 such that the angle is 75° from the horizontal can be maintained.

1.3.6 Heavy equipment and workshop

Construction project mostly depends on heavy equipment like Dozer, Excavator, Grader, Wheel Loader, Backhoe and Crane. So, the safe operation and maintenance of heavy equipment play a major role in accident prevention. A workshop facility shall be set up in the lay down area to perform routine maintenance and repairs of equipment deployed for the project. Following measures shall be taken to ensure safe operation and maintenance of equipment and plant:

- Equipment shall be put into service after obtaining approval by a competent technical authority.
- All the operators shall have valid Tanzania license and thoroughly educated about the safe operation and maintenance of equipment.
- It shall be ensured that operators are performing daily checks before commencing the activity and report abnormalities, if any.
- All operators shall undergo frequent refresher training on safe operation and basic firefighting.
- No one shall be allowed to travel in the cabin along with the operator.
- Equipment shall be transported from one place to another only by low bed trailers and proper lashing shall be ensured while transporting through road.

- Adequate space shall be available in the workshop for free movement of vehicle / equipment and each activity shall be performed in a clearly defined area.
- Hazardous activities like painting, welding, cutting, grinding etc. shall segregate from other activities normally will do in dedicated booths.
- Storage of hazardous materials shall be in a secured and dedicated area as per Tanzania Policy standards.
- Emergency exit, fire alarm and firefighting equipment, first aid box, requirement to wear PPE and other necessary safety information shall be displayed at prominent locations with visible signs.
- Adequate lighting and ventilations shall be provided in all work places.
- Adequate provision shall be made for the collection, temporary storage and disposal of solid and liquid waste material from all workplace.
- Good housekeeping standards shall be maintained.
- Smoking and consumption of food shall be restricted to designate area.
- No horseplay or practical work jokes shall be allowed in work place.

1.3.7 Cable Laying, Termination and Jointing& Electrical Works:

Laying of high voltage and low voltage cable and other Electrical works are one of the activities in this project. The main hazards involved in these are struck by, falling of materials, fall of persons, and failure of lifting equipment and tackles, fire and burn injuries. Following precautionary measures shall be taken to avoid any incidents during this stage.

- Risk assessment shall be conducted prior to execution of such job.
- All electrical works shall be performed by qualified persons who shall be provided with adequate and necessary personal protective equipment.
- Prior to maintenance operations on any electrical equipment or appliances, the electrical current shall be disconnected, (lockout and tag out) with a lock or any other adequate means and tagged out to ensure the prevention of reenergizing of the equipment by any person during work.
- Employees working in electricity shall be instructed in using the proper fire extinguishers in electrical fires such as Dry Chemical and CO2 extinguishers.
- Water or extinguishers containing water shall not be used in extinguishing electrical fires which occur in electrical equipment or conductors as water is a good conductor which causes electrical shocks for the person using the extinguisher.
- Metal ladders or non-insulated hand tools shall not be used while working in electrical installations. (Handles of all hand tools used shall be insulated and wooden ladders shall be used)
- When the fuse or circuit breaker disconnect the electrical circuit, electrical current shall not be re-connected before inspecting the cause of the fault and repair it and thus replace the fuse with other fuse of the same rating or the circuit breaker shall be returned to its first position by a qualified employee.
- Electrical circuit shall not be overloaded to prevent occurrence of fires.
- Electrical wires shall not be passed through doors or windows and shall be kept away from heating sources such as heaters and shall not be hung from nails to prevent the damage or wearing of the insulating material.
- Defective or corroded electrical wires shall not be used and shall immediately replace.

- Cable drums shall be placed on level and firm ground and properly wedged to prevent rolling off.
- Jacks and other accessories for cable laying shall be inspected by a competent person to make sure that it is free from defects.
- Rollers shall be placed properly to avoid the over exertion of force on cables while laying.
- The winch shall be fixed firmly on ground to prevent any unintended movement while pulling the cable.
- Experienced and trained persons shall be deployed for cable laying and winch operation.
- All cable jointing and terminations shall be done by certified and approved cable jointers.
- Adequate fire safety measures shall be taken care while termination and jointing the cable.
- The area shall be barricaded to prevent the entry of unauthorized persons during the operation.
- In case a person receives an electrical shock, this person shall not be touched, first, disconnect the power and remove the injured person away using a piece of wood or any other insulated material, and then, first aid shall be provided to the injured person such as Cardiac Pulmonary Resuscitation (CPR). The doctor shall be informed immediately or the injured person shall be taken to the nearest hospital.
- When recharging batteries, employees shall be instructed not touch the battery liquids, and shall be provided with adequate and suitable personal protective equipment when doing that (Face shield, rubber gloves, aprons) and when refilling batteries by acid, acid shall be added to water (and not water to acid), in case any burns by the effects of acids occurred, immediately flush the burn with big amount of water.

1.3.8 Portable Power and Hand Tools

The main causes of most injuries involving hand tools are the use of unsuitable tools, their incorrect use or their incorrect storage. Inspect the tool and ensure that it is in good condition. Unsafe tools include wrenches with cracked or worn jaws, screwdrivers with broken tips etc.

- Select the right tools for the job.
- Use all tools correctly.
- Keep tools in a safe place.
- We shall train the workers to select the right tools for each job, and ensure that the tools are available.
- Protect the edges of the sharp tools while carrying.
- Tools shall not be kept lying on floor, walkways or scaffolds,
- Tools shall not throw from one level to another. It shall be lifted and lowered by hand lines.
- All guards and covers shall be securely fitted and correctly adjusted.

1.3.9 Transportation

This section outlines the procedure and guideline for avoidance for motor vehicle accidents.

- Every person driving a motor vehicle or operating a machine must possess valid driving licenses appropriate to the class of vehicle being driven.

- All drivers should observe posted speed limits. Adverse weather conditions, traffic and light (visibility) require lower speeds than posted speed limit. Maximum speed limit must be limited 40 KPH in camps and 60 KPH on haul roads.
- All vehicles shall be parked uniformly and where provided, in designated parking areas. Parked vehicle shall not be obstructing other vehicle, roads, and access ways for fire hydrants.
- Vehicle shall be maintained in good condition and regular inspection carried out to check steering system, foot and parking brakes, tyres, seat belts, horn, Head lights, tail lights, stop light and indicators, rear view mirrors, wind shield wipers and washer, crank case and radiator level.
- Drivers and passengers in all vehicles including buses should wear seat belts.
- Driver shall slowdown in inter section, blind corners and stop completely at all stop.

Appendix VI: Hydrology Study Report

DETAIL DESIGN ON HYDROLOGY AND HYDRAULIC STUDY FOR ZONGOMELA INDUSTRIAL AREA, MARKET, BUS STAND AND THEIR ACCESS ROADS

1 HYDROLOGY STUDY

1.1 Introduction

As the main goal of the project, Kahama Municipal Council is planning to implement some community infrastructure and road projects Under, the Tanzania Cities Transforming Infrastructure and Competitiveness (TACTIC) program. This program aims to strengthen urban management performance and deliver improved basic infrastructure and services, one among the three areas to be covered by the particular project is the Improvement of roads, market and bus stand at Zongomela Industrial Park. These investments are expected to benefit socio-economic development and revenue collection at Kahama municipal council.

1.2 Location

The Zongomela industrial park area falls within the Zongomela ward which is the part of Kahama municipal council area. The area is set special for industrial activities. The upgrading of Zongomela bus stand, market and its access roads (3km) will facilitate the economic growth of the Kahama residents and the whole Tanzania at large.

1.3 Stakeholders' Consultation

In order to arrive at a right design of hydraulic infrastructures, stakeholders were involved for the purpose of providing necessary inputs to enable the successfulness of the design.

Stakeholders involved under this assignment were mainly the Kahama municipal council, KUWASA, TARURA and TANROADs.

Major concern of stakeholders was the absence and insufficient of existing drainages to the Zongomela industrial area. Stakeholders proposed to have a design which will accommodate the storm flow across all roads under design, The bus stand, market area plus the industrial park.

1.4 Terms of Reference

The hydrological and hydraulic studies were carried out for estimation of the design peak floods and provision of dimensions of the required hydraulic structures that will pass the floods flow safely across the study area of the bus stand, market place plus its access roads (3km).

The TRRL/ East African Flood Model shall be used to estimate the design flood flows across the study area. However, due to the limitation of the method to the size of catchment area, that has to be equal to 1km² or less than 200 km², the Rational method has to be used for catchments with smaller sizes less than 1km².

1.5 The Methodology

The methodology for Hydrological and Hydraulics studies adopted the following five tasks:

Tasks 1: Demarcation of the catchments to determine their coverage (km²) based on the available topographic maps.

Tasks 2: Carrying out field investigations to determine the catchment characteristics including land use and cover and the hydraulic parameters like the value of Manning's roughness coefficient, extent of flooding and flood marks on river banks and channel stability.

Tasks 3: Estimation of peak flood discharges that cross all roads under study for a given frequencies.

Tasks 4: Estimation of the hydraulic capacities of the existing drainage structures along the project roads and checking their adequacy basing on the computed design peak floods.

Tasks 5: Determination of the types, sizes, shapes and number of proposed structures required to adequately pass the design peak discharges, followed by computation of the scour depths for determination of extent of protection works required.

1.6 Catchments Characteristics

Drainage

The study area is drained with streams, which may influence flooding at the location. The preliminary delineation was done to identify the extent of draining streams in relation with their effect to the study area. The observation on drainage pattern of the area was indicated that there is a significant flow which comes to the study area and a proper mitigation to accommodate the flow should be addressed accordingly.

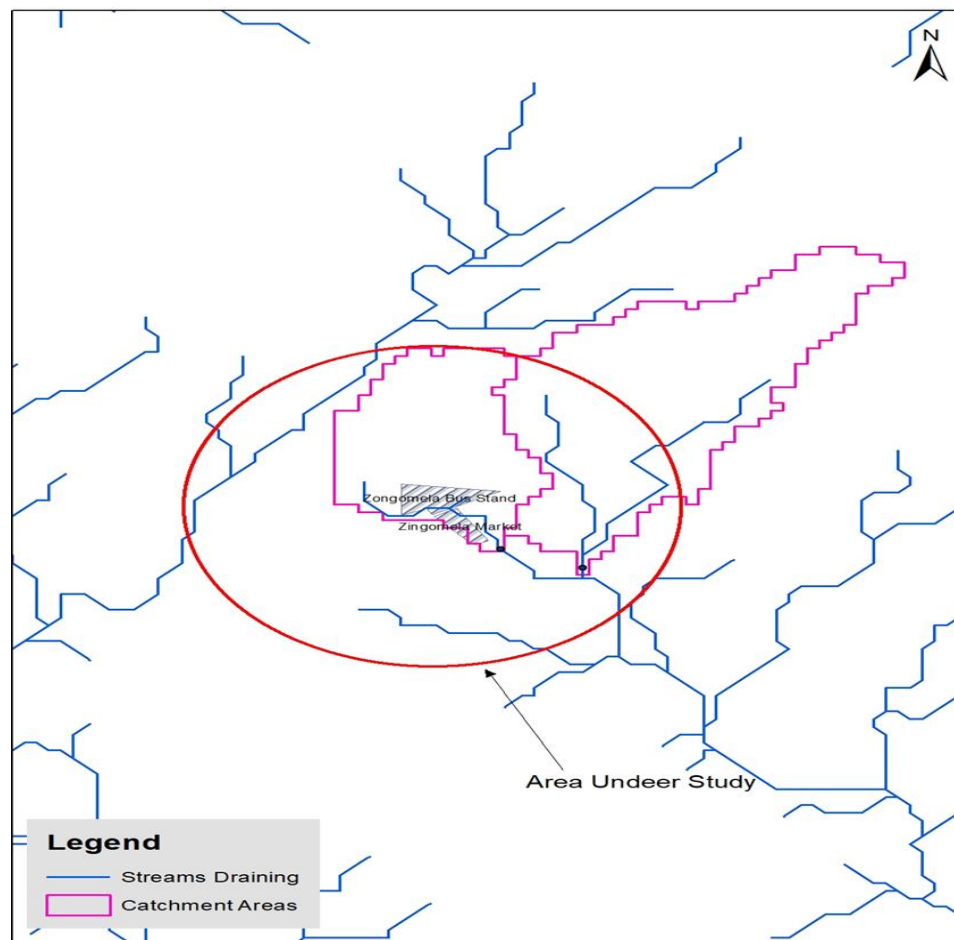


Figure 1: Drainage pattern of the study area- Zongomela Industria Area

1.7 Hydrological Analysis of the project area

The aim of the hydrological survey and analysis has been to determine flood runoff at locations where rivers/streams and valleys/channels cross project area (Zongomela Industrial area). The

analysis entailed the determination of catchment characteristics, determination of rainfall intensity-duration for appropriate return periods and calculation of design floods for the individual catchment areas. The approach has been to:

- Estimate the peak floods from catchments upstream of the project area;
- Check the adequacy of the existing hydraulic structures based on the estimated design peak floods and
- Propose new hydraulic structures that will safely pass the design peak floods across the project area without overtopping the embankments.

The consultant located the project area on Google map followed by identification of the topographic maps in which the project area falls on and only five (2) topographic sheets, having a scale of 1:50,000 were identified and purchased from the Ministry of Lands and Human Settlements. The purpose of adopting the topographical map was to investigate the topographical conditions of the project area and its draining extent (study area) and other hydrological features/data, which could be extracted from the topographical maps. The topographic sheets where the project area falls on covered the extended catchment area of streams crossing.

The digital elevation models, DEM (30mx30m) of the project area were processed with GIS software (ArcGIS and QGIS) to supplement information from the topographic maps. The reason for having two source of information (topographic sheet and Digital Elevation Model) was to overcome some of the limitations, which exist on topographic sheets. Such limitations on topographic sheets were the fact that they are too old, resolution is too coarse and some are in black and white. These limitations made the delineation process and extraction other required catchments characteristics such as river channels and drainage points difficult. The paper topographic sheets were used concurrently with DEM for the purpose of delineating the catchment area contributing to the channels draining to the project area and minimize limitations resulting from using topographical sheets. DEM analysis was made possible by the use of ArcGIS 10.5v and SWAT Model DEM pre-processor. Combining these two data sets provided a cross checking mechanism aiming at achieving good quality results. Both approaches are described in the next sub-sections

In additional to the data above, the consultant has completed reconnaissance field survey and collection of data which included all drainage structures inventory (condition and dimension) and field observations (topography coverage, soil and land use etc).

1.8 Delineation of catchments and its characteristics

The objective of adopting topographical maps and DEM (Digital Elevation Model) as primary source of data has been to delineate and characterize the catchments draining all rivers, streams and channels crossing the project area and to estimate associated catchment parameters, such as catchment area and channel lengths. Other parameters which were determined included stream elevation at start and at study area crossing, the rivers/stream slope and catchment slopes. These parameters, together with other variables such as rainfall, land use, vegetation cover, basin soils and soil parameters were used as important inputs data in the computerized flood estimation models for hydrological analysis and appropriate design of hydraulic drainage structures.

One of the common parameters required by most hydrological models to predict catchment runoff is the catchment area. In most cases, areas are measured from topographic sheets through

delineation and measurement of the area on the map using planimeter or from the DEM by the use of suitable GIS software such as ArcGIS.

In this hydrological analysis, both methods were applied and the calculated catchments areas draining to the project area compared reasonably.

1.9 Catchment delineation from Topographic maps

Before carrying out the delineation for the catchments of the streams/channel draining to the study area, the first task was to identify the proposed drainage route within the topographical sheet purchased where under this study all part of drainage system were identified falling within the map. Delineating the catchments of the streams/channel was the next step. The delineation was done for all catchments draining the proposed drainage channel. The delineation done was printed for quality checking purposes. After catchment delineation, the area measurement of this few-selected catchment was done as described next.

Understanding the size of the catchment is one of the important factors in hydrological analysis. Catchment size is used as a decisive factor on the type of model used to estimate the design discharge of a given catchment.

Using a digital Planimeter (PLACOM KP-90N), the sampled printed and delineated catchments were measured and recorded for purposed of comparison with the other results area which were to be measured using a SWAT software as described in the next sub section.

1.10 Catchment delineation Using DEM and ArcGIS

The Digital Elevation Model (DEM)/Digital Terrain Model (DTM) of the project was purchased and or retrieved from the Consultant's GIS database. The common available data set are in ARC **ASCII** format in decimal degrees and geographical Coordinate System datum **WGS84**, with a spatial resolution of 30mx30m and elevations given in meters. This data set was procured from the International Centre for Tropical Agriculture (CIAT), who have derived/ processed the data from the USGS/NASA SRTM (Shuttle Radar Topography Mission) data to provide seamless continuous topographical surfaces.

DEM processing in ArcGIS involved extracting tiles covering the project area (same extent as selected sheets of topographical maps) and re-projecting the data sets to UTM coordinate system (Arc 1960 UTM 37S datum). Other processes included:

- Creating contours from the DEM map (Digital Elevation Model) of the Project area.
- Scanning and geo-referencing paper topographical maps.
- Overlaying contoured DEM (Digital Elevation Model) and the geo-referenced topographical maps to establish fit between the two data sets.
- Digitizing the Kahama-DSM and superimposing to both topographical map and the DEM (Digital Elevation Model).
- Generating a drainage network of the project area. This process involved filling sinks in the DEM (Digital Elevation Model), creating a Flow direction and Flow accumulation rasters and defining the minimum (threshold) drainage area.
- The channels contributing to the existing drainage were identified and their catchment delineated using the “watershed delineation tool” (i.e., based on the drainage network, flow direction and flow accumulation rasters, slope and contour maps).

- Comparing the generated drainage network and the river network (available within the consultant GIS database) in order to confirm/verify reliability of the DEM (Digital Elevation Model).
- Identify all the drains crossing the study area and delineate their catchments, considering the intersection between the channel of interest and the project area as the catchment outlet.
- Calculating the areas for delineated catchments and length of the longest channels and compared them with those calculated from paper topographical maps, prior to using the derived parameters into appropriate models for discharge estimation.

