ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR THE PROPOSED UPGRADING OF KIRUMBA MARKET AND ITS ACCESS ROADS (2.9 KM) AT KIRUMBA KATI MTAA IN KIRUMBA WARD, ILEMELA MUNICIPALITY, IN MWANZA REGION

FINAL REPORT

PROPONENT:
ILEMELA MUNICIPAL COUNCIL
P.O.B OX 735
MWANZA
Tel: + 255 736 200 910
Email: md@ilemelamc.go.tz Web: www.ilemelamc.go.tz

SUBMITTED TO:
The National Environment Management Council (NEMC)
Regent Estate, Plot No. 29/30
P.O. Box 63154, Dar es salaam, Tanzania
Tel: +255 22 2774889 or +255 22 2774852
Fax: +255 22 2774901
E-mail: dg@nemc.or.tz

CONSULTANT:
ROSEMARY C. NYIRENDA
Mobile: +255 713 030 865/ +255 753 880 424
Email: rosemary.nyirenda35@gmail.com

SUBMISSION DATE: 28TH MAY, 2023

ESIA STUDY TEAM

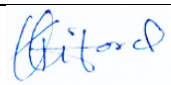
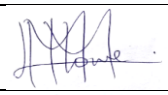
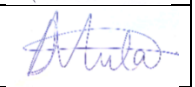
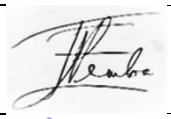
S/N	Name	Position	Registration	Signature
1.	Rosemary C. Nyirenda	Environmental Expert and ESIA Team Leader	NEMC/PC/EIA/2021/0075	
2.	Magdalena L. Mlowe	Environmental Specialist		
3.	Dr. Lilian G. Mulamula	Ecologist		
4.	Dr. Edmund Temba	Legal and Policy Framework		
5.	Dorcas Ephraim	Economist		

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED UPGRADING OF KIRUMBA MARKET AND ITS ACCESS ROADS (2.9KM) AT KIRUMBA KATI MTAA IN KIRUMBA WARD, ILEMELA MUNICIPALITY, IN MWANZA REGION

Proponent: Municipal Director, Ilemela Municipal Council

Introduction

Project Background

The Ilemela Municipal Council (IMC) was established in 2012 after the split of the former Mwanza City Council and it is one of the eight local government authorities of the Mwanza Region. The council has the area of 1080.55 Sq. Kms out of which 828.45 Sq. Kms (77 Percent) are covered by water body (Lake Victoria) and 252.10 Kms (23 Percent) is land. Ilemela lies in the southern shores of Lake Victoria, located between Latitude $2^0$15'and $2^0$3' South of the Equator and Longitude $32^0$45' and - $33^0$2' East of Greenwich (URT, 2017). Administratively, the Council comprises of 19 wards namely: Ilemela, Bugogwa, Sangabuye, Kayenze, Nyamanoro, Kirumba, Kitangiri, Pansiasi, Buswelu, Nyamhongolo, Nyakato, Buzuruga, Mecco, Nyasaka, Shibula, Kahama, Kawekamo, Ibungilo and Kiseke. In the east, it borders the Magu district, and Mwanza city council in the South while in the North and West, there is Lake Victoria.

About TACTIC Projects

Ilemela 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.

To attain its vision of *"having a strong economic base for provision of high quality and equitable socio-economic services for sustainable development of the community",* Ilemela plans to implement some community infrastructure and road projects under TACTIC –Tanzania Cities Transforming Infrastructure and Competitiveness (TACTIC) program. TACTIC aims at strengthening urban management performance and deliver improved basic infrastructure and services.

The TACTIC project will provide funding to cover for the following projects in Ilemela Municipal Council:

- Upgrading of Kirumba Central Market and its surrounding access roads (2.9 km): namely Vuka Road - 0.370 km; Msikitini Road - 0.289 km; Zenze Road - 0.239 km; Bismark Road - 0.209 km; Furahisha Uwanjani Road - 0.370 km; KVCC Road - 0.350 km; Mbugani Road - 0.240 km and Kirumba Sokoni Roads - 0.883 km
- Improvement of Buswelu - Busenga - Coca Cola Road/Musoma Road at Igoma (3.3 km) and Buswelu-Nyamadoke-Nyamhongolo Road (9.5km)

Environmental and Social Impact Assessment (ESIA)

This environmental and social impact assessment (ESIA) finding covers for the upgrading of Kirumba Central Market and its surrounding access roads of 2.9 km namely Vuka Road - 0.370 km; Msikitini Road - 0.289 km; Zenze Road - 0.239 km; Bismark Road - 0.209 km; Furahisha Uwanjani Road - 0.370 km; KVCC Road - 0.350 km; Mbugani Road - 0.240 km and Kirumba Sokoni Roads - 0.883 km. The detailed environmental and social impact assessment study was conducted in accordance with the National Environmental Impact Assessment and Audit regulations (2005), formulated after the Environmental Management Act No. 20 of 2004.