Estimating other parameters such as catchment slope, length of the longest channel, maximum and minimum elevation within each catchment were derived all other required topographical parameters (slope, elevation at start/ exit of channels/rivers).

1.11 Suitability of flood model for different Catchment sizes

According to literature and Tanzania standards, the Rational Method (RM) and East Africa Flood Model (EAFM) is recommended for un-gauged catchments. The area limitation of these methods is: (i) Rational Method applicable for catchments with areas which is less than 1km^2 , (ii) The East African Flood Model is applicable for catchments with areas of above 1km^2 but not for catchment with areas beyond 200km^2 . Other methods such as Soil Conservation Service (SCS-CN) method are applicable for catchment with areas beyond 200km^2 .

1.12 Estimation of Design Flood/Peak Discharge

Primary concern in estimating peak design floods that cruise on the project area rests on the accuracy of these estimates because they determine the sizes of the drainage structures to be constructed and therefore the associated costs.

The design floods/peak discharges are established by selecting the appropriate combination of rainfall and runoff characteristics that can reasonably be expected to occur. This is calculated in consideration of a selected design return period. The design criterion is usually the maximum flow carried by the drainage structure with no flooding at all during the design return period.

In order to estimate the design flood/peak discharges at the crossing-drainage locations, the following methods have been employed:

- ❖ Field studies;
- ❖ Rainfall data as input to the applicable flood models for the area; and,
- ❖ Comparison of the outputs of the various methods.

The concept behind for using more than one method has been mainly to get the critical/most applicable data since the flood estimation from un-gauged rivers/streams is rather complex and that one typical method may not necessarily yield reasonable results for a given catchment area. However, there are several factors, which outweigh applicability of hydrological flood models in different environments. Based on this reason, the hydrological flood models, which were applied in this study, were carefully selected to meet the condition of both the study area and geographical location as well as availability of data. With respect to the results of catchment's sizes from project area and specifications from Terms of Reference on drainage design review, two flood models, namely TRRL Flood model for East Africa and Rational Method have been applied to estimate peak discharge depending on the size of catchment's area. *Appendix 1 & 2* present the calculated peak discharges (m^3/s) by the mentioned above hydrological flood models and the designated design discharge at different outlet point on the project area for bridges, box, pipe culverts and

open drain locations. Details of the method/flood model are given in the succeeding sections of this Report.

1.13 Field Investigation

The maximum water levels on the existing hydraulic structures at sites were estimated from the observed flood-level marks on existing channels and trees, the available records and the local enquiries. On the basis of the maximum recorded water level and the local morphological, geologic and ecological setting, the peak discharge values were computed using the area-velocity method for the conceptual design of a few selected locations for the existing hydraulic structures on project area. It must be brought out that the data obtained through local enquiries were found to be of mixed feelings or exaggerated and hence, were considered for information only.

The Rational Method

The rational method is among of the very effective methods which mainly performs better in small catchment areas with less than 1km². Thus in this study all catchments with areas less than 1km² have been analyzed using rational method and has been one of the widely used for predicting peak discharges on un-gauged catchments. All criteria in the use of this method have been considered and addressed accordingly, including the followings:

- (i) Catchment areas are less than 1km²;
- (ii) The runoff coefficient was carefully chosen for each of the catchment.

The basic equation for the rational equation is given by:

$$Q_T = \frac{CIA}{3.6} \quad \text{Eqn(1)}$$

Where: QT = The peak discharge (m³/s);

I = The average Rainfall Intensity over the catchment (mm/hr);

C = The rational runoff coefficient;

A = Catchment area (km²).

While the area (A) is obtained from measurement on the electronic topographic sheet/DEM, the rational runoff coefficients are read directly from the tables. The runoff coefficients are given in Table 1.

Table 1: Runoff Coefficient Value for Different Catchment Type below.

Cs (Topography)			Ck (Soils)		Cv vegetation)	
Very Flat	<1%	0.03	Sand and Gravel	0.03	Forest	0.04
Undulating	1-10%	0.08	Sandy Clays	0.08	Farmland	0.11
Hilly	10-20%	0.16	Clay and Loam	0.16	Grassland	0.21
Mountainous	>20%	0.26	Sheet Rock	0.26	No Vegetation	0.28

Runoff coefficient (C): $C = C_s + C_k + C_v$

The rainfall intensity is always provided in the form of relation with time of concentration (T_C). Time of concentration is a principal factor used to link rainfall and runoff and it can be estimated using Bransby William empirical equation (Eqn 2) below.

$$T_c = \frac{0.97 \times L}{A^{0.1} \times S_c^{0.2}} \quad \text{Eqn (2)}$$

Where: S_c = Slope of the main channel;

L = Is the length of the channel (km);

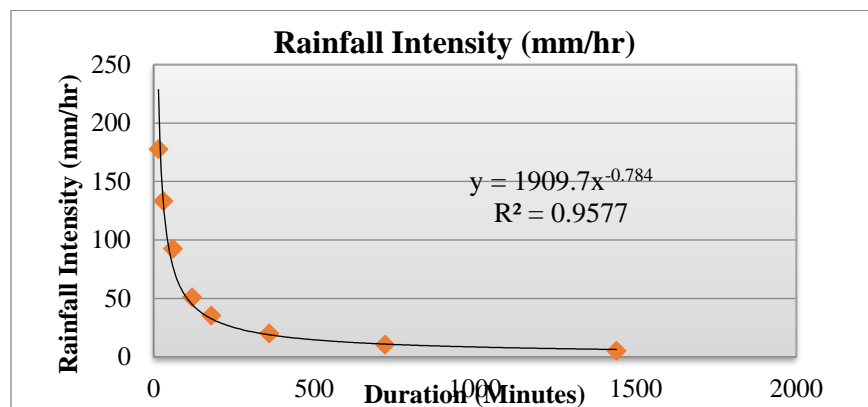
A = Catchment area (km^2).

Using the rainfall intensity – duration curve, a relationship between rainfall intensity (I) and time of concentration (T_c) was developed at 50 years return period for study region (Table 2). Using values for Kahama rainfall intensity the graph and equation relating rainfall intensity and time of concentration for the project road was developed. Figures 2 below provide both the graphs and the equations.

Table 2: Rainfall Intensity and Duration for Kahama (50 years storm)

Duration (minutes)	15	30	60	120	180	360	720	1440
Rainfall Intensity (mm/hr)	178.88	133.47	92.64	50.94	38.57	20.071	10.731	5.43

Figure 2: Relationship between T_c and Intensity in the study area (50yrs Return period)



After obtaining all the data required by the rational method (RM), a computerized RM model that comprised of all the equations and conditions discussed above was developed; the model was designed in such that it automatically provides the required size of the river/stream crossing structure to be installed to a specific Stream/River.

The TRRL East African Flood Model

This flood model was developed by the “Transport and Road Research Laboratory (TRRL)”, of the UK, to estimate flood. The TRRL East African Flood Model is applicable to all un-gauged catchments with areas between 1km^2 and 200Km^2 . This is the range in which the TRRL East African Flood Model is proven to provide accurate and reliable results (D. Fiddes, 1977). The Flood Model can be applied to such un-gauged catchments using very little measurements of catchment’s characteristic e.g., area, slope, and soil type. It is very useful in areas where there are no or just a few rainfall stations. Major limitations and assumptions of this method have been taken into account.

TRRL East African Flood Model is based on the fact that storm rainfall for a given duration can be related to the daily totals as measured by the standard rain gauge. It assumes that if antecedent catchment's conditions are envisaged over the region, T-year flood results from a T-year storm. The TRRL East African Flood Model requires other catchment characteristics for estimate of the peak discharges. Table 3 below illustrates the type of data required by the model.

Table 3: Data required by the TRRL East African Flood from the catchment under consideration

No.	Description	Symbol	Units
1	Catchment Area	A	km ²
2	Land/Catchment Slope (s)	s	m/m
3	Channel Length (L)	L	km
4	Elevation at the channel source	Es	m
5	Elevation at the channel exist	Ee	m
6	Catchment Type	None	None
7	Lag time (K)	K	hr
8	Soil Type	None	Unit less
9	Standard Contributing area coefficient	C _s	Unit less
10	Rainfall Zone (dry/wet)	None	Unit less
11	Catchment wetness factor	C _w	Unit less
12	Land use factor	C _L	Unit less
13	Rainfall time	T _p	hr
14	Rainfall time index	n	Unit less
15	2-year daily point rainfall	R ² /24	mm
16	10-year: 2-year ratio	r	Unitless

Soil conservation service-curve number method

The Soil Conservation Service (SCS) Curve number (CN) method is a computer modelling method for estimating runoff from rainfall on the catchment areas. This method is developed by US National Resources Conservation Services (NRCS). The model estimates precipitation excess as a function of cumulative precipitation, soil cover, land use, and antecedent moisture which are related through an intermediate parameter, the Curve Number (commonly abbreviated CN). The Curve Number is estimated by considering the soil group (A, B, C or D) and land use maps. It is also affected by the soil moisture before a precipitation event, or the antecedent moisture condition (AMC); AMC II for average moisture, AMC I for dry condition and AMCIII for wet condition. The Curve number (CN), rainfall and travel time is used to derive the unit peak discharge in the catchment. The peak discharge in the catchment at SCS- 24-hour rainfall distribution type II will be computed basing on the direct runoff, area of the catchment and the unit peak discharge. However, SCS-CN method it cannot be applied if the curve number is less than 40. Also, the allowable minimum initial abstraction must be 20% of the potential maximum retention. The following are the procedures and equations for this methodology.

- a) The basin model is prepared in HEC HMS software. In this model, there are seven sub basins that was delineated.

- b) The CN grid is created using HEC GEOHMS tool basing on the antecedent moisture content, land-use and soil cover of the catchment. The curve number grid was created basing on the following reference table;

Table 4: Reference table for curve number

Land use description		Hydrologic soil group			
		A	B	C	D
Cultivated land:	Without conservation treatment	72	81	88	91
	With conservation treatment	62	71	78	81
Pasture or range land:	Poor condition	68	79	86	89
	Good condition	39	61	74	80
Meadow: Good condition		30	58	71	78
Wood or forested land	Thin stand, poor cover, no mulch	45	66	77	83
	Good cover	25	55	70	77
Open spaces: lawns, parks, golf course, cemeteries, etc.	Good condition: grass cover on 75% or more of the area	39	61	74	80
	Fair condition: grass cover on 50% to 75% of the area	49	69	79	84
Commercial and business areas (85% impervious)		89	92	94	95
Industrial districts (72% impervious)		81	88	91	93
Residential (Notes 1 and 4)					
Average lot size Average % impervious (Note 2)					
1/8 acre or less	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
Paved parking lots, roofs, driveways, etc. (Note 3)		98	98	98	98
Streets and roads					
Paved with curbs and storm sewers (Note 3)		98	98	98	98
Gravel		76	85	89	91
Dirt		72	82	87	89
Urban areas					
Low density (15-18% impervious		69-71	75-78	82-84	86
Medium density (21- 27% impervious surfaces)		71-73	77-80	82-84	86
High density (50-75% impervious surfaces)		73-75	79-82	86-88	90

Note 1: Curve numbers are computed assuming the runoff from the house and driveway is directed towards the street with a minimum of roof water directed to the lawns where additional infiltration could occur.

Note 2: The remaining pervious areas (lawn) are considered to be in good pasture condition for these curve numbers

Note 3: In some warmer climates of the country a curve number of 95 may be used.

Note 4: Curve numbers may vary with different parts of the country. The local office should be contacted for the recommended numbers in that locality.

The following table describes the correspondence between landuse plan and land use as defined in SCS-CN above.

Table 5: Correspondence between land-use plan and landuse as per SCS method

Proposed landuse	Landuse description as per SCS	A	B	C	D
Afforestation	forested land, thin stand, poor cover, no mulch	45	66	77	83
Cemetery sites	open spaces like cemeteries	49	69	79	84
Commercial	commercial and business area	89	92	94	95
Defence area	urban area medium density	73	80	84	86
Education facilities	urban area medium density	73	80	84	86
Government areas	urban area medium density	73	80	84	86
Health facilities	urban area medium density	73	80	84	86
High density	urban area high density	75	82	88	90
Lakes	Water	100	100	100	100
Light industries	industrial districts	81	88	91	93
Low density	urban area low density	71	78	84	86
Medium density	urban area medium density	73	80	84	86
Parks	paved parking lots	98	98	98	98
Passive recreation	open space fair condition	49	69	79	84
Public facilities	urban area medium density	73	80	84	86
Public utilities	urban area medium density	73	80	84	86
Religious sites	urban area medium density	73	80	84	86
Residential commercial	commercial and business area	89	92	94	95
River	Water	100	100	100	100
Road	paved driveways	98	98	98	98
Special planning areas	urban area low density	71	78	84	86
Transportation	streets and roads; gravel	76	85	89	91
Wetland	Water	100	100	100	100

c) For each sub basin, SCS curve number is assigned as loss method and SCS unit hydrography is assigned as transform method. For each reach, Lag is assigned as routing method and constant is assigned as loss/gain method.

d) The initial abstraction (mm), curve number and percentage of impervious (%) is assigned on each sub basin. The initial abstraction is taken as 20% of potential maximum retention (S). The potential maximum retention is estimated basing on the following formula.

$$S = (25400/CN) - 254$$

Equation 1: Potential maximum retention

Where CN is the curve number of the sub basin

- e) The Lag time (min) is assigned for each sub basin at standard graph (PRF 484). The peak rate factor accounts for the percentage of the runoff before peak flow. The lagtime is estimated by taking 60% of the time of concentration (tc).

The time of concentration is estimated by using soil conservation service equation as described on the following equation;

$$T_c = L^{0.8} (S+1)^{0.7} / (0.6 \times 1900 \times Y^{0.5})$$

Equation 2: Time of concentration

Where;

L=Length of the stream in feet

S=Storage variable estimated by $(1000/CN)-10$, CN is the Curve number in the sub basin and

Y=average sub basin slope in %.

- f) The steady state initial condition is assumed for each reach, hence initial inflow from upstream elements is equal to outflow. The time at which the inflow to the reach is delayed to become outflow is estimated for each reach. The lag parameter is estimated basing on the procedure (e) above.

In order to account the water losses on the channel, the fixed flow rate reduction and fraction or ratio of flow are assigned for each reach. The fixed flow rate is subtracted from routed outflow and the remainder is multiplied by the ratio. The reduced flow becomes the outflow of the reach. The fixed flow rate is obtained by multiplying the boundary area of the reach and the infiltration rate. The infiltration rate depends on the soil characteristics on the reach area boundary. The reaches are passing along HSG-C and D soil. The following is the infiltration rates is applied.

Table 6: Infiltration rates

Soils Group	Infiltration Rate(in/hr)	Relative Runoff Potential
C	1.27 - 3.81	High
D	0 - 1.27	Very High

The fraction of flow is taken as the ratio of infiltration rate and rainfall intensity for a particular time of concentration. Rainfall intensity from Kahama TMA was used.

- The meteorological model is created for all sub basins using hypothetical storm at rainfall distribution SCS type II.
- The time series data is created at the interval of one day.
- The control specifications are created by assigning the start and the end time of the control process. The start and the end time of the model are assigned in such a way that all hydrological routing in the mode is accounted. The time interval was set at maximum of 29% of sub basin lagtime in such way that all flows will be accounted during the routing process.
- The peak discharge (q_p) of the basin model is estimated basin on the following equation.

$$\text{Peak discharge, } QP = Q_u \times A_m \times Q$$

Equation 3: Peak discharge

Whereby;

Q_p = peak discharge in m^3/s

Q_u = unit peak discharge ($m^3/s/m^2/mm$). The unit peak discharge is estimated basing on the travel time in the basin, curve number and rainfall.

A_m = Area of the basin (m^2)

Q = Direct runoff (mm).

The direct runoff Q is estimated basing on the following equation.

$$Q = (P - I_a)^2 / ((P - I_a) + S)$$

Equation 4: Direct runoff

Whereby;

P = rainfall

S = Potential maximum retention which depends on curve number.

I_a = Initial abstraction is replaced by 20% of the potential maximum retention.

Variables for design

During the design, there were two kinds of variables that were reviewed:

Fixed variables

These are variables whose values are fixed; the values are fixed such that they are not affected by engineering judgement but by the physical nature of the watershed. These includes:

- a) Catchment Area
- b) Catchment Slope
- c) Channel Length
- d) Rainfall time

These variables will be verified by calculations by using similar data source as the designer.

Sensitive Variable

These are the variables whose values are subjected to engineering judgement hence the experience of the engineer can affect the results. These variables include: -

- a) Land cover
- b) Lag time
- c) Climate data e.g., rainfall

The TRRL model is very sensitive to these variables. The wrong choices of these variables will heavily affect the results, also these variables are sensitive to engineering judgement and experience hence a conservative value shall be considered.

The observed rainfall response time is very important in calibrating the time parameter in any hydrological model. The selection of the empirical formula (rational method) has to base on the rainfall time within the watershed.

The accurate land-use/cover data are recommended and the accuracy assessment has to be done for the available data and the kappa coefficient has to be established in order to check the suitability of the data in the analysis. The final values established has to include the future landcover change.

The sensitivity test and calibration will be done for both landcover and time parameters for the purpose of checking the quantitative impacts of the change of those parameters and the relation to the output or observed values. The separate account for the future climate change has to be included. For the best practice 10% has to be added for the higher storm events (100 & 50 years) and 20% for the smaller storm events (10 and 25 years).

The variables mentioned above will be determined and the discharge shall be recomputed and compared to the ones determined by the designer.

1.14 Hydraulic design approach

The hydraulic review will involve the verification of the sizes of the structures using the design discharge. Conservative parameters shall be used to verify the design.

The culverts hydraulics shall be carried out according to the methods outlined in HDS 5. In very flat areas manning equation shall be used in free flow condition to determine the acceptable width and height of the structure.

$$Q = \frac{1}{n} A \left(\frac{A}{P} \right)^{\frac{2}{3}} \sqrt{S} \dots\dots\dots \text{Manning equation.}$$

Where:

- n=Manning coefficient
- A=Cross section area of the flow
- P=Wet perimeter
- S=Slope

When the discharge is significant and there is potential for floodplain inundation the HEC-RAS 1D model will be developed to model the floodplain inundation.

The hydraulic design will involve the verification of the sizes of the proposed structures when subjected to the design verified flow. The calculations will base on the inlet/ outlet control energy equations based on the condition observed.

Each typical hydraulic structure shall be evaluated for its capacity at a lowest allowed cross slope of the culvert. The arbitrary elevation of each culvert as considered for hydraulic purpose; the elevation of each culvert is expected to be fixed at the level of stream at site.

In order to account for effects of sedimentations in the structures, the design velocity through the structures has to ensure self-cleaning. Here the *Hjulstrom curve* was used.

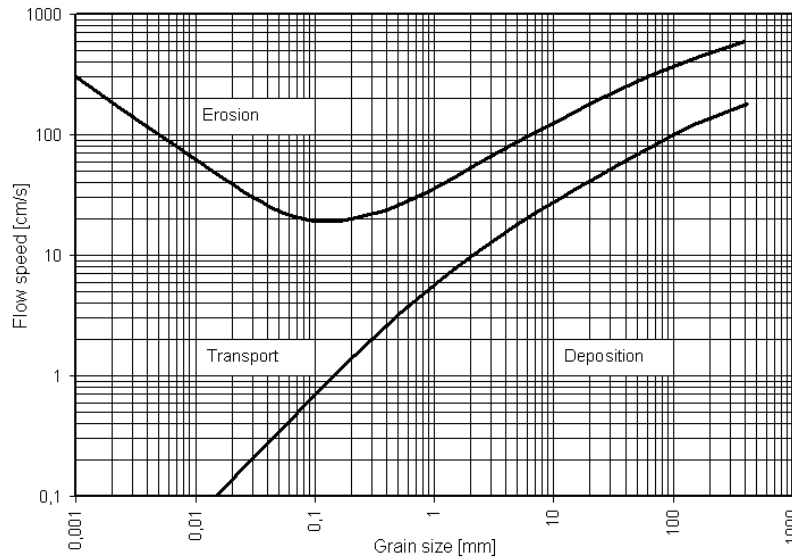


Figure 3: Hjulstrom curve

1.15 Analysis of Results and Recommended Return Period

The detailed calculations for all the catchments using various flood models are presented in Appendix 1 & 2.

The return periods recommended is 100 years for bridges and 50 years for box culverts while 25 years for pipe culverts and 2 years for open drainage structures. A justification for this choice is as explained below having considered the following facts: -

- ❖ The reliable method of estimating the design discharge would be to consider the actual observations at the site (TRL ORN 9). However, due to paucity of the relevant and required data, one would need to use statistical probability and/or other applicable methods to arrive at the design flood for a given return period keeping in mind that: -
 - The longer the return period the higher will be the discharge. Taking the economic point of view, one cannot play too safe as the cost of the structure to be built will go up with an increased design flood discharge;
 - The chances of occurrence and non-occurrence of such flood return periods of 25 and 50 years return period are already extra ordinary flood for such type of drainage structures since any flood e.g., 1000 years flood could occur in the 25 or 50 years period over which records are available;
 - Normally, it is the widely used practice (experience, economic point of view and “sound” engineering practice) to design for a frequency of once in 50 years for box culverts and for 100 years for all bridges while 25-year floods are considered adequate for pipe culverts and 2 years for other drainage structures.

Having considered the rationale for return period considered above, it is hereby considered both safe and cost-effective design for such return periods to be used for such type of drainage structures. It is further brought out that, the nature of the problems defining the flood return period is such that there can be no guarantee that in case a drainage structure is designed for an estimated

1000-year return period, for instance, the design discharge would not be exceeded in the first year of the structure's life time ("Hydraulic Factors in Bridge Design" by R.V. Farraday, G. Maunsell & Partners, F.G. Charlton, Hydraulic Research Station Ltd, Oxfordshire, U.K, 1983). It is, therefore, a normal practice to adopt such return periods as explained above.

2 HYDRAULIC ANALYSES

Hydraulic analysis is a crucial step in the design of culverts, bridges and open channels. It provides all the conclusions regarding the required size of the structures and their layout. The primary objectives are to define the minimum acceptable dimensions of the drainage structures from the hydraulic capacity considerations, taking into account the peak discharges obtained from the hydrological studies and analysis. Simply hydraulic analysis provides the relationship between the discharge data and the required structure to convey the runoff. The dimensions required to be established included the waterway width, length, heights (freeboard) and foundation depth.

The following aspects/elements were estimated/worked out:

- Hydraulic values such as water velocity, water level, water depth, HFL; and,
- Scour depth.

There are limited numbers of methods for determining sizes of structures in open channels. The most popular method is the ***Manning equations*** and is discussed and applied in this design as explained sub-sections of hydrology report. Also Simplified expressions or formulae derived from the Nomographs produced by the U.S. Department of Transportation were applied.

The computations were made using different methods for both conceptual and detailed design. The minimum acceptable dimensions of the major drainage structures were worked out taking into account the local geotechnical conditions. The design proposals were based on the considerations of safety, hydraulic adequacy and overall economy of construction.

2.1 General Requirements

While carrying out detailed design for the drainage structures under Zongomela Industrial area, the consultant did observe the following general requirements;

- The structures to occupy the full spans and the natural depths of the channels they cross in order to ensure unchanged channel flow regime and therefore avoid problems that would otherwise arise due to future morphological changes.
- The bridge openings to be designed for peak floods with a freeboard of 0.6m in small rivers and at least 1.2m in major rivers.
- The Manning's equation that uses the hydraulic characteristics of the channels should be used to dimension the bridges.
- For culverts, the ratio of the upstream water head (H_w) and the height (h) of the culvert to be $H_w/h > 1.2$. This ratio is recommended for cases where the available data is insufficient to predict the flooding effect from headwater depth.

2.2 Design Return Periods

Bridges, culverts and open drains have been designed to cope with a peak flood with a recurrence interval reflecting the expected service life of the structure, the importance of the structure, the damages that may occur in case of failure. In accordance with Terms of Reference and

internationally recognized practice, the following minimum criteria regarding recurrence interval have been recommended for use.

Table 7: Recommended Recurrence Intervals for Design of Hydraulic structures

Type of Structure	Recurrence interval T(years)	Freeboard(m)
Bridge	100	0.6,1.2 & 1.5
Box culvert	50	0.25, 0.5
Pipe culvert	25	0
Urban Channel	10-2	0

2.3 Freeboard Standards

Freeboard is the vertical clearance between the maximum design flood levels (DFL) and the bridge soffit (lowest part of the superstructure), taking into account backwater effects. It is normally provided for in bridges to make sure that floating debris including tree, trunks pass safely as well as navigational requirement. It also takes care of the local afflux. Table 5 below gives values of freeboard frequently used.

Table 8: Vertical clearance at design flood level (DFL)-Freeboard

S/N	Discharge (m ³ /s)	Free Board (mm)
1.	< 0.3	150
2.	0.3 – 3.0	450
3.	3.0 – 30.0	600
4.	30.0 – 300.0	900
5.	> 300.0	1200

2.4 Minimum Dimensions-Sizing of drainage structures

There are limited numbers of methods for determining sizes of structures in open channels. The most popular method is the Manning equations and is discussed and applied in this detailed design as explained next sub-sections. Also Simplified expressions or formulae derived from the Nomographs produced by the U.S. Department of Transportation were applied.

2.5 Discharge capacity by Manning's equation

The relationship between discharge and water level is estimated using the Manning equation on cross section of the waterway bed and Area velocity Method. The backwater effect due to the drainage structure decreasing the waterway width has been taken into account.

The cross-section and the longitudinal slope of the watercourses at the drainage structure site have been surveyed and local roughness coefficients evaluated to cross check the cross-drainage dimensions established in relation to scour as obtained using the Lacey's method.

Considering the fact that flood discharge of a higher magnitude than the designed flood discharge may occur during the life-time of the drainage structure, it was considered prudent to provide an adequate margin of safety when designing the foundations and protection works. An empirical approach to this phenomenon was to add to the design values (*e.g., discharge, velocity, etc.*) a factor depending on catchments extent and the discharge. For foundation design particularly the protection works, the velocity values have been increased by 25% for all proposed cross-drainage structures.

2.6 Discharge capacity of culverts

In the hydraulic of the culvert, energy is required to force water through the drainage structure. This type of energy takes the form of increased water level on the upstream. The depth of water surface measured from the invert level of the culvert is what is known as headwater depth (H_w).

Headwater depth is an important factor in the design of box/pipe culverts. In this study the headwater depth (H_w) of two third of the box/pipe culverts was allowed to flow through the culvert. This depth is recommended in most highway manuals.

The discharge capacities of the open channels and culverts were assessed on the basis of simplified design criteria with headwater/height ratio of 1.00, 1.25 and 1.50 respectively and inlet control conditions. The allowable ratio of headwater depth H_w /height (h) of culvert opening, that is, $H_w/h \geq 1.2$. Maximum value of this ratio is 1.5. Simplified expressions for calculations of discharge capacity of culverts/open channels were established on the basis of the formulae derived from the monographs produced by the U.S. Department of Transportation which had been used extensively in the past for culvert design. The table below summarizes the culvert design criteria:

Table 9: Simplified Formulas for Calculation of discharge capacity of culverts (Inlet control)

Type of Culvert	Discharge Capacity Q (m^3/s)		
	Hw/D=1.00	Hw/D=1.25	Hw/D=1.50
Concrete Pipe	$1.3 \times D^{2.5}$	$1.9 \times D^{2.5}$	$2.2 \times D^{2.5}$
Corrugated Metal Pipe	$1.1 \times D^{2.5}$	$1.6 \times D^{2.5}$	$1.8 \times D^{2.5}$
Box Culvert	$1.5 \times B \times H^{1.5}$	$2.1 \times B \times H^{1.5}$	$2.5 \times B \times H^{1.5}$
D: diameter of a pipe culvert (m)		B: width of a box culvert (m)	
H_w : headwater height (m)		H: height of a box culvert (m)	

After the hydrological analysis of all catchments, which drain the project area, it was crucial to then discuss on the hydraulic structures, which will convey the discharge of the stream.

From above Manning's calculation and simplified expressions derived from the monographs produced by the U.S. Department of Transportation, a simple model of hydraulic tool box was then applied and resulted to a proper design of structures. The model input of hydraulic tool box mainly is the discharge generated from the hydrological analysis which enables it to compute for the open channel and box size.

3 CONCLUSION AND RECOMMENDATIONS

The catchment characteristics extracted from the topographic maps and the DEM provided a significant basis for the hydrological and hydraulic analysis of the project road under study. Also, the applied flood models have been used in accordance to conditions and assumptions which produce accurate results.

Four hydrological models/methods have been used during the course of this study to arrive at the hydrological and hydraulic design review of the drainage to be designed. All the applied models were computerized. The models include:

- i. The Rational Method (RM) which was used to estimate peak flows for all the catchments with areas of less than 1km²
- ii. The East African Flood Model (EAFM) which was used to estimate peak flows for all the catchment with areas from 1km² to 200km².
- iii. SCS-CN –Soil conservation method: This basically used for cross checking purposes to confirm discharges of different streams draining the study area with respect to their hydraulic capacities.
- iv. Engineering judgement: Method which was used to estimate peak flows for all the catchments with areas which do not appear in either delineation and topographic sheets

Results from Rational Method (RM)

The results from the rational method are presented in APPENDIX 1. The model results consist three types of information which are the input data, hydrological analysis and hydraulic analysis.

While the hydrological analysis provides the estimated amount of floods produced from the catchment, the hydraulic analysis provide the size of the proposed standard drainage structure to convey such amount of flood.

Results from East African Flood Model (EAFM)

The results are presented in APPENDIX 2. The results show all the input data, the hydrological outputs and the hydraulic requirement for the estimated flows. Most of the hydraulic structure under this model has been designed assuming 50-year return period. In this model, a number of box culverts are proposed for the hydraulic structure based on the hydrological requirements, physical conditions and the design standards

Engineering judgement

The estimated peak discharges so computed have been considered to be accurate enough for the design of the appropriate drainage structures with an addition of 25%. Based on the estimated design flood discharges, various drainage structures have been proposed as shown in Appendix 4 (Hydraulic sizing). The drainage structures proposed are sufficient for passing the peak floods safely along the project area. They occupy well the natural channel cross sections at the project sites.

Sediment and general debris transportation down the streams are a common phenomenon and therefore regular cleaning of the openings will be required to ensure sustainable hydraulic performance of the drainage structures.

3.1 Conceptual Storm Water Proposal

The surface storm water on roads will be collected through proposed closed ditches located under sidewalk, Ditches section is trapezoidal and water will be intercepted through curb openings

Ditches will direct water flows to the natural streams at the south of project site. The natural stream coming from the northeast will be directed through box culvert to its natural path at the south. The following figure is the proposed drainage scheme. (Figure 5).

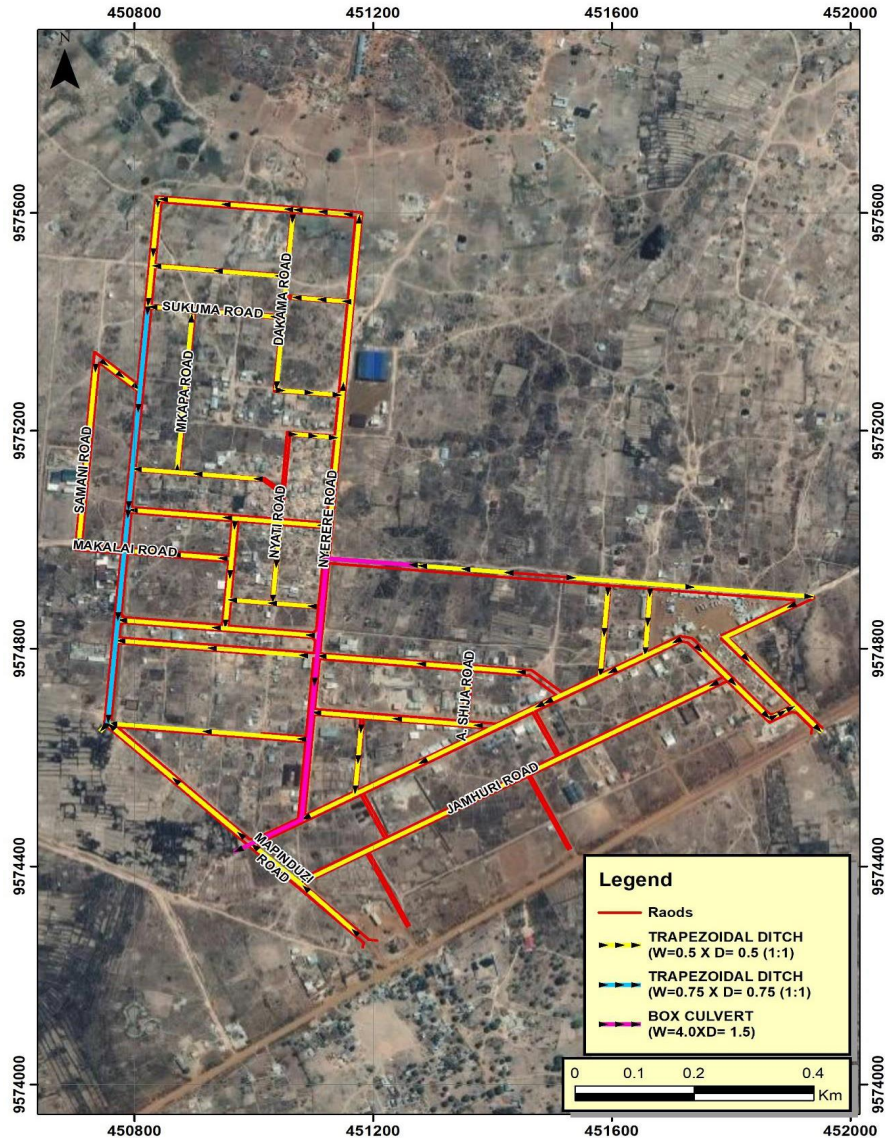


Figure 5: Proposed Open Drainages at Zongomela industrial area,market &Bus Stand

3.2 Longitudinal drainage

Design philosophy

The design of the longitudinal drainage was performed according to the standard cross sections of access roads alignments of the bus stand and will be defined for each alignment and implemented as an associated feature to it.

Ditches types and lining

Ditches are proposed to be all with trapezoidal shape and lined properly with concrete. Four concrete types shall be considered for the design as described in Table 10 below. The discharge capacity calculated by Manning's equation for each type of ditch related to slope.

Table 10: Proposed standard ditch types

TYPE	BASE WIDTH (M)	HEIGHT (M)	TOP WIDTH (M)	% MAX WATER DEPTH	Manning	Wet Area (m2)	Wet Perimeter (m)	Discharges for S=1%	Discharge for S=0.4%
1	0.4	0.4	1.5	75%	0.016	0.210	1.249	0.4	0.25
2	0.5	0.5	1.5	75%	0.016	0.328	1.561	0.725	0.459
3	0.75	0.75	2.25	75%	0.016	0.738	2.341	2.138	1.352
4	1.25	0.75	2.75	75%	0.016	1.020	2.841	3.218	2.035

The ditches will be disposed according to their capacity, the contributing area and the geometric design of the main line platform.