Project Components

The new market is intended to have the following; Retail shops around the market, Market Structure, Restaurant, Mini Supermarkets, Fish and Meat Shop, Managers Office, Toilets, Garbage collection point, Ramps, Parking and all the access roads improved to the asphalt level.

Design Considerations

Design of the Kirumba market in Ilemela Municipality has been done focusing on providing an environmentally friendly working atmosphere to the staff and the public. The designs have strive to achieve the following;

- ***Environmental consideration-*** The architecture that will blend well with environment. Buildings and other facilities within the market will follow natural topography of the land.
- ***Design vs weather-*** The design that will take into consideration all weather conditions in and around the site.
- ***Architectural language-*** The design will take into consideration elements of traditional architecture in combination with modern architecture.
- ***Welcoming buildings-*** Most of the building facilities at the market are to be used by public. The market and the associated structures will have welcoming looks and main entrance will be emphasized.
- ***Consideration for security and safety-*** Security will be considered in all areas including private and public areas. Guidelines for safety will be established.
- ***Future expansion-*** Architects design will allow for future expansions/extensions. Architects will make sure that construction of the market (extension) do not create nuisance to the occupants.
- ***Economics design-*** Architects will come up with designs that will stand taste of time and at the same time economical.

- ***Landscaping-*** Landscaping will include a combination of greenery, hard surfaces and sculptures. Proposed plant will be those that will withstand drought

The Temporary Market during Construction

During construction phase, it is planned that the existing vendors shall be relocated to the nearby area of Magomeni which will act as the host market for Kirumba traders. The area is generally flat in topography. IMC is committed to provide all the necessary temporary facilities to facilitate swift movement. The existing vendors shall be given the first priority to rent space after completion of construction.

POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

Tanzania is committed to attaining sustainable development goal. A few country policies and legislation that have a close bearing to urban development are mentioned below;

- Environmental Management Act No. 20 of (2004), Cap. 191
- The Water Supply and Sanitation Act No. 12 of 2009
- The Land Act, 1999
- The Urban Planning Act (2007)
- Occupation Health and Safety (2003)
- Employment and Labour Relations Act No. 6 0f 2004
- Engineers Registration Act and its Amendments 1997 and 2007
- The Contractors Registration Act (1997)
- The Architects and Quantity Surveyors Act (1997)
- The Local Government Laws (Urban Authorities) Act (1999)
- Public Health Act 2009
- The Tanzania Development Vision 2025
- 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. 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.

Stakeholders Consultation

Stakeholders included government agencies, beneficiaries, commercial companies, and all other formal or informal groups associated with a project. Interviews and Community meetings were used in the process of stakeholder involvement. From one stakeholder, the team was connected to another and another stakeholder, in chain like or network process. The following is a short list of both institutional and individual stakeholders that were consulted;

- Ilemela Municipal Council
- Mwanza Urban Water Supply and Sanitation Authority (MWAUWASA)
- Kirumba ward leaders (Ward executive officer)
- Kirumba Kati Mtaa leaders (Mtaa Executive officer)
- Business Men at Kirumba Market (Meeting)
- Kirumba ward Community (Meeting)

The Major issue raised was;

i. **Temporary relocation of traders:** Traders at both markets raised the issue that IMC must provide a temporary area which is conducive for their business so that they can still earn their daily bread. It was also stressed that, after construction priority must be given to those who are trading at the markets to rent space into the new market.
ii. **Waste Management:** Most stakeholders had the opinion that the market can be new, yes, but if waste (especially solid waste) is not handled well, the aesthetic value of the market and surrounding area shall be compromised.
iii. **Labour issue:** Stakeholders around the market wish the contractor to employ locals especially labourers in order to improve the livelihood of an area

Impacts Analysis

The development of infrastructure such as markets can cause a wide range of environmental and social impacts on a number of receptors. The impacts are of both positive and negative nature. The significant environmental and social impacts identified include;

Positive Social Impacts during pre-construction phase;

- Job creation and
- Increased income of the community

Positive Social Impacts during construction phase;

- Job creation and
- Increased income

Negative Environmental Impacts

- Increased noise, vibration and air pollution
- Occupational Safety and health risks
- Increased Waste
- Loss of Vegetation

Negative Environmental Impacts during Demobilization Phase phase;

- Increased noise, vibration and dust
- Occupational Safety and health risks
- Increased Waste due to improved infrastructure which will attract more people

Positive Social Impacts during operational phase;

- Improved health and hygiene
- Improved livelihood of traders

Negative Social Impacts

- Sexual harassment due to high interaction at the market area

Negative Environmental Impacts

- Increased solid waste
- Health and safety due to fire hazards

Mitigation Measures

Many of the mitigation measures put forward can be rectified by design and engineering practices that shall be adhered to during all the project phases. The major environmental and social impacts and their associated mitigation measures 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 fenced 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 bus terminal shall strictly adhere to the Fire Safety Standards
- ***Poor maintenance of bus terminal during operation:*** A private cleanliness firm with adequate number of staff shall be commissioned to clean the bus terminal, its facilities and the surrounding daily.

Environmental and Social Management Plan

The options to minimize or prevent the identified adverse social and environmental impacts as well as a monitoring plan have been suggested in this report and are contained in the ESMP. Many of them are based on good design and engineering practices. The Environmental and Social Management Plan (ESMP) presents the implementation schedule for the proposed mitigation measures to both environmental and social impacts as well as planning for long-term monitoring activities. The ESMP also includes the associated environmental costs needed to implement the recommended mitigation measures. The engineering designs have already included some of the mitigation measures recommended in this report. Additional recommendations are provided in the ESMP to enable the proposed facilities become more environmentally friendly. The implementation steps will involve the PO-RALG, Ilemela Municipal Council, Association of traders, Contractor, the Resident Engineer, NEMC, some utilities providers such as MWAUWASA and TANESCO, and the local communities at large.

Summary and Conclusion

The ESIA study results show that although there are some limited negative environmental implications of the project, the modern Market will have high socio-economic benefits to the people of Ilemela Municipality and Ilemela in totality. The associated negative impacts, to a large extent have been minimized through good engineering design and envisaged construction practices. Specific mitigation measures have been suggested in this report to offset some of the inherent adverse impacts. Implementing these mitigation measures would increase environmental soundness of the project Market.

It is, therefore, concluded that, implementation of the proposed project will entail no detrimental impacts provided that the recommended mitigation measures are adequately and timely put in place. The identified adverse impacts shall be managed through the proposed mitigation measures and implementation regime laid down in this EIS. IMC is committed in implementing all the recommendations given in the EIS and further carrying out the environmental auditing and monitoring schedules.

ACKNOWLEDGEMENT

The Ilemela Municipal Council (IMC) wishes to convey heartfelt thanks and appreciation to all stakeholders who in one way or other supported the completion of this work. Special thanks to the market traders, MWAUWASA and TANESCO for provision of relevant information and for their prompt assistance during the consultation. Last but not least we thank the Kirumba street and ward leaders for their cooperation and assistance. The proponent would like to thank the team of consultants, 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.

ABBREVIATIONS AND ACRONYMS

AADT	Average Annual Daily Traffic
AAS	Atomic Absorption Spectrophotometer
AIDS	Acquired Immune Deficiency Syndrome
A.M.S.L	Above Mean Sea Level
BATNEEC	Best Available Technology Not Entailing Excess Cost
IMC	Ilemela Municipal Council
MWAUWASA	Mwanza Urban Water and Sanitation Authority
CBD	Convention on Biological Diversity
CBO	Community Based Organization
CITES	Convention on International Trade in Endangered Species
CRB	Contractors Registration Board
CTC	Care and Treatment Clinic
CoI	Corridor of Impact
DoE	Division of Environment
EIA	Environmental Impact Assessment
EIS	Environmental Impacts Statement
EMA	Environmental Management Act
EMP	Environmental Management Plan
ERB	Engineering Registration Board
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
EWURA	Energy, Water Utilities Regulation Authority
GoT	Government of the United Republic of Tanzania
HBC	Home Based Care
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome
IMC	Ilemela Municipal Council
MWAUWASA	Mwanza Urban Water and Sanitation Authority
NACP	National AIDS Control Programme
NEMC	National Environment Management Council
NGO	Non-Governmental Organization
NSGRP	National Strategy for Growth and Reduction of Poverty
OP	Operational Policy
PAs	Protected Areas
ESIA	Preliminary Environmental Assessment
PEDP	Primary Education Development Programme
PLHAS	People Living with HIV/AIDS
PMTCT	Prevention of Mother to Child Transmission
PO-RALG	Prime Minister's Office, Regional Administration and Local Government
RoW	Right of Way
SACCOS	Credit Co-operative Societies
SIA	Social Impacts Assessment
STD	Sexually Transmitted Diseases
STI	Sexual Transmitted Infections
TAC	Technical Advisory Committee
TACAIDS	Tanzania Commission for Aids
TACTIC	Tanzania Cities Transforming Infrastructure and Competitiveness

TANESCO	Tanzania Electric Supply Company Ltd
TTCL	Tanzania Telecommunucation Company Ltd
ToR	Terms of Reference
WB	World Bank
VCT	Voluntary Counselling Treatment
WHO-GPA	World Health Organization Global Programme on AIDS

CHAPTER ONE

INTRODUCTION

1.1 Project Background

The Ilemela Municipal Council (IMC) was established in 2012 after the split of the former Mwanza City Council and it is one of the eight local government authorities of the Mwanza Region. The council has the area of 1080.55 Sq. Kms out of which 828.45 Sq. Kms (77 Percent) are covered by water body (Lake Victoria) and 252.10 Kms (23 Percent) is land. Ilemela lies in the southern shores of Lake Victoria, located between Latitude $2^0$15'and $2^0$3' South of the Equator and Longitude $32^0$45' and - $33^0$2' East of Greenwich (URT, 2017). Administratively, the Council comprises of 19 wards namely: Ilemela, Bugogwa, Sangabuye, Kayenze, Nyamanoro, Kirumba, Kitangiri, Pansiasi, Buswelu, Nyamhongolo, Nyakato, Buzuruga, Mecco, Nyasaka, Shibula, Kahama, Kawekamo, Ibungilo and Kiseke. In the east, it borders the Magu district, and Mwanza city council in the South while in the North and West, there is Lake Victoria.