APPENDICES

APPENDIX 1: ANALYSIS AND RESULTS FROM RATIONAL METHOD

APPENDIX 1: Results from the Rational Methods of Flood Estimation (Catchment Size of less than 1km ²)																							
Input Data										Hydrological Analysis						Hydraulic Modeling				Hydraulic Design			
S.No.	Easting	Northing	A	L	Ea	Ee	C _u	C _u	C _v	S	C	T ₀	T ₀	I	Q		Box Culvert/Bridge	Pipe Culvert	Box Culvert/Bridge	Pipe Culvert	Inlet water elevation above invert diameter 1m/D		
			km ²	km	m	m	unitless	unitless	unitless	m/m	unitless	hr	Minutes	mm/hr	m ³ /s	Slope	Span (l)	Height (h)	Diameter (d)	Span (l)	Height (h)	No of cells	Diameter (d)
1	480920	867698	0.5746	2.50	1266	1265	0.08	0.18	0.26	0.009	0.45	8.58	451.15	17.11	1.42	0.005	1.0	0.9	1.0			2.0	0.9
2	481441	8674374	0.6570	3.57	1287	1251	0.08	0.18	0.26	0.010	0.52	9.09	543.02	13.28	1.38	0.020	1.0	0.9	1.0			2.0	0.9

APPENDIX 2: ANALYSIS AND RESULTS FROM TRRL EAST AFRICA FLOOD MODEL

PART 1: INPUT DATA AND INITIAL ANALYSIS																													
Catchment input data to be fed into the EAFM														Computerized analysis according to the conditions and requirements of the East African Flood Model															
Sources include: Topographic map; Tables, Figures and Maps applicable to the CAFM																													
S/No	Easting	Northing	A	s	L	Ea	Ee	K	C _u	C _u	C _u	T ₀	a	R ^{1/24}	r	S	C _u	T ₀	R ^{1/24}	R ₀	ARF	P	RO	Q ₀	T ₀	T ₀	R ₀	P	
			km ²	m/m	km	m	m	hr	unitless	unitless	unitless	hr	unitless	mm	unitless		m/m	unitless	hr	mm	mm	unitless	mm	m ²	m ³ /s	hr	hr	mm	mm
ZONGOMELA INDURIAL AREA	480920	8674307	1.1434	3.405	2.15	1260	1260	1.5	0.25	1.00	1.50	5.75	0.96	70	1.48	0.03	0.68	4.20	104.30	91.66	0.97	95.40	88098.94	4.24	0.34	4.44	82.31	88.78	
	481080	8674130	1.9590	5.183	3.30	1306	1222	1.5	0.45	1.00	1.50	0.75	0.96	70	1.48	0.03	0.68	4.20	104.30	91.66	0.97	95.40	110598.63	7.20	0.36	4.56	82.47	88.26	

Appendix VII: Geotechnical Study Report

1 GEOTECHNICAL

1.1 Introduction

The main aim of this section of the report is to illustrate the adopted geotechnical design basis, design criteria, and geotechnical design and recommendations that will be used for the road design/ construction and for foundation recommendations of the buildings constructed in Municipality; that would satisfy the building function; type; shape and fulfil the geotechnical requirements of safety, stability, serviceability and durability.

1.2 Project Location

The project includes the LGAs of Mwanza, Ilemela, Geita and Kahama that are located at the northern part of Tanzania.

Kahama is a town in northwestern Tanzania, with a population of 99,795 (2012 census). It is located in the center of a gold mining area. In March 2012 it became the administrative headquarters of the newly created Shinyanga Region.

1.3 Geological Study

The geologic setting of Tanzania is represented by several major litho-structural provinces that include different types of rocks and range in age from the Archean to the Recent. The Precambrian basement rocks cover most of the western two thirds of the country and consist mainly of Igneous and metamorphic rocks of Tanzanian Craton. The Phanerozoic is characterized by a series of sedimentary units of Paleozoic to Mesozoic age (at western and eastern borders) which are followed by Cenozoic intrusive and extrusive phases that accompanied the active rifting phase. (Semkiwa et al., 2005).

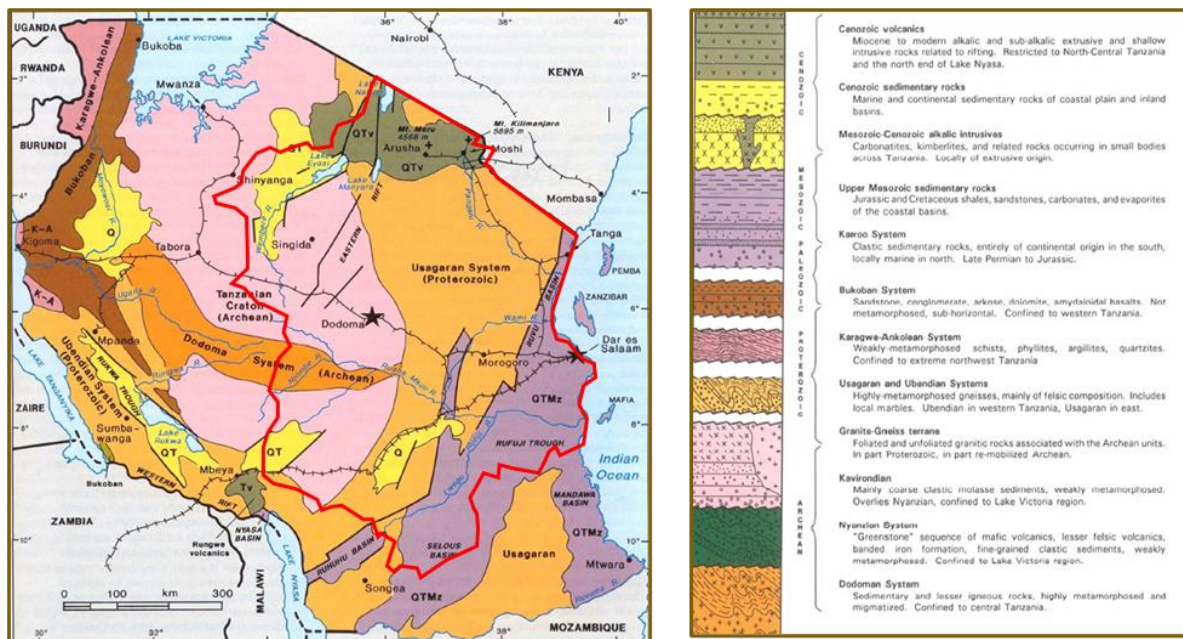


Figure 1: Google Earth satellite Images showing the site history of the project area.

1.3.1 General Geological Setting of KAHAMA

The City of Kahama is located in the northwestern part of Tanzania to the south of Lake Victoria. It is characterized by flat to undulating topography with some isolated hills of different elevations that are dissected by valleys/wadis. The rock units of the Kahama area are composed mainly of; Quaternary sediments that consist of alluvial deposits, sandy residual soils that derived from granitic rocks, and laterite soils derived from greenstone. These sediments are underlain by granodiorite granite and some biotite granite. Shear zones are the most common discontinuities in the project area-oriented NW-SE and N-S directions and the rocks are affected by two sets of faults-oriented NW and NE. regarding the site levels, Mbulu bus terminal and Sango market parking are on an elevation 1222m MSL, and Zongomela industrial area is on an elevation ranging from 1226m to 1231m MSL.

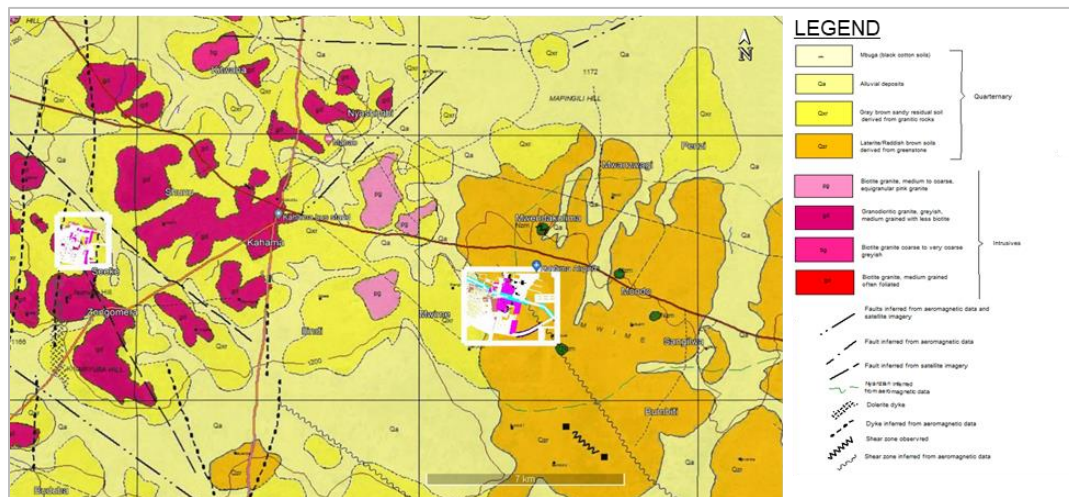


Figure 2 Geologic map of Kahama, Geological Survey of Tanzania, 2002, (Scale 1:100,000)

1.1.1 Potential Geological Constraints

Based on the desk study of the available geological data, the following geological concerns are revealed to be considered:

- i. Problematic soil
 - The lateritic soil is weak, collapsible and contains dissolution cavities, in places.
 - The black clayey soil may have swelling/shrinking properties.
 - The soil contains rock blocks in some locations.
- ii. Seismicity
 - The project areas are located in a low to moderate seismic zone. However, national, and international seismic codes and standards should be followed in the detailed design stage.

1.4 Exposure/Environmental Conditions and Durability Requirements for Concrete

This section discusses the exposure conditions and the durability requirements in addition to the relevant measures that shall be taken into consideration for the protection buried structural concrete elements.

The exposure conditions and necessary protection measures of reinforced substructure concrete elements shall be assessed according to BS EN 206 standard and its complementary BS 8500-1 Standard. The concrete protection measures will be adopted to ensure dense and durable concrete over the project design life of 50 years for the building structures and 100 years for the infrastructure/culvert concrete.

Kahama Municipality

The chemical composition test results of soil and groundwater samples obtained from test pits and boreholes drilled at the project location reveal high levels of sulphates and chlorides in the tested soil samples and low levels of sulphates and chlorides in the tested groundwater samples with neutral pH levels, as summarized in the below table.

	Soil Samples			Water Samples		
	Chlorides (as Cl), (mg/l)	Sulphates (as SO ₄), (mg/l)	pH	Chloride (as Cl), (mg/l)	Sulphate (as SO ₄), (mg/l)	pH
Min.	632.3	901.1	5.99	85.90	20.30	6.37
Max.	1053.8	5299.7	8.82	343.6	223.5	7.78
Average	832.98	3000.22	7.58	240.52	136.53	7.05
Adopted in Analysis*	983.53	4,755	8.37	343.6	223.5	7.78
Count	14	14	14	19	19	19

*For the soil samples and noting the number of tested samples, the average of the highest two test results were considered for the analysis of the exposure conditions whereas the maximum concentrations were considered for the groundwater samples.

The foundations and other substructure concrete elements are anticipated to be in contact with shallow groundwater. Considering the above test results and the shallow groundwater, the exposure conditions are defined as follows:

- BS 8500: XD2/ DC2 (DS-2/AC-2)
- BS EN 206: XD2/ XA1

The protection measures for the foundation and other substructure concrete elements in contact with soil/groundwater to ensure very dense and durable concrete against potential chemical and chloride attacks are as in item 1.6.2 below.

1.5 Geotechnical Recommendations

Based on the mentioned in the above section, the following recommendations shall be followed.

1.5.1 Foundation Recommendations

- Shallow Isolated Footing connected with ground beams and/or continuous footing are adopted as foundations for the proposed project.
- The appropriate foundation depth would be chosen at a depth not less than 1.50m below the ground level.
- Due to the relatively high fines content, and for the structural safety and to avoid any excessive differential movement between the footings, excavation should extend to a satisfying depth below the foundation level.
- The bottom of excavation is to be flooded by water for at least 48 hours. Any loose layers fill materials, soft spots, and any inferior materials such as broken or loose rocks or gypsum at the excavation level should be totally removed and replaced by an approved material, and as directed by the Engineer.
- The excavation level should be well compacted to its maximum dry density using heavy vibratory roller of a static weight of not less than 15 tons, under the supervision of a competent Geotechnical engineer.
- An approved replacement backfill material (replacement layer of 1.5m thickness (and 1.0m thickness for underground tank) consists of a mixture of gravel and sand (1 Sand: 1 Gravel) should be then placed in compacted layers of maximum thickness of 200mm (at least 95% of its maximum dry density as per modified Proctor test), from the excavation level to reach the foundation level with a protrusion not less than the replacement layer thickness.
- The footings are to be connected with ground beams in both directions (if applicable) at the foundation level.
- Unless shoring/side support is used, the Contractor is to follow the default construction sequence. This includes the excavation and erection of deeper footings adjacent to any shallower ones. Excavation close to existing foundations/raft is prohibited unless special guarantee safe excavation side slopes not steeper than 2.0 Horizontal: 1 Vertical.
- If the ground water is encountered during the foundation excavation, or need arises to excavate below the groundwater level, a dewatering system is to be maintained to lower the water level below the proposed excavation levels by a minimum of 0.50 m to enable inspection, cleaning and casting of concrete in the dry, the dewatering system is to be designed by the Contractor to ensure that there is no migration of fines and sand particles during the dewatering procedures.
- The Contractor should provide standby equipment on the project site for immediate operation to maintain dewatering on a continuous basis in the event that any part of the system becomes inadequate or fails.
- The dewatering system is to be designed to ensure that there is no migration of fines and sand particles during the dewatering procedures.
- Dewatering works shall be carried out in accordance with project specification. Contractor shall undertake all necessary temporary works to accomplish dewatering without damaging site improvements adjacent to excavation.
- The Contractor shall ensure that all diversions of existing utilities are carried out prior to excavation and to the approval of Engineer.
- Field and laboratory tests are to be conducted to assure that each replacement layer achieving the specified required properties.

- In case of the GWT is higher than the foundation level, full tanking system (with retaining wall as a water barrier against water ingress) should be considered.
- The maximum net allowable bearing pressure at the proposed foundation level is 150.0kPa for the buildings & 80kPa for underground tank.

1.5.2 Protection Measures for the Foundation

- From durability perspective, a minimum compressive strength Grade of C35/45 (cylinder/cube) is required.
- Portland cement conforming to BS EN 197-1 Type CEM I 42.5N, C3A content between 5% and 8%, shall be used in the concrete mix in combination with either fly ash (21% to 35% of cementitious weight), GGBS (36% to 65% of cementitious weight) or Silica fume (5% to 10% of cementitious weight).
- Maximum water to cementitious ratio of 0.4.
- Minimum Cementitious Content of 380 kg/m³.
- The concrete shall be dense and durable with “Low” permeability level, satisfying minimum two test requirements out of the below specified requirements:
 - Water Absorption of 2.0% maximum when tested according to BS 1881: Part 122 standard.
 - Depth of penetration of 15mm maximum when tested according to BS EN 12390-8 standard.
 - Chloride Ion Penetration of 2,000 Coulombs maximum when tested according to ASTM C1202.
- Minimum cover to reinforcement of 55mm for concrete in contact with blinding or prepared ground and 100 mm for concrete in direct contact with soil/groundwater.
- The application of full tanking waterproofing membrane protection is necessary for surface protection of buried concrete elements.

1.5.3 Foundation Recommendations for the Culverts

- Allowable bearing capacity of the soil under the culvert is 100 kPa. The foundation depth is 1.50m for culverts at C-BH-01 & C-CU-01. The foundation depth is 1.0m for the culvert at C-CU-02.
- For Culvert at the location of C-BH-01: Excavation should proceed below foundation level down 2.2m. For culvert at C-CU-01: Excavation should proceed below foundation level down 1.0m. For culvert at C-CU-02: Excavation should proceed below foundation level down 0.5m. Any loose layers fill materials, soft spots and any inferior materials such as broken or loose rocks at the excavation level should be totally removed and replaced by an approved material as directed by the Engineer.
- The excavation level should be flooded with water, where applicable, for not less than 48 hours and then left to dry. The excavation level should be well compacted using a vibratory roller with a static load that is not less than 15.0 tones to its maximum dry density under the supervision of a qualified geotechnical engineer.
- An approved replacement back-fill material (Engineered fill) of 2.2m thickness for the culvert at C-BH-01, 1.0m for the culvert at C-CU-01, and 0.5m for the culvert at C0-CU-02 should be then placed in compacted layers as per earthmoving Specifications from the excavation level to reach the foundation level with a protrusion of the same thickness all around.

- In case of open excavation, the Contractor is to guarantee a safe excavation slope not steeper than 2.0 Horizontal: 1.0 Vertical. Otherwise, an excavation supports and protection systems/shoring capable of safely resisting soil and groundwater pressures, shall be designed, provided, installed, monitored and maintained for supporting the sides of the excavation without disturbing the underlying soil or causing any damage to adjacent structures, utilities, pavements, or other facilities, in a manner accepted to the Engineer, at the Contractor's sole risk and responsibility. The Contractor is also responsible for removing the excavation supports and protection systems when they are no longer needed without disturbing the underlying soil or causing any damage to adjacent structures, utilities, pavements, or other facilities.
- Unless shoring/side support is used, the Contractor is to follow the default construction sequence. This includes the excavation and erection of deeper footings adjacent to any shallower ones. Excavation close to existing foundations/raft is prohibited unless special precautions are taken after consulting the Engineer.
- If the ground water is encountered during foundation excavation, or need arises to excavate below the groundwater level, a dewatering system is to be maintained to lower the water level below the proposed excavation/foundation levels by a minimum of 0.50 m to enable inspection, cleaning and pouring of concrete in the dry. The dewatering system is to be designed to ensure that there is no migration of fines during dewatering.
- The backfill behind and above the walls of the culverts is to follow the "soil filling and backfilling for roads" Specifications
- The soil/GW is to be considered aggressive requiring protection against chemical attacks.

1.5.4 Earthwork and Excavation Support

Open cuts may be applied whenever the soil and site conditions allow for unsupported cut slopes. Otherwise, an adequate temporary shoring system will be used such as sheet pile walls, secant piles walls, and/or others. The temporary shoring system shall be designed, provided, installed, operated, maintained and dismantled (upon completion of works) by the Contractor wherever required. The Supervising Engineer shall ensure the review of the Contractor's relevant design notes, method statement, and Quality Control system.

Based on the stability and nature of the soil, it is recommended to use earth slopes not steeper than 2.0H: 1.0V at the excavation levels.