1.1.1 Geographical Location

The Council lies on the southern shores of Lake Victoria within Mwanza Region between Latitude $2^0$15' and $2^0$31' South of the Equator and Longitude 32^0 45' and - $33^0$2' East of Greenwich approximately 1,140 meters above sea level. It borders with the Magu district in the East and Mwanza city council in the South while to the North and West, there is Lake Victoria.

1.1.2 Land Area and Administrative Units

The Ilemela municipal council has a total surface area of 1080.55 sq. kms out of which 828.45 sq.kms (77 percent) is covered by water body (Lake Victoria) and 252.10 (23%) sq. kms are land area. The council is the second smallest council in Mwanza region, occupying about 2.1 percent of the region's land of about 11,796.0 sq. kms. During the time of its establishment in 2012, the council had only 9 wards namely, Buswelu, Nyakato, Nyamanoro, Kirumba, Kitangiri, Pansiasi, Ilemela, Bugogwa and Sangabuye.

1.1.3 About TACTIC Projects

Ilemela 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.

To attain its vision of *"having a strong economic base for provision of high quality and equitable socio-economic services for sustainable development of the community",* Ilemela plans to implement some community infrastructure and road projects under TACTIC – Tanzania Cities Transforming Infrastructure and Competitiveness (TACTIC) program.

TACTIC aims at strengthening urban management performance and deliver improved basic infrastructure and services.

The TACTIC project will provide funding to cover for the following projects in Ilemela Municipal Council:

- Upgrading of Kirumba Central Market and its surrounding access roads (2.9 km): namely Vuka Road - 0.370 km; Msikitini Road - 0.289 km; Zenze Road - 0.239 km; Bismark Road - 0.209 km; Furahisha Uwanjani Road - 0.370 km; KVCC Road - 0.350 km; Mbugani Road - 0.240 km and Kirumba Sokoni Roads - 0.883 km
- Improvement of Buswelu - Busenga - Coca Cola Road/Musoma Road at Igoma (3.3 km) and Buswelu-Nyamadoke-Nyamhongolo Road (9.5km).

1.2 Environmental and Social Impact Assessment (ESIA)

This environmental and social impact assessment (ESIA) finding covers for the upgrading of Kirumba Central Market and its surrounding access roads of 2.9 km namely Vuka Road - 0.370 km; Msikitini Road - 0.289 km; Zenze Road - 0.239 km; Bismark Road - 0.209 km; Furahisha Uwanjani Road - 0.370 km; KVCC Road - 0.350 km; Mbugani Road - 0.240 km and Kirumba Sokoni Roads - 0.883 km. The ESIA study in Tanzania was conducted from January to December 2022 in accordance with the National Environmental Impact Assessment and Audit regulations (2005), formulated after the Environmental Management Act No. 20 of 2004. The Environmental Management Act (2004) of Tanzania requires project developers to register projects with NEMC for screening purposes to determine if the project needs full EIA or not. This project will need this approval before it is implemented. The environmental and social impact assessment study was also conducted as part of the design works where by some of the mitigation measures will be rectified during finalization of the designs.

1.3 Project Development Objectives

There are several markets in Municipality which serves for market purposes but the qualities of service delivery offered by these markets are poor. The current market is congested, lacks important services; Considering that the sub-project will also improve the open space and the location is at the CBD of Ilemela, this sub-project will beautify the town. Improving the roads will also mitigate flooding mitigation, and open space. Due to rapid population increase in Municipality there is a need to have a modern market which will consist but not limited of modern shops, toilets, kiosks and other modern facilities. It is intended that the proposed market will provide services for selling agricultural products, industrial products, foods and other homemade products.

1.4 Objectives of this ESIA Study

The objective of this ESIA is to assess the environmental and social impacts of the Kirumba Market and its associated access roads in Ilemela Municipality to be implemented under TACTIC and recommend mitigation measures to address the negative and positive impacts in accordance with the country's environmental and social laws as well as the World Bank's environmental and social framework (ESF). The ESIA have addressed both countries and the World Bank ESF.

1.5 Scope of Work

The scope of this work is;

- To provide description of the relevant parts of the project including project location, design, components and activities.
- To review of policies, legislation, standards and regulations governing Environment at International, Regional and Local levels
- To assemble, evaluate, and present baseline data on the relevant environmental and social characteristics of the project area.
- To make consultation with Government agencies, local communities and the private sector operating in near the project area.
- To assess and quantify the potential environmental impacts resulting from the construction of the proposed roads construction, especially within the zone of influence of the project.
- Describe alternatives that were examined in the course of developing the proposed project and identify other alternatives, which would achieve the same objectives
- To develop an Environmental Management Plan (EMP) detailing actions and responsibilities for impacts mitigation and monitoring.

1.6 Approach and Methodology

1.6.1 Study Team

In order to properly address the environmental issues, Ilemela Municipal Council commissionedundertaking the ESIA study. The team included: 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.

1.6.2 Review of Relevant Documents

The consultant noted that the important issues reflected in the ToR deserve special reference to the existing official information particularly in the following documents:

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

It was the conviction of the Consultant 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.

1.6.3 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 Ilemela Municipality. Other information was appraised through key informants' interviews and experts' observations.

1.6.4 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 Kirumba Market and another one with Kirumba ward community.

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

- Ilemela Municipal Council
- Mwanza Urban Water Supply and Sanitation Authority (MWAUWASA)
- Kirumba ward leaders (Ward executive officer)
- Kirumba Kati Mtaa leaders (Mtaa Executive officer)
- Business Men at Kirumba Market (Meeting)
- Kirumba ward Community (Meeting)

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 Consultant was convinced that 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 Consultant was targeting 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.

1.6.5 Project impact assessment

Superimposing project elements onto the existing social and environmental natural conditions made it possible to identify the potential impacts of the proposed project in Ilemela Municipality. 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. *Inter alia*, the assessment entailed the following:

Collection of Baseline Data

The collection of baseline data was conducted subsequent to defining the scope of the ESIA. These data allow the study team to determine whether more detailed information on environmental conditions at the development site and its surroundings are needed and where such information can be obtained.

Both primary and secondary data were collected. Primary data were collected by direct measurement, observations and using semi-structured interviews with respective and targeted parties (as explained in the previous section). Secondary data were obtained from various relevant sources of information such as education and health reports and many other official and non-official documents and Internet.

Review of Policies, Legal and Institutional Framework for Environmental Management

This allowed the study team to update and enhance their understanding of national policies, legislation and institutional arrangements for environmental management in Tanzania and relevant international procedures to ascertain the optimal management of impacts.

Identifying Environmental Impacts

This was undertaken by using a checklist method which is a compilation of contender list of key impacts such as traffic congestion, noise pollution, waste management etc.

Predicting Environmental Impacts

This was done by using "best estimate" professional judgment of the experts and case studies as analogous or references. The environmental and social impacts were identified and their potential size and nature were predicted. The prediction of impacts specified the impact's causes and effects and its secondary and tertiary consequences for the environment and the social aspects.

Determining the Significance of Impacts

The key activity was to evaluate the significance of impacts, the major criteria used were

- The level of public concern
- Scientific and Professional Evidence concerning
    1. Resource loss, Ecological damage
    2. Negative Social Impacts
    3. Resource use options etc.

Identifying Mitigation and Management Options

The options for dealing with identified and predicted impacts were considered. This enabled the study team to analyze proposed mitigation measures. A wide range of measures have been proposed to prevent, reduce, remedy or compensate for each of the adverse impacts evaluated

as being significant. Analysis of the implications of adopting different alternatives was done to assist in clear decision-making.

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 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 is 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 present 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 talk about cost benefit analysis

Chapter eleven is giving the details of decommissioning procedures

Chapter twelve gives the summary and conclusions of the study.

CHAPTER TWO

PROJECT BACKGROUND AND DESCRIPTION

2.1 Location and accessibility

The project area is located in Ilemela Municipality, which is one of the seven districts of the Mwanza Region of Tanzania. Mwanza City, is a port city and capital of Mwanza Region on the southern shore of Lake Victoria in north-western Tanzania. With an estimated urban population of 1,182,000 in 2021, it is Tanzania's second largest city, after Dar es Salaam. It is also the second largest city in the Lake Victoria basin after Kampala, Uganda and ahead of Kisumu, Kenya at least in population size. Within the East African community, Mwanza city is the fifth largest city after Dar, Nairobi, Mombasa, and Kampala.

It is slightly ahead of Kigali, Kisumu, and Bujumbura in the population of city proper limits. However, in terms of infrastructure, Kigali and Kisumu cities are way ahead of Mwanza. Mwanza city is also the capital city of Mwanza Region. Mwanza region is one of Tanzania's 31 administrative regions. Mwanza region is part and parcel of Tanzania Mainland's Lake zone, which comprises of the regions of Mara, Geita and Kagera (**Figure 1**). The neighbouring regions are Geita to the west, Shinyanga to the south, and Simiyu to the east. Furthermore, Lake Victoria borders the region's north frontier.