The backfill to be used behind retaining walls shall consists of well graded granular soil such as A-1-a as per AASHTO classification and should be placed in layers not exceeding 25cm in thickness and compacted to the required 95% compaction of the maximum dry density according to ASTM D-1557 specification.

In general, it is recommended to use filling material classified as (A-1-a) and/or (A-1-b) according to AASHTO for structural filling works, while (A-2-4) can be used for general fill works, (A-3) can be used only in confined areas.

All fill material shall be compacted as per project specifications and approved by the Engineer, so as to produce a minimum degree of compaction of 95 percent. Clean sands and gravel fill shall be defined as cohesionless granular material meeting the following requirements: Naturally or

artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940; with at least 90 percent passing a 37.5-mm sieve, maximum Plasticity index 6%, maximum percentage by Dry Weight passing #200 sieve is 12%.

2 PAVEMENT DESIGN

2.1 Introduction

The pavement design criteria are in accordance with the following reference standards:

- Tanzania Pavement and materials Design Manual 1999
- Tanzania Low Volume Roads Manual, 2016
- AASHTO Guide for Design of Pavement Structures

2.2 Material Source

Existing and Virgin Sources of gravel, rock/aggregate, sand and water were sampled and tested in the study area as detailed in this section (refer to Appendices of factual data).

The performed tests for the potential Gravel sources are:

- Grading (particle size distribution),
- Atterberg Limits,
- Moisture/density relationship,
- California Bearing Ratio (CBR)
- Any other necessary tests as per PMDM.

The performed tests for the potential sources of hard stone are:

- Los Angeles Abrasion,
- Aggregate Crushing Value (ACV) and or Ten Per Cent Fine Value (TFV),
- Sodium Sulphate Soundness,
- Bitumen Affinity,
- Specific Gravity and Water Absorption,
- Soluble salts content,
- Aggregate Impact Value (AIV),
- Any other necessary tests as per PMDM.

Moreover, the existing water sources for supplying water for construction works were identified and its quantity and quality (pH, Chloride content, and Sulphate content) were assessed. The tests on Sand sources included the gradation, fines content and the organic content.

2.2.1 Locations of Sources of Material

A list of the coordinates of the material sources and estimated quantities is tabulated here below:

Gravel Sources

- KAHAMA Gravel - Mwima Mwendakulima: The estimated quantity is 60000 active.

The test results on some samples show that the gravel is clayey Gravel with sand (71-83% Gravel, 9-23% Sand, 7-18% fines and PMDM class is G15 and G25.

- KAHAMA Gravel - Nyandekwa: The estimated quantity is 15000 not active.

The test results on some samples show that the gravel is clayey Gravel with sand (54-66% Gravel, 21-35% Sand, 11-13% fines and PMDM class is G15.

- KAHAMA Gravel - Lowa: The estimated quantity is 16000 not active.

The test results on some samples show that the gravel is clayey Gravel with sand (75-90% Gravel, 5-9% Sand, 5-16% fines and PMDM class is G25.

Sand Sources

- KAHAMA Sand - Zongomela: The estimated quantity is 8500 active, pit sand.

The sand source has a high fines content and has too many organic impurities. It is not suitable for use in concrete work. Other sources need to be explored

Rock sources

- KAHAMA Quarry - Zongomela: The estimated quantity is 550000 active quarry.

Water source

- KAHAMA – Kofija Mbulu.
- KAHAMA – Bijampola Zongomela

The test results on some samples show that: pH value is 7.34, Chloride content 207 mg/l, and Sulphate content 117 mg/l. The water sources are both suitable for construction works. Care should be taken not to contaminate or deplete adjacent public water sources.

	Area	Easting	Northing	Estimated Quantity	Distance from city (km)
GRAVEL SOURCES					
1	KAHAMA Gravel Mwima - Mwendakulima	461,922.3 0	9,572,812.2 0	60000 - Active	7.5
2	KAHAMA Gravel - Nyandekwa	447,044.0 0	9,569,243.1 0	15000 - not Active	10
3	KAHAMA Gravel - Lowa	443,383.5 0	9,568,124.4 0	16000 - not Active	13.5
SAND SOURCES					
1	KAHAMA Sand - Zongomela	448,273.9 0	9,571,328.4 0	8500 - Active Pit Sand	7.8
QUARRY / Rock Sources					
1	KAHAMA Quarry - Zongomela	448,233.5 0	9,571,480.8 0	550000 Active quarry	8
WATER SOURCES					
1	KAHAMA - Kofija Mbulu	459,542.3 0	9,575,667.8 0	Dam	4.6
2	KAHAMA - Bijampola Zongomela	454,776.1 0	9,575,370.3 0	Dam	0.5

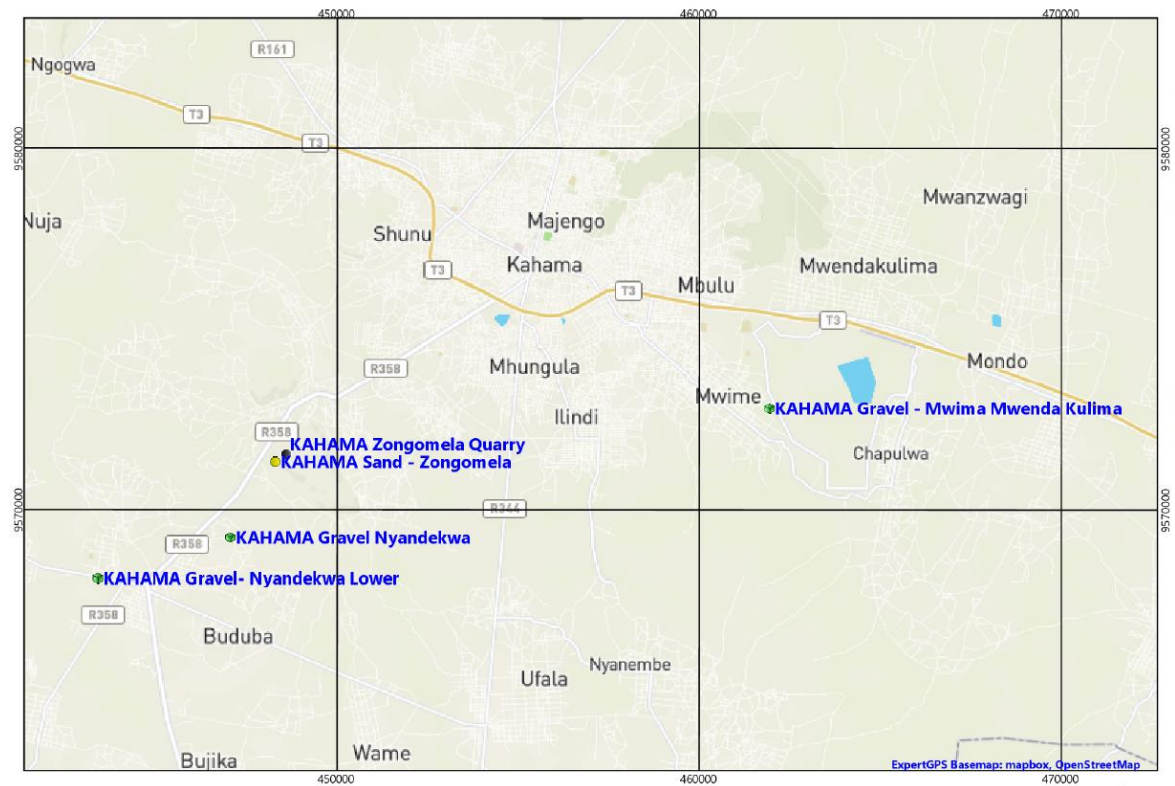


Figure 4: Coordinates and locations of Sources of materials for Kahama

Appendix VIII: Stormwater Drainage Designs

The proposed ditches will be primarily trapezoidal and lined in concrete. The discharge capacity calculated by Manning's equation for each type of ditch related to slope.

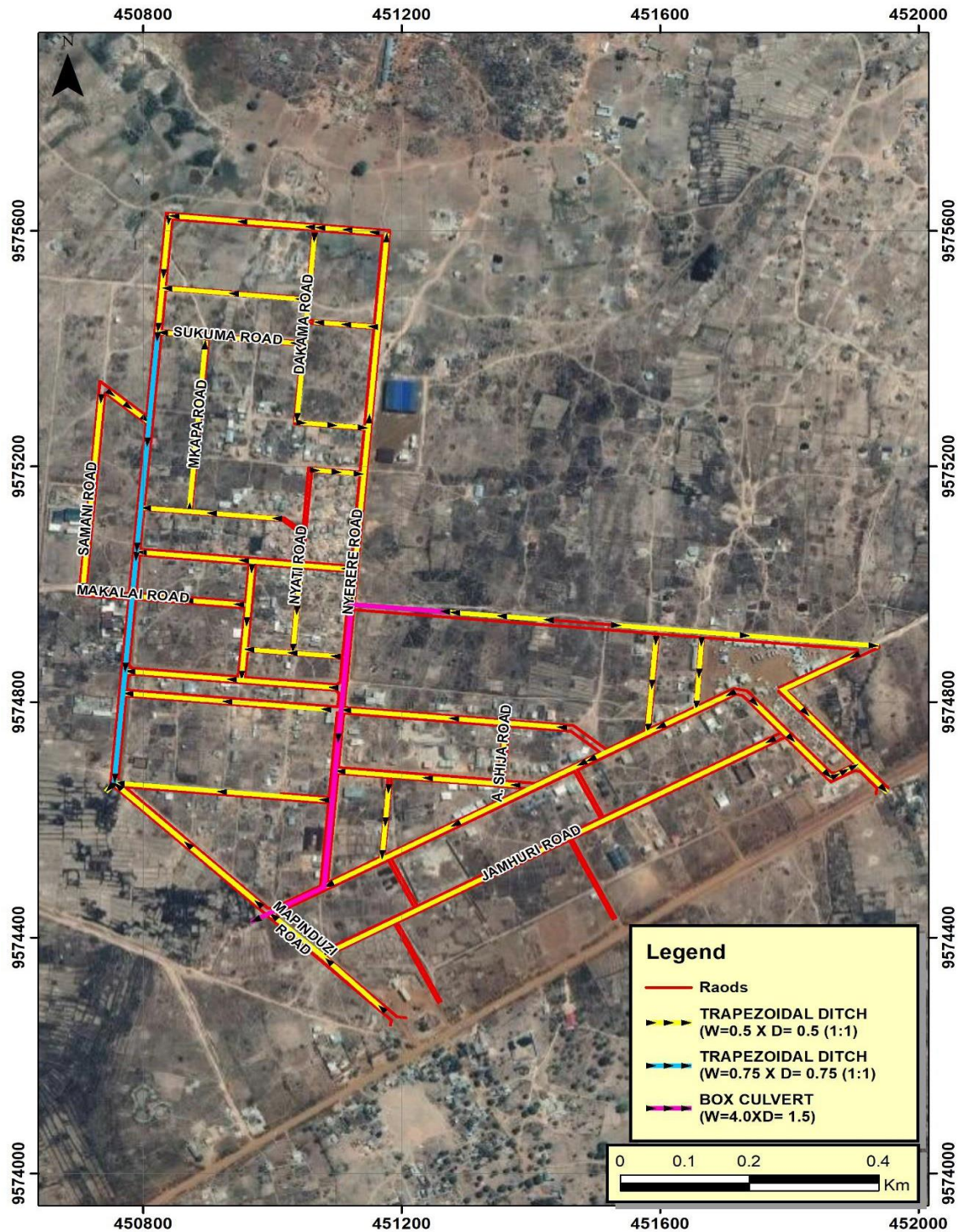


Figure 5: Proposed Open Drainages at Zongomela industrial area (roads, market &minibus stand)

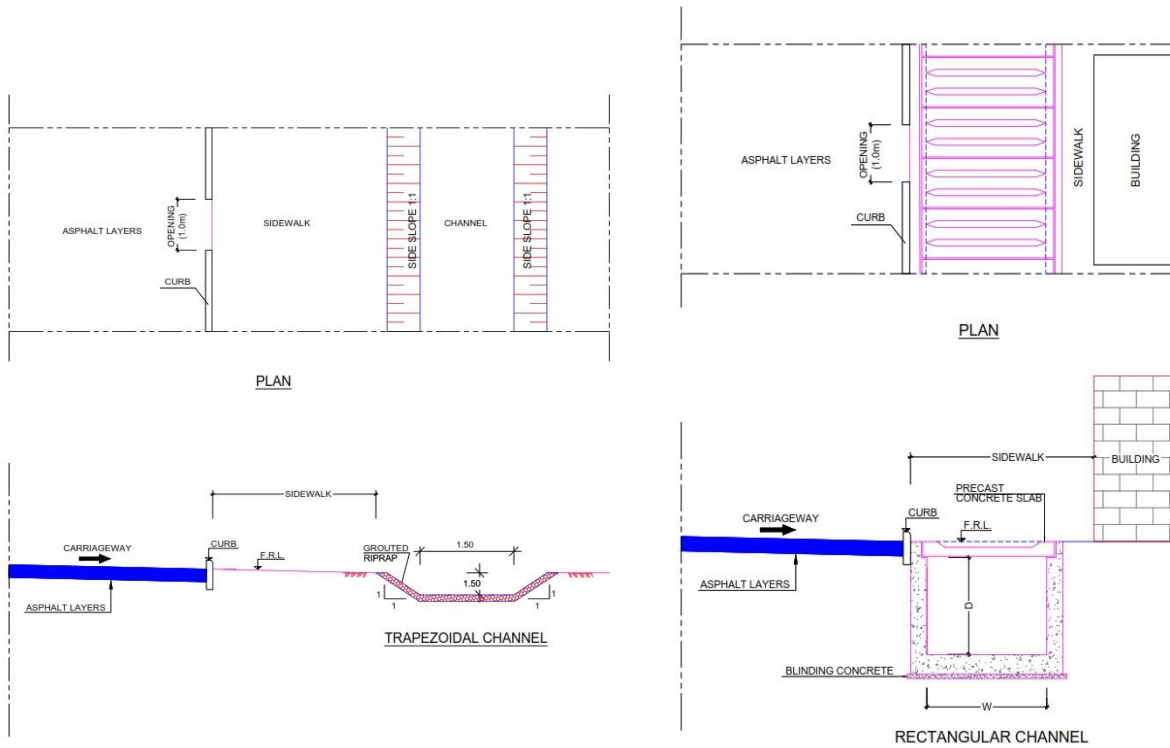


Figure 2: Cross-section for the used channels

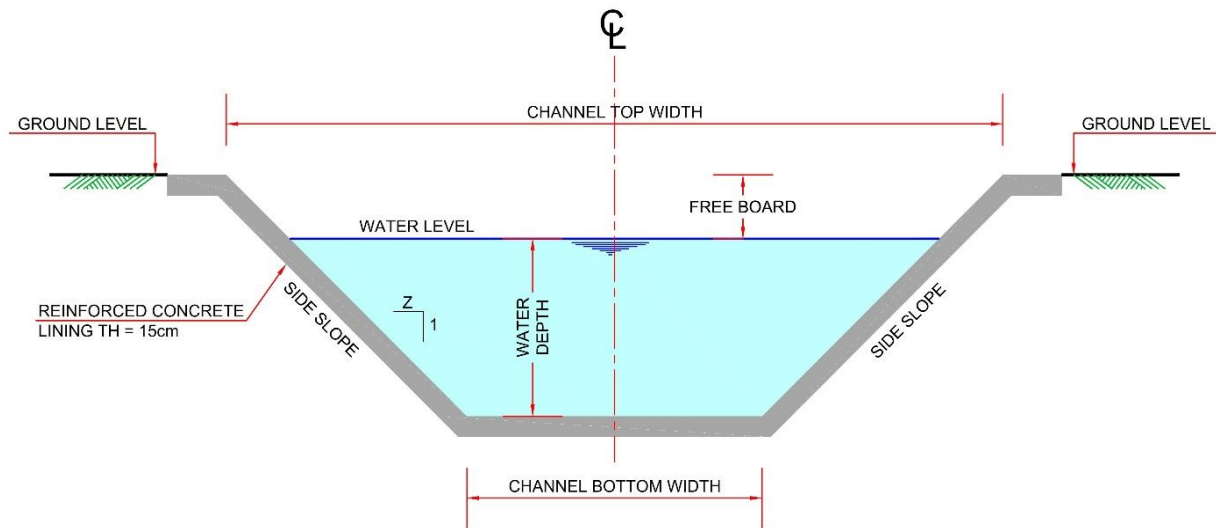
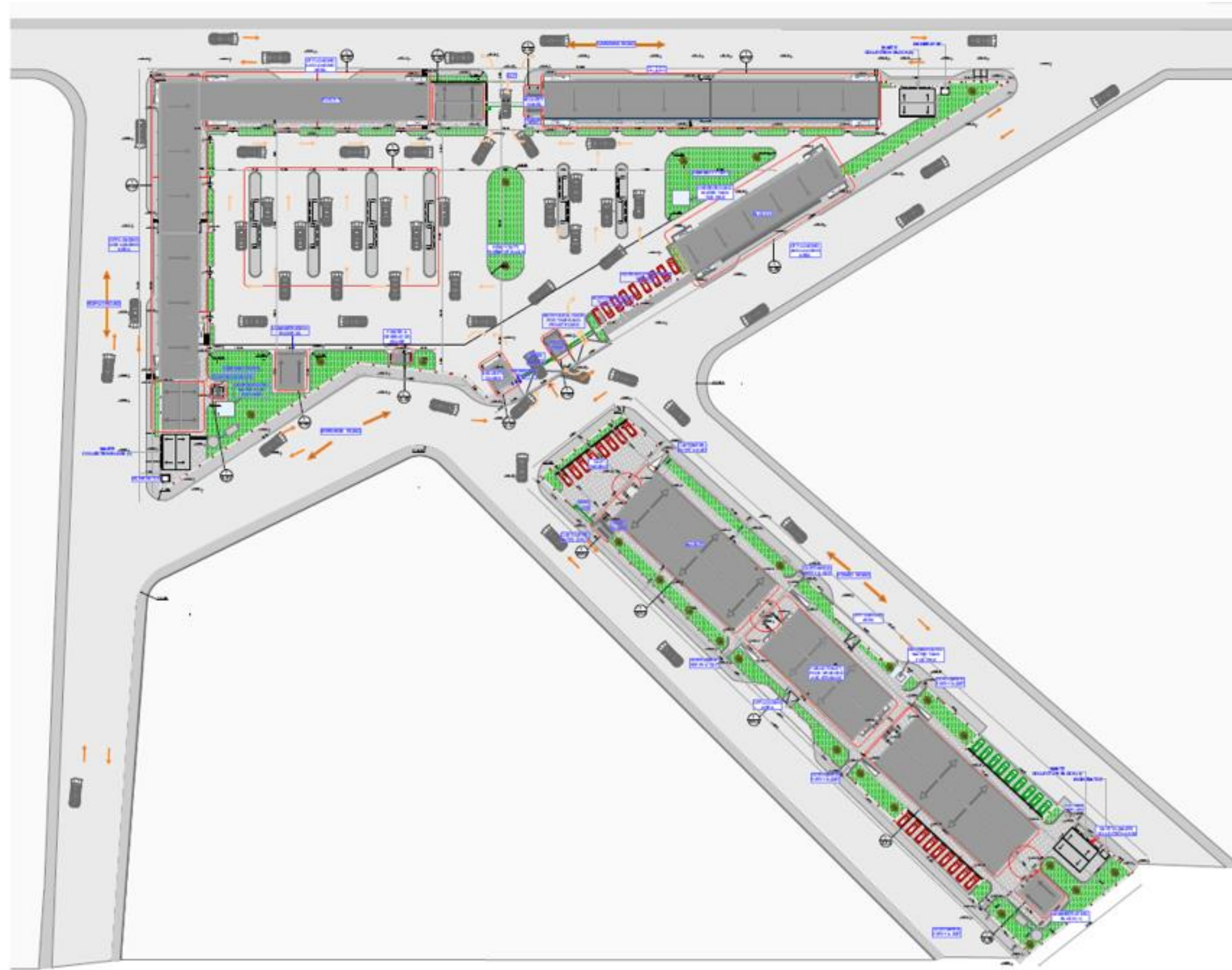