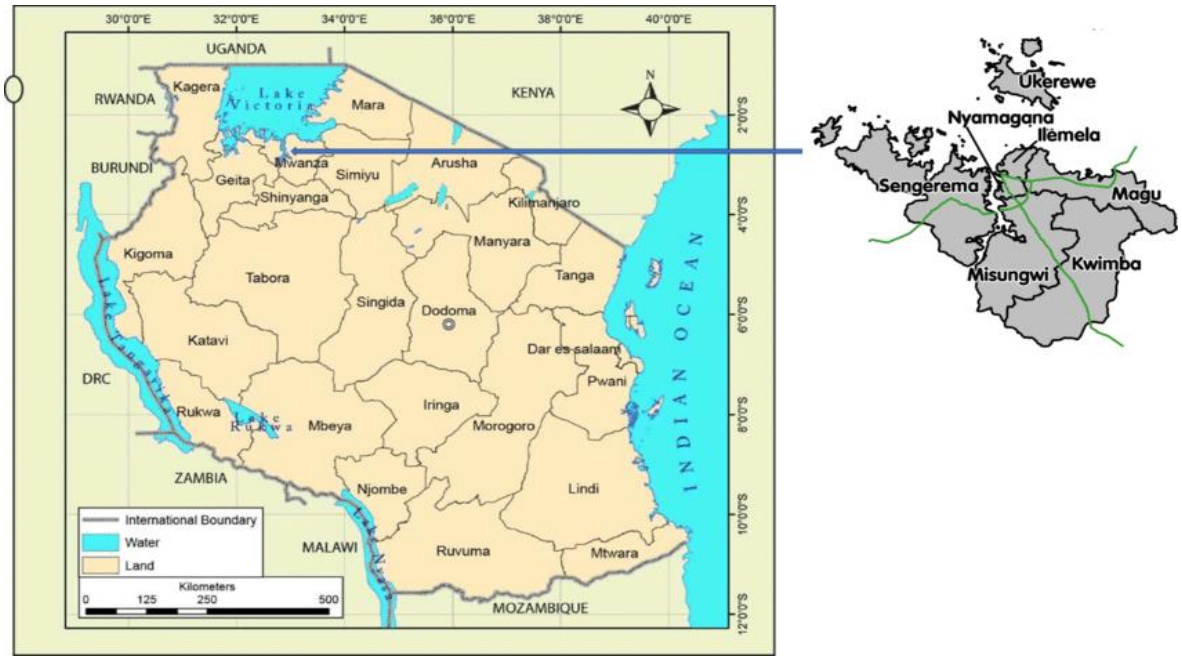


Figure 1: Map of Tanzania showing the Mwanza region (Source: Tanzania Atlas, 2020)

2.2 Location and Site Environment

The IMC is envisaging to reconstruct and modernise Kirumba Market, located at Kirumba Kati Street in Kirumba ward. The ward is strategically located and a focal point for business activities in Ilemela District and Mwanza city in general (**Figure 2**). The main commodities sold at Kirumba Market are cereals, fruits, vegetables, fish, butterry, and households items.