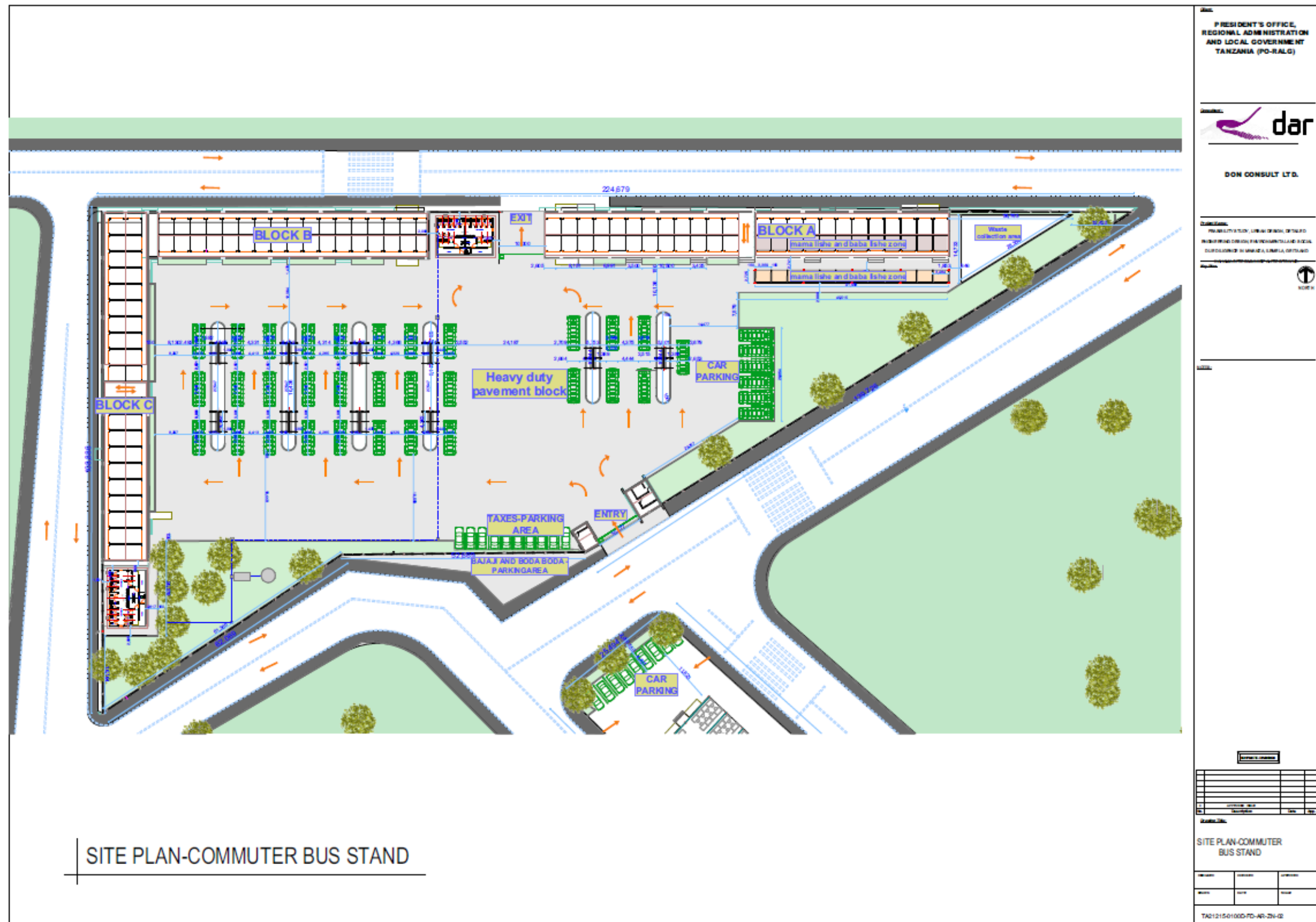
Figure 3: Typical Cross-Section for a Concrete Lined Channel (Bed and Sides)

Appendix IX: Architectural Drawings

1. SITE LAYOUT PLAN



1 SITE PLAN
1:500



2. 3D VIEW OF THE PROPOSED ZONGOMELA INDUSTRIAL PARK





**ENGLISH-SWAHILI VERSION OF NON-TECHNICAL EXECUTIVE
SUMMARY FOR THE UPGRADING OF THE MINIBUS STAND,
MARKET AND ACCESS ROADS (3KM) IN ZONGOMELA
INDUSTRIAL PARK ON PLOT NO. 646, BLOCK “A” LOCATED AT
ZONGOMELA MTAA, ZONGOMELA WARD, KAHAMA
MUNICIPALITY IN SHINYANGA REGION**

PROPONENT:

Kahama Municipal Council
P.O.B Ox 472, Kahama
Tel: +255 282710032/ +255719679464
E-Mail : md@kahamamc.go.tz / info@kahamamc.go.tz
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SUBMITTED TO:

The National Environment Management Council (NEMC)
Regent Estate, Plot No. 29/30
P.O. Box 63154, Dar es salaam, Tanzania
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CONSULTANT:

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Email: rosemary.nyirenda35@gmail.com

SUBMISSION DATE: 5TH JULY, 2023

NON-TECHNICAL EXECUTIVE SUMMARY

1. Title and location of the project/undertaking

Environmental and social impact assessment of the upgrading of Minibus stand, Market and Access Roads (3Km) in Zongomela Industrial Park Plot 646, Block “A” located at Zongomela Mtaa, Zongomela Ward, Kahama Municipality in Shinyanga Region.

2. Name of the proponent and contacts

The President’s Office

Regional Administration and Local Government Authority

Kahama Municipal Council

P.O. Box 472, Kahama

Tel: +255282710032/ +255719679464

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4. Brief outline and justification of the proposed project

(a) Brief description of the project environment

The government of the United Republic of Tanzania in collaboration with development partners intends to finance the improvement of infrastructures at Zongomela Industrial Park (roads, market and minibus stand) in Kahama Municipality as part of the Tanzania Cities Transforming Infrastructure and Competitiveness (TACTIC) project financed by the World Bank (WB). Kahama Municipal Council wishes to develop an Industrial Park at Zongomela and the Township roads at Bitumen level. The roads at Zongomela Industrial Park will ensure reliable provision of quality industrial goods and services and raise their income, reduce poverty and improve employment opportunities and easy access to services and thus improve the livelihood of the people. Upgrading of roads to Bitumen standard (3km) and Minibus stand at Zongomela Industrial Park, the rationale of proposed upgrading of roads and minibus stand is to formalize the business to 623 plots surveyed and allocated free of charge to entrepreneurs, create good environment for marketing promotion of products, increase KMC own source revenue, create more job opportunities and stimulate socio-economic development of the community.

The EIA study was conducted in accordance with the Environmental Management Act (Cap 191) and the Environmental Management Act (Environmental Impact Assessment and Audit) Regulations of 2005 as amended in 2018. The Regulations give mandate to NEMC to oversee

the EIA process, which culminates with an award of the Environmental Impact Assessment Certificate by the Vice President's Office - Ministry responsible for the Environment. The Environmental Impact Assessment Certificate is among the prerequisite approvals required before the project takes off. This project will need this approval before it is implemented.

(b) Project Description

Zongomela industrial area was proposed to accommodate small and large industries and traders in order to reduce congestion in the town centre. The area was established in 2017. The area is surveyed, and owners of individual plots have title deeds. The land was given for free by the town council and owner paid for processing of title deeds. The proposed land use is a mix of residential and commercial. Zongomela industrial park is located in Zongomela ward, Zongomela mtaa, at about 5 km from Kahama CBD. The Park has a total area of 2,162 Acres; out of which 500 Acres is for small scale industries and is the one which will be improved, 1,662 Acres for small- and large-scale industries which covers 50 km of roads. The project will improve 3km of roads within the park to bitumen standard where by Zongomela industrial park has a road network of 57 km. The proposed Zongomela market has an area of 0.98 acres. The bus stand will be built in an area covering 3.16 acres. The zone is general land owned by Kahama Municipal Council although the individual plots are owned by business people who occupy the area. Owners of the individual plots were issued with the title deeds. The KMC also owns the plots for the proposed market and mini bus stand within the industrial park. The two areas have title deeds which show ownership by the Kahama Municipal Council. Zongomela industrial area is surrounded by scattered settlement including national housing residential area.

The proposed project being a community service is projected to benefit a lot of people from different corners of Shinyanga where the project shall improve infrastructures at Zongomela Industrial Park (roads, market and bus stand). Kahama Municipal Council, Ministry of Finance, PO-RALG, TARURA and transport sector and works department are the main actor in organizing and management of fund before and during construction phase. The proposed project will serve Kahama Municipality inhabitants and all transportation and conservation industry stakeholders for approximately more than 30 years after completion.

5. Policy, Legal and Institutional Framework

Tanzania is committed to attaining Sustainable Development Goals. A few policies and legislation that have a close bearing to urban development are but not limited to National Environmental Policy (NEP) of 2021, National Transport Policy (2003), Construction Industry Policy (2003), National Land Policy (1995), National Gender Policy (2002), The National Investment Promotion Policy (1996) Environmental Management Act (Cap 191), Water Supply and Sanitation Act (2019), Land Act No. 4 of 1999, The Urban Planning Act (2007), Occupational Health and Safety Act (2003), The Road Act (2007), Employment and Labour Relations Act (2015), Engineers Registration Act (2007), the Contractors Registration Act (1997), The Local Government (Urban Authorities) Act (Cap 288), the Architects and Quantity Surveyors Act (1997), the HIV and AIDS (Prevention and Control) Act (2008), the Tanzania 2025 Development Vision and Environmental Impact Assessment and Audit Regulations (2005) as amended in 2018.

Others are the World Bank Environmental and Social Framework (ESF) which describes ten (10) Environmental and Social Standards (ESS). The ten ESSs as per the WB ESF are: ESS1: Assessment and Management of Environmental and Social Risks and Impacts; ESS2: Labor and Working Conditions; ESS3: Resource Efficiency and Pollution Prevention and Management; ESS4: Community Health and Safety; ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement; ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; ESS7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities; ESS8: Cultural Heritage; ESS9: Financial Intermediaries; and ESS10: Stakeholder Engagement and Information Disclosure.

Given the nature of activities of this project, with the exception of ESS9: Financial Intermediaries almost all the ESSs are relevant. The World Bank's Environmental and Social Framework sets out the Bank's commitment to sustainable development, through a Bank Policy and a set of Environmental and Social standards that are designed to support Borrowers' projects, with the aim of ending extreme poverty and promoting shared prosperity. The E&S Framework comprises of: (1) Vision for Sustainable Development, which sets out the Bank's aspirations regarding environmental and social sustainability; (2) The World Bank Environmental and Social Policy for Investment Project Financing, which sets out the mandatory requirements that apply to the Bank; and (3) The Environmental and Social Standards, together with their Annexes, which set out the mandatory requirements that apply to the Borrower and projects. Other document is the World Bank Environmental, Social, Health and Safety (ESHS) Guidelines.

6. Stakeholder Consultations and Public Involvement and the results

Generally, most of stakeholder's views and concerns support the proposed project. All the comments received from the stakeholders were compiled, summarized and sorted to identify issues that have been addressed in the full and detailed Environmental Impact Assessment. A matrix with planned schedule of visits was prepared to guide the team to consult all stakeholders that were identified. Stakeholders were identified using simple methods such as focus group discussion and key informant interviews. In all the process of stakeholder consultation professional discussion was key especially when exploring technical issues. The stakeholders identified include but not limited to Kahama District Council including the District Executive Director and the entire team (legal, community development, environment, physical planning, engineering), Kahama Water and Sewerage Authority (KUWASA), Tanzania Electric Supply Company Ltd (TANESCO), Kahama Office, Association of people with disabilities, Association of Traders in Zongomela Industrial Area, Representatives of Zongomela Traders, Association of vendors at Zongomela market, Association of Mama Ntilie at Zongomela market, Association of drivers at Zongomela mini bus stand, Office of the Mayor of Kahama Municipal Council, Mini bus stand users, Ward office and Mtaa office

Major issues of concern raised were:

- Stakeholders' categorization
- Designs to consider various climatic and social issues;
- Bus Stand and Market to accommodate all current users;

- Interaction between local communities and influx of labourers during construction should be monitored; and
- Designs to consider energy use efficiency

6.1 Assessment of Impacts

Impact identification in this EIA aimed at ensuring that all potential significant impacts were identified and addressed. The EIA team used tools to identify various impacts particularly adverse impacts. These impacts were identified during the stakeholders' consultative meetings, interview, literature review and observation. Some of the issues/impacts identified were thus regarded as possible impacts.

(a) Mobilization and Construction phase

- Positive Social Benefits
 - i. Benefits to communities resulting from employment during construction
 - ii. Benefits to businessmen due to improved transportation and increased accessibility
- Negative Social Impacts
 - i. HIV / AIDS among workers and nearby communities
 - ii. Safety and health risks due to influx of people working for the project
 - iii. Unwanted pregnancy
- Positive Environmental Benefits
 - i. Improved environment which consists of standard drainage system
 - ii. Improved air quality due to expected greenery
- Negative Environmental Impacts
 - i. Loss of natural vegetation
 - ii. Increased Dust and noise levels
 - iii. Waste management problems during construction
 - iv. Safety and health risks
 - v. Population influx from labourers
 - vi. Vibration pollution

(b) Impacts associated with Operation Phase

- Positive Social Benefits
 - i. Benefits to communities resulting from employment
 - ii. Increased accessibility of the areas
 - iii. Improved social services
 - iv. Increased land value and development
- Negative Social Impacts
 - i. HIV / AIDS among workers and nearby communities
 - ii. Community safety caused by the influx of workers
 - iii. Unwanted pregnancy

- Positive Environmental Benefits
 - i. Improved environment which consists of standard drainage system
 - ii. Improved transportation of people and luggage
 - iii. Improved air quality due to expected greenery
- Negative Environmental Impacts
 - i. Increased pressure on social services and utilities
 - ii. Increased Dust and noise levels
 - iii. Increased waste during operations

(c) Impacts associated with Demobilization Phase

The following key issues are associated with decommissioning phase:

- Negative Social Impact
 - i. Loss of employment which might lead to poor quality of life
- Negative Environmental Impact
 - i. Production of rubble and associated disposal problems
 - ii. Noise and Dust Pollution

2. Mitigation Measures

Many of the mitigation measures put forward are nothing more than good engineering practice that shall be adhered to during all the project phases. Other major mitigation measures for each of the identified impacts to be observed include;

- **Higher noise levels:** Machine operators in various sections with significant noise levels shall be provided with noise protective gear.
- **Dust emission:** Trucks transporting construction materials shall be covered if the load is dry and prone to dust emissions.
- **Waste management:** The contractor shall have adequate facilities for handling the construction waste. A large Skip Bucket shall be provided at the site.
- **Health and safety of workers:** Appropriate working gear (such as nose, ear mask and clothing) and good construction site management shall be provided. During construction the contractor shall ensure that the construction site is well protected and hygienically kept with adequate provision of facilities including waste disposal receptacles, sewage, firefighting and clean and safe water supply.
- **Lack of employment for local community:** The contractor shall deploy locally available labour
- **Traffic management:** Adequate sign boards will be placed at the relevant location and flag man will be assigned whenever necessary.
- **Pressure on community services such as water and electricity:** Alternative measures like use of solar power, drilling a borehole at site, water recycling shall be explored and implemented if found feasible. For instance, use of energy savers bulbs shall be given high priority

- **Accidents and fire incidences:** The design of the proposed project strictly adheres to the Fire Safety Standards.

7. Alternative Analysis

From the environmental safeguard viewpoint, alternative analysis is an important tool for the best selection of the project site, technology to be followed, and operational mechanism in terms of environmental acceptability of the chosen method. The following alternatives have been considered by this project.