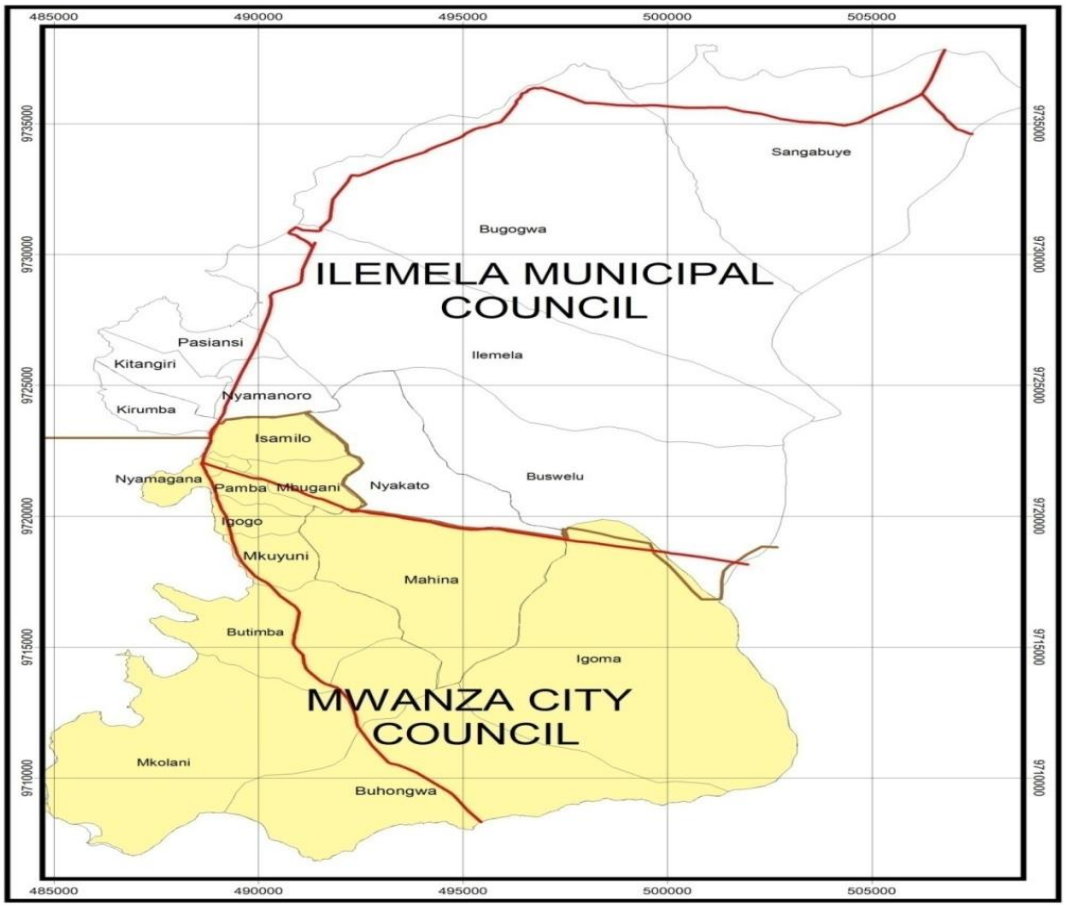


Figure 2: Map showing the location of Mwanza City Council and Ilemela Municipal Council (Source: IMC, 2021)

2.3 Site Condition and Access Roads

The market is easily accessible. It is connected with newly constructed tarmac roads which are Pasiansi - Buzuruga road, Sabasaba- Kiseke - Buswelu, Makongoro junction - Mwaloni Kirumba roads. These roads are passable throughout the year and are supported by street lights. The project will also involve improvement and upgrading of roads that connect the market (access roads). The neighboring land use include residential houses, garages, business buildings shops, salon, petty businesses, skip bucket, cargo vehicles parking, mama lishe and offices **(Figure 3)**. Therefore, the proposed project site is located near environmental sensitive areas hence will require special attention to ensure that these areas are well protected/mitigated.

Figure 3: Kirumba market site and its access roads (Source: Consultant, January 2022)

2.4 Project Site Legal Status (Land Tenure and market Ownership)

The land size for the proposed Kirumba Market is 6,698.38 m^2. It is a surveyed land located in plot No.19858 in Kirumba Ward, with a tenure of 99 year. According to the Ilemela Municipality, the market is owned by the Council and traders have no claim over market structure as all belongs to the council. This was also confirmed by market administration as well as traders and other market users. The site is predominantly occupied by old market building with a number of temporary sheds where business activities is ongoing. The road corridor is an existing one hence there will be no relocation thus no compensation.

2.5 Existing activities at the project area

The proposed project site is predominantly occupied by old market building with a number of temporary sheds whereby business activities are ongoing (**Figures 4** and **5**). There are varieties of business activities ongoing at the old market building. Such activities include fruit vending, grains vending, vegetables vending, beef butchery.


Figure 4: Vegetable vendors inside Kirumba market and boda boda outside the market (Source: Consultant, January 2022)

Figure 5: Exiting activities within the market (Source: Consultant, January 2022)

2.6 Project rationale

The Ilemela Municipal Council has experienced a rapid population increase in recent years. Kirumba Ward is one of 19 Wards of Ilemela Municipality which its population has been tremendously increasing thus resulting to increased congestion at the current market. Therefore, the proponent intends to develop a modern market building at Kirumba market area in Kirumba Ward to absorb the current congestion and provision of accessible and conducive business environment to Kirumba market vendors. The proposed Kirumba Market project and its access roads involves the construction of a modern Market building with all necessary facilities such shops, fruit and grain vending spaces, beef and fish butchers, cold rooms for fish storage, administrative block, restaurants, washrooms, parking area. All the access roads will also be improved to asphalt level with all the necessary facilities such as drains, curb stones and lights.

2.7 Design Components and Consideration

2.7.1 Design Components

The new proposed market is intended to have the following; Retail shops around the market, Market Structure, Restaurant, Mini Supermarkets, Fish and Meat Shop, Administrative block, Manager's Office, Toilets, Garbage collection point (with a volume capacity of 5 m^3), Ramps, Parking, washrooms including safe menstrual room and all the access roads improved to the asphalt level (**Table 1**). The proposed site has a plot area of 6,698.38 m^2 with a total built area of 4,282.02 m^2 , 1.18 plot ratio, 64% coverage and setback.

Table 1: The number of existing and proposed facilities in Kirumba market

Facility	**Existing Number**	**Proposed Number**
Shops	80	131
Vendor	600	400
Stalls	350	270
Number of restaurants		4
Cold room		3 unit
Parking		17

Facility	Existing Number	Proposed Number
Washrooms including safe menstrual rooms		16
Chicken abattoir		1
Fish washing area		1
Chicken cages		30
Generator shed		1
Solid waste management		1
Manager's Office		1
Administrative block		1

(Source: Consultant's analysis, 2022)

The proposed designs for Kirumba market and its access roads has taken on board all the concerns of stakeholders from the site plan (**Figure 6**) and other architectural designs (**Figures 7** and **8**).