(a) "No action" alternative of the project

The no project alternative entails retaining the current status quo (No Upgrade of Zongomela industrial area). Adopting this option would mean avoiding most of the negative effects associated with the project and missing all the positive benefits such as benefits to communities resulting from employment during construction and availability of conducive and adequate business spaces to small and large industries and traders in order to reduce congestion in the town centre.

(b) Alternative Analysis for Selection of Sites

The option of using another site apart from that of the proposed one was also considered. However, the Proposed site was observed to have the following advantages over others;

- The site is owned by Kahama Municipal Council (No need to buy a new piece of land and does not need compensation).
- The site is located on a favourable piece of land which is close to transportation facilities (road network) and health service
- The plot is located on a favourite piece of land. It is surrounded by residential and institutional activities; it is in the CBD area.
- Availability of water and electricity mains supply

(c) Alternative Analysis for Technology and materials options

Generation of noise from the construction activities (welding, compaction, drilling, trenching etc) will raise the noise level at the site. Thus, to prevent these adverse effects to the surrounding community, the contractor will use machines that do not generated a lot of noise. Therefore, the proposed project will employ the use of locally and internationally accepted materials and equipment to achieve public health, safety, security and environmentally aesthetic requirements.

(d) Alternative analysis for energy options

The use of other alternative energy sources apart from power from the National grid and diesel generators were considered. As it is the case in most of developing countries, supply of electricity from national grids is not reliable as it mostly originates from hydroelectric power generators, which depend on rainfall frequency, intensity and pattern. On the other hand, diesel generators, which are mainly used during power interruptions, emit a lot of greenhouse gases especially when they are run for a long time. Solar energy was considered, and the design team shall explore the feasibility of using this alternative.

8. Environmental and Social Management Plan, Environmental Monitoring Plan and Auditing

The Environmental and Social Management Plan (ESMP) is presented in the Environmental Impact Statement. The options to minimize or prevent the identified adverse social and environmental impacts as well as a monitoring plan have been suggested and they are based on good engineering practices. It also, defines roles and responsibility of different actors of the plan. The plan during the implementation of the project is important in order to measure the success of the mitigation measures. The contractor shall implement components relevant to the actual construction and operation phases. Developer shall be responsible for overall implementation of proposed Plan.

The estimated costs for implementing the mitigation measures are just indicative. Additionally, the ESPM include an estimate of the costs of the measures so that the project Developer can budget the necessary funds. Appropriate bills of quantities should clearly give the actual figures. In any case, the consultant used informed judgment to come up with these figures. The project shall ensure that the activities which are causing impacts to the environment are managed in a comprehensive, systematic, planned and documented manner. Developer shall communicate the environmental and social management plan and environmental and social monitoring plan to its employees and its contractors to ensure that implementation is done accordingly.

Furthermore, Developer shall ensure availability of resources which are required for implementation of its environmental management plan. The plan shall be monitored to ensure that environmental objectives are met Kahama Municipal Council shall carry out routine auditing and communicate the audit report to the top management so as to ensure continued sustainability of the environmental management system.

9. Resources evaluation

Kahama Municipal Council has set aside a total of 6.9 billion Tanzania shillings as initial cost for the upgrading of Zongomela Industrial Park. All these funds will cover costs of civil and construction works; Information, Communication and Technology works, procurement of medical devices; and cross cutting issues. The estimated costs for implementing impact management as well as monitoring process as outlined in Environmental Impact Statement is TZS. 168,0000,000 and TZS 55,000,000 respectively. The estimated costs for mitigation do not include the environmental costs, which could not be accurately calculated. Since some of the impacts will only be realized during construction phase, the costs for these will also be short term, especially if mitigation measures are fully implemented the project benefits outweighs the project costs by far.

10. Decommissioning

As decommissioning will take place in the remote future, the specific conditions for mitigation are generally inherently uncertain. In view of this, specific mitigation measures pertaining to environmental impacts of decommissioning works cannot be proposed at the moment with a reasonable degree of certainty. A decommissioning plan that takes environmental issues into consideration shall be prepared by the developer prior to the decommissioning works. Should

it be done, decommissioning may entail a change of use (functional changes) or demolition triggered by change of land use.

11. Summary and Conclusion

The proposed upgrading of Zongomela Industrial Park as such, entails minimal adverse environmental impacts of which adequate mitigation measures have been proposed and incorporated in the project design. It can therefore be concluded that, the proposed project will entail no significant impacts provided that the recommended mitigation measures are adequately and timely implemented. The identified impacts will be managed through the proposed mitigation measures and implementation regime laid down in this ESIA. The proponent is committed in implementing all the recommendations given in this ESIA and further carrying out the environmental auditing and monitoring schedules.

**MUHTASARI USIOKUWA WA KIUFUNDI WA TATHMINI YA
ATHARI ZA MAZINGIRA NA JAMII ZA UBORESHAJI WA KITUO
CHA DALADALA, SOKO NA BARABARA (KM 3) KATIKA ENEO LA
VIWANDA LA ZONGOMELA KWENYE KIWANJA NAMBA 646,
KITALU “A”, MTAA WA ZONGOMELA, KATA YA ZONGOMELA,
MANISPAA YA KAHAMA, MKOANI SHINYANGA**

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TAREHE YA KUWASILISHA: 5 JULAI, 2023

MUHTASARI USIO WA KIUFUNDI

1. Kichwa na eneo la mradi/shughuli

Tathmini ya Athari za Kimazingira na Kijamii kwa mapendekezo ya kuboreshwa kwa kituo cha daladala, soko na barabara (km 3) katika eneo la viwanda la Zongomela kwenye kiwanja namba 646, kitalu “A” katika Mtaa wa Zongomela, Kata ya Zongomela, Manispaa ya Kahama, Mkoa wa Shinyanga.

1. Jina la Mwekezaji na anwani

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3. Muhtasari mfupi na uhalali wa mradi unaopendekezwa

(a) Maelezo mafupi ya mazingira ya mradi

Serikali ya Jamhuri ya Muungano wa Tanzania kwa kushirikiana na wadau wa maendeleo inatarajia kufadhili uboreshaji wa miundombinu katika Hifadhi ya Viwanda ya Zongomela (barabara, soko na stendi ya mabasi) katika Manispaa ya Kahama ikiwa ni sehemu ya mradi wa kubadilisha miundombinu na ushindani wa Miji Tanzania (TACTIC) unaofadhiliwa na Benki ya Dunia (WB). Halmashauri ya Manispaa ya Kahama inapenda kuendeleza Hifadhi ya Viwanda katika eneo la Zongomela na barabara za Mji mdogo kwa kiwango cha lami. Barabara za Hifadhi ya Viwanda ya Zongomela zitahakikisha upatikanaji wa bidhaa na huduma bora za viwandani na kuinua kipato chao, kupunguza umaskini na kuboresha fursa za ajira na upatikanaji wa huduma kwa urahisi na hivyo kuboresha maisha ya wananchi. Uboreshaji wa barabara kwa kiwango cha lami (kilomita 3) na stendi ya mabasi madogo katika Hifadhi ya Viwanda ya Zongomela, Sababu za mapendekezo ya uboreshaji wa barabara na stendi ya mabasi madogo ni kurasimisha biashara kuwa viwanja 623 vilivyopimwa na kugawiwa bure kwa wajasiriamali, kuweka mazingira mazuri ya masoko. kukuza bidhaa, kuongeza mapato ya

chanzo cha KMC, kuunda nafasi zaidi za kazi na kuchochea maendeleo ya kijamii na kiuchumi ya jamii.

Tathmini ya Athari kwa Mazingira (TAM) ilifanyika kwa mujibu wa Sheria ya Usimamizi wa Mazingira (Sura ya 191) na Kanuni za Usimamizi wa Mazingira (Tathmini na Ukaguzi wa Athari kwa Mazingira) za 2005 kama ilivyorekebisha mwaka wa 2018. Kanuni hizo zinaipa NEMC mamlaka ya kusimamia mchakato wa TAM, ambao unafikia kilele, pamoja na kutunukiwa Cheti cha Tathmini ya Athari kwa Mazingira na Ofisi ya Makamu wa Rais - Wizara yenye dhamana ya Mazingira. Cheti cha Tathmini ya Athari kwa Mazingira ni miongoni mwa vibali vya lazima vinavyohitajika kabla ya kuanza kwa ujenzi wa mradi. Mradi huu pia utahitaji cheti hiki kabla ya utekelezaji wake.

(b) Maelezo ya Mradi

Eneo la viwanda la Zongomela lilipendekezwa kuchukua viwanda vidogo na vikubwa na wafanyabiashara ili kupunguza msongamano katikati ya mji. Eneo hilo lilianzishwa mwaka 2017. Eneo limepimwa, na wamiliki wa viwanja binafsi wana hati miliki. Ardhi hiyo ilitolewa bure na baraza la manispaa na mmiliki kulipwa kwa usindikaji wa hati miliki. Matumizi ya ardhi yaliyopendekezwa ni mchanganyiko wa makazi na biashara. Hifadhi ya viwanda ya Zongomela iko katika kata ya Zongomela, mtaa wa Zongomela, karibu kilomita 5 kutoka Kahama CBD. Hifadhi hii ina jumla ya eneo la Ekari 2,162; kati ya hizo Ekari 500 ni kwa ajili ya viwanda vidogo na ndiyo itakayoboreshwa, Ekari 1,662 kwa ajili ya viwanda vidogo na vikubwa vinavyotumia barabara zenye urefu wa kilomita 50. Mradi huo utaboresha kilomita 3 za barabara ndani ya hifadhi hadi kufikia kiwango cha lami ambapo by Zongomela industrial park ina mtandao wa barabara wa kilomita 57. Soko la Zongomela linalopendekezwa lina eneo la ekari 0.98. Stendi ya mabasi itajengwa katika eneo lenye ukubwa wa ekari 3.16. Kanda hiyo ni ardhi ya jumla inayomilikiwa na Halmashauri ya Manispaa wa Kahama ingawa viwanja binafsi vinamilikiwa na wafanyabiashara wanaomiliki eneo hilo. Wamiliki wa viwanja binafsi walipewa hati miliki. KMC pia inamiliki viwanja vya soko linalopendekezwa na stendi ya mabasi madogo ndani ya bustani ya viwanda. Maeneo hayo mawili yana hati miliki zinazoonyesha umiliki wa Halmashauri ya Manispaa wa Kahama. Eneo la viwanda la Zongomela limezungukwa na makazi yaliyotawanyika ikiwa ni pamoja na eneo la makazi ya kitaifa.

Mradi unaopendekezwa kuwa wa huduma kwa jamii unatarajiwa kuwanufaisha wananchi wengi kutoka pembe mbalimbali za Shinyanga ambapo mradi huo utaboresha miundombinu katika Hifadhi ya Viwanda ya Zongomela (barabara, soko na stendi ya mabasi). Halmashauri ya Manispaa ya Kahama, Wizara ya Fedha, TAMISEMI, TARURA na Sekta ya Uchukuzi na Idara ya Kazi ndio wahusika wakuu katika uandaaji na usimamizi wa fedha kabla na wakati wa ujenzi. Mradi unaopendekezwa utahudumia wakazi wa Manispaa ya Kahama na wadau wote wa sekta ya usafirishaji na uhifadhi kwa takriban zaidi ya miaka 30 baada ya kukamilika.

4. Mfumo wa Sera, Sheria na Kitaasisi

Sera na sheria mbalimbali ambazo zinahusiana na zinaongoza utekelezaji wa mradi huu ni pamoja na Dira ya Maendeleo ya Tanzania 2025, Sera ya Taifa ya Mazingira ya 2021, Sera ya uchukuzi (2003), Sera ya Sekta ya Ujenzi (2003), Sera ya Taifa ya Ardhi (1995), Sera ya Taifa

ya Jinsia (2002), Sera ya kukuza Uwekezaji (2003) na Sheria ya Usimamizi wa Mazingira (Sura ya 191), 2004, na Kanuni za Tathmini na Ukaguzi wa Athari kwa Mazingira (2005) kama ilivyorekebisha mwaka 2018. Sheria nyingine ni kama vile; Sheria ya Majisafi na Usafi wa Mazingira (2019), Sheria ya Ardhi namba 4 ya 1999, Sheria ya Mipango Miji (2007), Sheria ya Afya na Usalama Kazini (2003), Sheria ya Ajira na Mahusiano Kazini (2015), Sheria ya Usajili Wahandisi (2007), Sheria ya Usajili wa Makandarasi (1997), Sheria ya Serikali za Mitaa (Mamlaka za Mijini) (Sura ya 288), Sheria ya Wasanifu Majengo na Wakadiriaji Majenzi (1997), na Sheria ya VVU na UKIMWI (Kinga na Kudhibiti) (2008).

Pia kuna Mfumo wa usimamizi wa mazingira na jamii wa Benki ya Dunia unaoeleza Viwango kumi (10) vya Mazingira na Kijamii ambavyo vinapaswa kufuatwa wakati wa utekelezaji wa miradi hususani ile inayofadhiliwa na Benki ya Dunia. ESS1: Tathmini na usimamizi wa Hatari na Athari za Mazingira na Kijamii; ESS2: Masuala ya Ajira na Mazingira ya Kazi; ESS3: Ufanisi wa Rasilimali na Kuzuia na Kusimamia Uchafuzi; ESS4: Afya na Usalama ya Jamii; ESS5: Utwaaji wa Ardhi, Vizuizi vya Matumizi ya Ardhi na Uhamishaji wa Watu na Makazi bila Hiari; ESS6: Uhifadhi wa Bioanuwai na Usimamizi Endelevu wa Maliasili Hai; ESS7: Wenyeji/Jamii za wenyeji zenye mfumo wa kiasili wa maisha za Kiafrika Kusini mwa Jangwa la Sahara ambazo Kihistoria zimekuwa haziangaliwi kwenye masuala ya maendeleo kutokana na mfumo wao wa Maisha na tamaduni zao; ESS8: Urithi wa Kitamaduni; ESS9: Waamuzi wa Fedha; na ESS10: Ushirikishaji wa Wadau na upashanaji wa habari/taarifa.

Kwa kuzingatia asili ya shughuli za mradi huu, isipokuwa ESS9: Waamuzi wa Kifedha; karibu ESS zote zinahusika katika mradi huu. Mfumo wa Mazingira na Jamii wa Benki ya Dunia unaweka wazi dhamira ya Benki ya maendeleo endelevu, kupitia Sera ya Benki na seti ya viwango vya Mazingira na Kijamii ambavyo vimeundwa kusaaidia miradi ya Wakopaji, kwa lengo la kumaliza umaskini uliokithiri na kukuza ustawi wa pamoja. Mfumo wa E&S unajumuisha: (1) Dira ya Maendeleo Endelevu, ambayo inaweka wazi matarajio ya Benki kuhusu uendelevu wa mazingira na kijamii; (2) Sera ya Benki ya Dunia ya Mazingira na Kijamii inaweka masharti na vigezo vya lazima vya kimazingira na kijamii ambavyo Miradi ya Uwekezaji, inayofadhiliwa na Benki ni lazima ikidhi; na (3) Viwango vya Mazingira na Kijamii, pamoja na Viambatanisho vyake, ambavyo vinaweka mahitaji ya lazima yanayotumika kwa Mkopaji na miradi. Hati nyingine ni Miongozo ya Benki ya Dunia ya Mazingira, Kijamii, Afya na Usalama.

5. Mashauriano ya Wadau na Ushirikishwaji wa Umma na matokeo

Kwa ujumla, maoni ya wadau wengi yanaunga mkono mradi uliopendekezwa. Maoni yote yaliyopokelewa kutoka kwa wadau yalikusanywa, kufupishwa na kupangwa ili kuainisha masuala mbalimbali ambayo yameshughulikiwa katika Tathmini kamili na ya kina ya Athari kwa Mazingira. Jedwali lenye ratiba ya ziara lilitayarishwa ili kuiongoza timu kushauriana na wadau wote waliotambuliwa. Wadau walitambuliwa kwa kutumia mbinu rahisi kama vile majadiliano ya vikundi na usaili wa watoa taarifa muhimu wenye uelewa mkubwa wa mradi. Katika mchakato wote wa mashauriano ya wadau majadala wa kitaalamu ulikuwa muhimu hasa wakati wa kuchunguza na kutathmini masuala ya kiufundi. Wadau walioainishwa ni pamoja na Halmashauri ya Wilaya ya Kahama pekee akiwemo Mkurugenzi Mtendaji wa Wilaya na

timu nzima (sheria, maendeleo ya jamii, mazingira, mipango mizuri, uhandisi), Mamlaka ya Majisafi na Majitaka Kahama (KUWASA), Shirika la usambazaji umeme Tanzania (TANESCO), Ofisi ya Kahama, Chama cha Watu wenye Ulemavu, Jumuiya ya Wafanyabiashara katika Eneo la Viwanda la Zongomela, Wawakilishi wa Wafanyabiashara wa Zongomela, Jumuiya ya wauzaji soko la Zongomela, Chama cha Mama Ntilie soko la Zongomela, Chama cha Madereva katika stendi ya mabasi madogo ya Zongomela, Ofisi ya Meya wa Halmashauri ya Manispaa wa Kahama, watumiaji wa stendi ya mabasi madogo, Ofisi ya Kata na Ofisi ya Mtaa.

Masuala makuu na maangalizo yaliyotolewa yalikuwa:

- Uainishwaji wa wadau uzingatiwe;
- Miundo inapaswa kuzingatia masuala mbalimbali ya hali ya hewa na kijamii;
- Stendi ya mabasi na soko iwe na uwezo wa kutoa huduma kwa watumiaji wote wa sasa;
- Muingiliano kati ya jamii za wenyeji na kufurika kwa vibarua wakati wa ujenzi unapaswa kufwatiliwa; na
- Miundo izingatie ufanisi wa matumizi ya nishati

6. Tathmini ya Athari

Uainishaji wa athari katika TAM hii ulilenga kuhakikisha kuwa athari zote muhimu zinazoweza kutokea zina ainishwa na kushughulikiwa. Timu ya TAM ilitumia zana kutambua athari mbalimbali hasa athari mbaya. Athari hizi zilibainishwa wakati wa mikutano ya mashauriano ya wadau, mahojiano, mapitio ya maandiko na uchunguzi. Baadhi ya maswala/athari zilizoainishwa kwa hivyo zilichukuliwa kuwa ni athari zinazorekebisha.

(a) Awamu ya Uhamasishaji na Ujenzi

• Faida Chanya za Kijamii

- i. Manufaa kwa jamii yanayotokana na ajira
- ii. Faida kwa serikali kutokana na mapato na kodi
- iii. Faida kwa wafanyabiashara kutokana na uboreshaji wa miundombinu ya soko.

• Athari Hasi za Kijamii

- i. VVU/UKIMWI miongoni mwa wafanyakazi na jamii ziishizo Jirani na eneo la mradi
- ii. Usalama wa jamii unaosababishwa na kufurika kwa wafanyakazi
- iii. Mimba zisizohitajika

• Faida Chanya za Mazingira

- i. Mazingira yaliyoboreshwa ambayo yana mfumo wa kawaida wa mifereji ya maji
- ii. Kuboresha ubora wa hewa kutokana na kuweka ukanda wa kijani (upandaji wa miti ya kivuli na mapambo)

• Athari Hasi za Mazingira

- i. Kupoteza uoto wa asili
- ii. Kuongezeka kwa viwango vya vumbi na kelele
- iii. Ongezeko la taka na matatizo ya usimamizi wa taka wakati wa ujenzi
- iv. Hatari za usalama na afya
- v. Ongezeko la watu wanaotafuta fursa za ajira na biashara katika eneo la mradi
- vi. Athari zitokanazo na mitetemo.

(b) Athari zinazohusiana na Awamu ya Operesheni

• Faida Chanya za Kijamii

- i. Kuongezeka kwa fursa za ajira na kuboreka kwa viwango vya maisha kwa jamii
- ii. Upatikanaji wa fursa za biashara na ongezeko la kipato
- iii. Kuongezeka kwa usalama wa eneo hilo
- iv. Kuboreshwa kwa huduma za kijamii
- v. Kuongeza mapato kwa Halmashauri ya Manispaa Ya Kahama na nchi kwa ujumla kutokana na kodi mbalimbali.

• Athari Hasi za Kijamii

- i. Kuongezeka kwa maambukizi ya VVU/UKIMWI miongoni mwa wafanyakazi na jamii ziishizo karibu na mradi.
- ii. Hatari za kiafya na usalama wa jamii unaosababishwa na shughuli za mradi
- iii. Mimba zisizohitajika.

• Faida Chanya za Mazingira

- i. Mazingira bora yaliyoboreshwa ya viwanda ambayo yana mfumo wa mifereji ya uondoshaji ya maji ya mvua.
- ii. Huduma bora za usafirishaji wa abiria na mizigo
- iii. Kuboresha ubora wa hewa kutokana na kijani kibichi kinachotarajiwa.

• Athari Hasi za Mazingira

- i. Kuongezeka kwa shinikizo kwenye huduma za kijamii na huduma
- ii. Kuongezeka kwa viwango vya vumbi na kelele
- iii. Kuongezeka kwa taka wakati wa uendeshaji wa mradi
- iv. Hatari za usalama na afya kutokana na hatari za moto

(c) Athari zinazohusiana na Awamu ya ufungaji wa mradi

Masuala muhimu yafuatayo yanahusishwa na awamu ya kufunga mradi:

• Athari Hasi za Kijamii

- i. Kupoteza ajira ambayo inaweza kusababisha hali duni ya maisha

• Athari Hasi kwa Mazingira

- i. Uzalishaji wa kifusi na matatizo yanayohusiana na utupaji wa taka za ujenzi

ii. Kelele na Uchafuzi wa utokanao na vumbi

2. Hatua za Kukabiliana

Mradi huu umezingatia njia mbalimbali za kuweza kukabiliana na athari zitokanazo na shughuli za ujenzi wa mradi katika awamu zote. Njia nyingi ni zile zinazohusiana na kuwepo kwa mfumo mzuri na miongozo ya kukabiliana na athari katika hatua zote za mradi kulingana na aina ya athari husika kama zilizoainishwa hapa chini.

- **Viwango vya juu vya Kelele:** Vifaa na mitambo yote ya ujenzi itafanyiwa ukaguzi na marekebisho ya mara kwa mara kama ilivyoelekezwa katika vijitavu vya maelekezo ya kifaa/mtambo husika. Waendeshaji mashine katika sehemu mbalimbali zilizo na viwango vikubwa vya kelele watapewa vifaa vya kuzuia kelele. Shughuli za mradi zinazohusisha mitambo yenye viwango vikubwa vya kelele zitafanyika nyakati za mchana.
- **Uchafuzi wa hewa kwa njia ya vumbi:** Malori yanayosafirisha malighafi na vifaa vya ujenzi yatafunikwa ikiwa mzigo ni mkavu na unaweza kusababisha utoaji wa vumbi. Wafanyakazi walio katika maeneo yenye viwango vikubwa vya vumbi watapewa vifaa vya kujikinga na vumbi. Unyunyizaji wa maji utafanyika mara kwa mara katika sehemu zote za kazi za ujenzi ikiwemo barabara za kuingia na kutoka katika eneo la mradi pamoja na katika maeneo yote ya machimbo ya malighafi za ujenzi. Kwa kuongezea, sehemu za barabara zinazopitiwa sana na magari ya ujenzi pia zitanyunyiziwa maji mara kwa mara.
- **Ongezeko la taka:** Mkandarasi ataandaa mpango maalumu wa udhibiti wa taka zitakazozalishwa wakati wa shughuli za ujenzi wa mradi. Mkandarasi atahakikisha kuwa vifaa vifaa vya kutosha vya kukusanyia taka za ujenzi vimewekwa katika maeneo yote muhimu ndani ya eneo la mradi ikiwemo vizimba na mapipa makubwa ya kukusanyia taka. Pia Mkandarasi atahakikisha kuwa, taka zilizokusanywa katika eneo la mradi zinaondolewa kwa wakati na kwenda kutupwa katika maeneo maalumu ya kutupia taka katika Manispaa wa Kahama. Wakandarasi waliosajiliwa na Baraza la Mazingira la Taifa tu ndio watakao husika na ukusanyaji na uondoshwaji wa taka katika eneo la mradi.
- **Afya na usalama wa wafanyakazi:** Vifaa vya kujikinga na hatari mbalimbali mahala pa kazi vitagaiwa kwa wafanyakazi kulingana na aina ya kazi wanazofanya (kama vile barakoa, vizuizi vya kelele vya kuvaa masikioni, mavazi maalum ya kazi, kofia ngumu, miwani inayofunika macho vizuri, viatu vigumu n.k.) na usimamizi mzuri wa kambi za wafanyakazi utazingatiwa. Wakati wa ujenzi mkandarasi atahakikisha kuwa eneo la ujenzi limezungushiwa uzio na kuhifadhiwa kwa usafi na vifaa vya kutosha ikiwa ni pamoja na vyombo vya kutupa taka, maji taka, zima moto na usambazaji wa maji safi na salama.
- **Fursa za ajira kwa jamii ya wenyeji:** Mkandarasi ataandaa mpango wa ajira na kazi ambapo ataainisha idadi na aina ya fursa za ajira zitakazotolewa kwa wanachi waishio jirani na mradi.
- **Shinikizo kwa huduma za jamii kama vile maji na umeme:** Hatua mbadala kama vile matumizi ya nishati ya jua, kuchimba kisima kwenye tovuti, kuchakata maji zitachunguzwa na kutekelezwa ikipatikana inawezekana. Kwa mfano, matumizi ya balbu za kuokoa nishati yatapelele kipaumbele cha juu
- **Ajali na matukio ya moto:** Muundo wa soko utazingatia kikamilifu Viwango vya Usalama wa Moto.

7. Uchambuzi Mbadala

Kutoka kwa mtazamo wa ulinzi wa mazingira, uchambuzi mbadala ni nyenzo muhimu kwa uteuzi bora wa eneo la mbadala la mradi, teknolojia ya kufuatwa wakati wa ujenzi na uendeshaji, na gharama zitokanazo na mbadala husika. Njia mbadala zifuatazo zimezingatiwa na mradi huu.

a) "Hakuna hatua" mbadala ya mradi

Hakuna mbadala wa mradi unahusu kubaki na hali ilivyo sasa (Hakuna uboreshwaji wa eneo la viwanda la Zongomela). Kupitisha chaguo hili kunaweza kumaanisha kuepuka athari nyingi mbaya zinazohusiana na uwepo wa mradi na kukosa manufaa yote chanya kama vile manufaa kwa jamii yanayotokana na ajira wakati wa ujenzi na uwepo wa maeneo ya biashara yanayofaa na ya kutosha kwa viwanda vidogo na vikubwa na wafanyabiashara ili kupunguza msongamano katikati ya mji.

b) Uchambuzi Mbadala wa Uchaguzi wa Maeneo

Chaguo la kutumia eneo jingine la mradi mbali na ile lililopendekezwa pia ilizingatiwa. Hata hivyo, uchaguzi huu ulionekana kuwa na faida zifuatazo juu ya nyingine;

- Kiwanja kinamilikiwa na Halmashauri ya Manispaa Ya Kahama (Hakuna haja ya kununua kipande kipya cha ardhi na hakihitaji fidia).
- Eneo liko kwenye kipande cha ardhi kinachofaa ambacho kiko karibu na vyombo vya usafiri (mtandao wa barabara) na huduma za afya
- Kiwanja kiko kwenye kipande cha ardhi unachopenda. Imezungukwa na shughuli za makazi na taasisi; iko katika eneo la kibiashara la katikati ya mji.
- Upatikanaji wa maji na usambazaji wa njia kuu za umeme

c) Uchambuzi Mbadala kwa ajili ya chaguzi za Teknolojia na nyenzo

Kuzalisha kelele kutoka kwa shughuli za ujenzi (kulehemu, kukandamiza, kuchimba visima, kuchimba mitaro nk) kutaongeza kiwango cha kelele kwenye tovuti. Hivyo, ili kuzuia athari hizi mbaya kwa jamii inayowazunguka, mkandarasi atatumia mashine ambazo hazitoi kelele nyingi. Kwa hivyo, mradi uliopendekezwa utatumia matumizi ya vifaa vinavyokubalika ndani na kimataifa ili kufikia mahitaji ya afya ya umma, usalama, usalama na uzuri wa mazingira.

d) Uchambuzi mbadala wa chaguzi za nishati

Matumizi ya vyanzo vingine vya nishati mbadala mbali na umeme kutoka gridi ya Taifa na jenereta za dizeli yalizingatiwa. Kama ilivyo katika nchi nyingi zinazoendelea, usambazaji wa umeme kutoka gridi za taifa si wa kutegemewa kwani mara nyingi hutoka kwa jenereta za umeme zinazotokana na maji, ambazo hutegemea kiwango cha mvua, ukubwa na muundo. Kwa upande mwingine, jenereta za dizeli, ambazo hutumiwa hasa wakati wa kukatika kwa umeme, hutoa gesi nyingi chafu hasa wakati zinaendeshwa kwa muda mrefu. Nishati ya jua ilizingatiwa na timu ya kubuni itachunguza uwezekano wa kutumia mbadala huu.

8. Mpango wa Usimamizi wa Mazingira na Kijamii, Mpango wa Ufuatiliaji wa Mazingira na Ukaguzi

Mpango wa Usimamizi wa Mazingira na Kijamii umewasilishwa katika Taarifa ya Athari kwa Mazingira. Chaguo za kupunguza au kuzuia athari mbaya za kijamii na kimazingira zilizotambuliwa pamoja na mpango wa ufuatiliaji zimependekezwa na zinatokana na mazoea mazuri ya uhandisi. Pia, inafafanua majukumu na wajibu wa watendaji mbalimbali wa mpango. Mpango wakati wa utekelezaji wa mradi ni muhimu ili kupima mafanikio ya hatua za kupunguza. Mkandarasi atatekeleza vipengele vinavyohusika na awamu halisi za ujenzi na uendeshaji. Msanidi atawajibika kwa utekelezaji wa jumla wa Mpango uliopendekezwa.

Gharama zilizokadiriwa za kutekeleza hatua za kupunguza ni dalili tu. Zaidi ya hayo, Mpango wa Usimamizi inajumuisha makadirio ya gharama za hatua ili Msanidi wa mradi aweze kupanga bajeti ya fedha zinazohitajika. Bili zinazofaa za kiasi zinapaswa kutoa takwimu halisi. Kwa hali yoyote, mshauri alitumia uamuzi sahihi kuja na takwimu hizi. Mradi utahakikisha kwamba shughuli zinazosababisha athari kwa mazingira zinasimamiwa kwa kina, utaratibu, mipango na kumbukumbu. Msanidi programu atawasilisha mpango wa usimamizi wa mazingira na kijamii na mpango wa ufuatiliaji wa mazingira na kijamii kwa wafanyikazi wake na wakandarasi wake ili kuhakikisha kuwa utekelezaji unafanywa ipasavyo.

Zaidi ya hayo, Msanidi programu atahakikisha upatikanaji wa rasilimali ambazo zinahitajika kwa ajili ya utekelezaji wa mpango wake wa usimamizi wa mazingira. Mpango huo utafuatiliwa ili kuhakikisha kuwa malengo ya mazingira yanafikiwa. Halmashauri ya Manispaa ya Kahama itafanya ukaguzi wa kawaida na kuwasilisha taarifa ya ukaguzi kwa uongozi wa juu ili kuhakikisha uendeleu wa mfumo wa usimamizi wa mazingira.

9. Tathmini ya rasilimali

Halmashauri ya Manispaa ya Kahama imetenga jumla ya zaidi ya shilingi bilioni 6.9 za Tanzania kama gharama za awali za uendelezaji na uboreshaji wa eneo la viwanda la Zongomela. Fedha hizi zote zitagharamia kazi za kiraia na ujenzi; kazi za umeme na Habari, Mawasiliano na Teknolojia, ununuzi wa vifaa tiba; na masuala mtambuka. Makadirio ya gharama za utekelezaji wa usimamizi wa athari pamoja na mchakato wa ufuatiliaji kama ilivyoainishwa katika Taarifa ya Athari kwa Mazingira ni shilingi za Kitanzania 168,000,000.00 na 55,000,000.00 mtawaalia. Gharama zilizokadiriwa za kupunguza hazijumuishi gharama za mazingira, ambazo hazikuweza kuhesabiwa kwa usahihi. Kwa kuwa baadhi ya athari zitapatikana tu wakati wa awamu ya ujenzi, gharama za hizi pia zitakuwa za muda mfupi, haswa ikiwa hatua za kupunguza zitatekelezwa kikamilifu faida za mradi zitazidi gharama za mradi kwa mbali.

10. Kufungwa kwa mradi

Kwa vile uondoaji utafanyika katika siku zijazo za mbali, hatua mahususi za kupunguza zinazohusu athari za kimazingira za kazi za uondoaji kazi haziwezi kupendekezwa kwa sasa kwa kiwango cha uhakika. Mpango wa uondoaji unaozingatia masuala ya mazingira utatayarishwa na msanidi programu kabla ya kazi za uondoaji. Iwapo itafanyika, uondoaji unaweza kuhusisha mabadiliko ya matumizi (mabadiliko ya kiutendaji) au ubomoaji unaosababishwa na mabadiliko ya matumizi ya ardhi.

11. Muhtasari na Hitimisho

Mapendekezo ya uboreshaji wa maeneo ya Viwanda la Zongomela, yanahusisha athari ndogo ndogo za kimazingira ambapo hatua za kutosha za kukabiliana nazo zimependekezwa na kujumuishwa katika muundo wa mradi. Kwa hivyo inaweza kuhitimishwa kuwa, mradi uliopendekezwa hautajumuisha athari kubwa mradi hatua zilizopendekezwa za kupunguza zinatekelezwa vya kutosha na kwa wakati. Athari zilizoainishwa zitadhibitiwa kupitia mapendekezo ya hatua za kupunguza na mfumo wa utekelezaji uliowekwa katika TAM hii. Mwekezaji amejitolea kutekeleza mapendekezo yote yaliyotolewa katika TAM hii na kutekeleza zaidi ratiba za ukaguzi na ufuatiliaji wa mazingira.



JAMHURI YA MUUNGANO WA TANZANIA
OFISI YA RAIS, TAWALA ZA MIKOA NA SERIKALI
ZA MITAA
HALMASHAURI YA MANISPAA YA KAHAMA



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Baraza la Taifa la Hifadhi na Usimamizi Mazingira (NEMC),
S.L.P. 2724,
KAHAMA.

YAH: HATI NAMBA 4204 SHY.

Husika na kichwa cha barua hapo juu.

2. Halmashauri ya Manispaa ya Kahama inamiliki Kiwanja Namba 646 Kitalu "A" Zongomela Kahama Township yenye Namba ya Usajili 4204 SHY inayoonesha matumizi katika Kiwanja hicho kuwa Kituo cha Mabasi (Use Groups P (a) as defined in the Urban Planning (Use Groups and Use Classes) Regulations, 2018).
3. Aidha, Ofisi ya Mkurugenzi wa Manispaa ya Kahama inatoa ufafanuzi ya kwamba eneo hilo lina Ukubwa wa Hekari 1.27, vilevile katika Eneo ndani yake kuna Kituo kidogo cha Mabasi pamoja na Soko dogo (Mini Market) haikuwezekana kuainisha matumizi yote yaani Soko pamoja na Kituo cha mabasi katika Hati Miliki.
4. Hivyo, kupitia ufafanuzi huu tunaomba uendelee na taratibu zako za kiutendaji uiwa unataarifa kwamba Eneo hilo ndani yake kuna Eneo la Soko pamoja na Kituo kidogo cha Mabasi.
5. Nawasilisha kwa hatua zako zinazostahili.


C. B. Mkusa

KAIMU MKURUGENZI
HALMASHAURI YA MANISPAA
KAHAMA

MUNICIPAL DIRECTOR
KAHAMA MUNICIPAL COUNCIL
P.O. Box 472
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