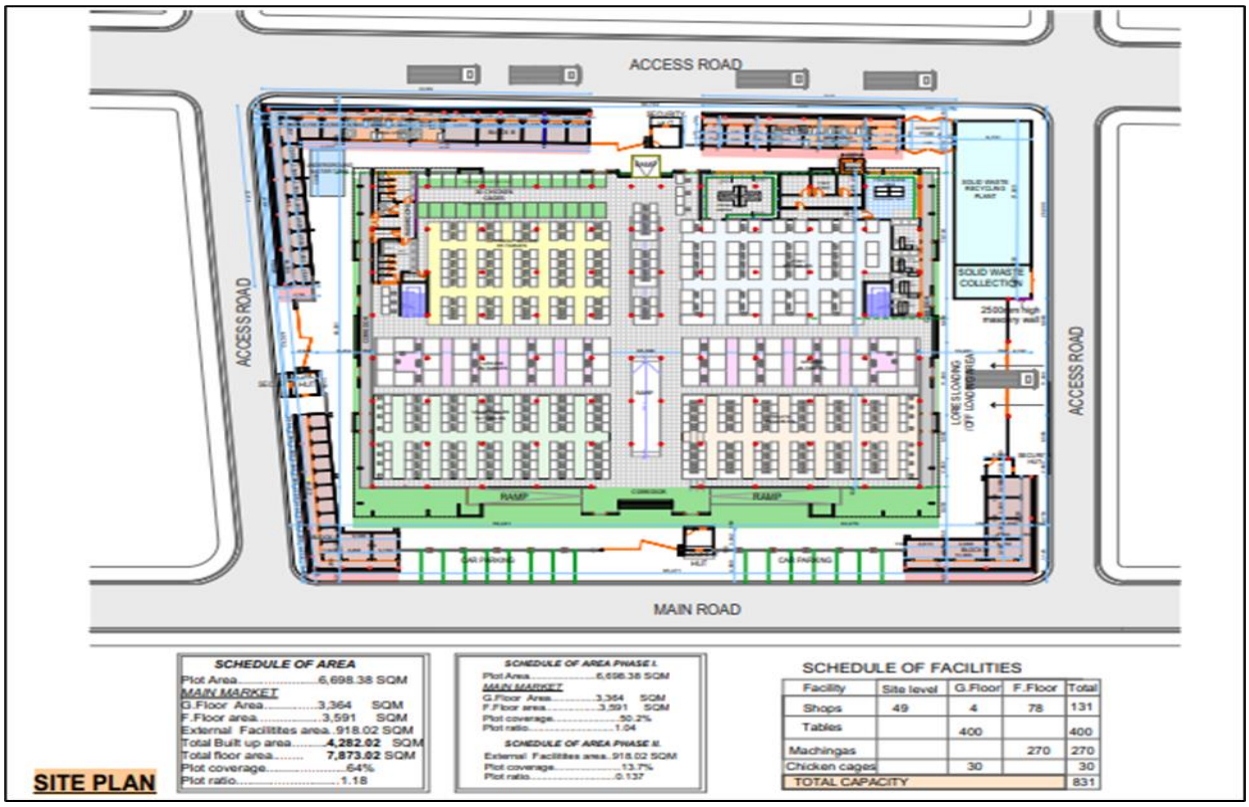


Figure 6: Site plan for Kirumba market showing shops, vendors and Machinga tables (Source: Consultant, January 2022)

Figure 7: Proposed Kirumba market architectural structure as seen in 3D
(Source: Consultant, January 2022)


Figure 8: Architectural designs of the proposed shops surrounding Kirumba market
(Source: Consultant, January 2022)

2.7.2 Design Considerations

Design of the Kirumba market in Ilemela Municipality and its access roads has been done focusing on providing an environmentally friendly working atmosphere to the staff and the public (**Figures 9 and 10**). The designs have strive to achieve the following;

- ***Environmental consideration-*** The architecture that will blend well with environment. Buildings and other facilities within the market will follow natural topography of the land.

- ***Design vs weather-*** The design that will take into consideration all weather conditions in and around the site.
- ***Architectural language-*** The design will take into consideration elements of traditional architecture in combination with modern architecture.
- ***Welcoming buildings-*** Most of the building facilities at the market are to be used by public. The market and the associated structures will have welcoming looks and main entrance will be emphasized.
- ***Inclusivity-*** The designs ensure the proposed building considers accommodation of people with disabilities in both accessibilities and services by putting ramps and toilets for PwDs.
- ***Consideration for security and safety-*** Security will be considered in all areas including private and public areas. Guidelines for safety will be established.
- ***Future expansion-*** Architects design will allow for future expansions/extensions. Architects will make sure that construction of the market (extension) do not create nuisance to the occupants.
- ***Economics design-*** Architects will come up with designs that will stand taste of time and at the same time economical.
- ***Landscaping-*** Landscaping will include a combination of greenery, hard surfaces and sculptures. Proposed plant will be those that will withstand drought

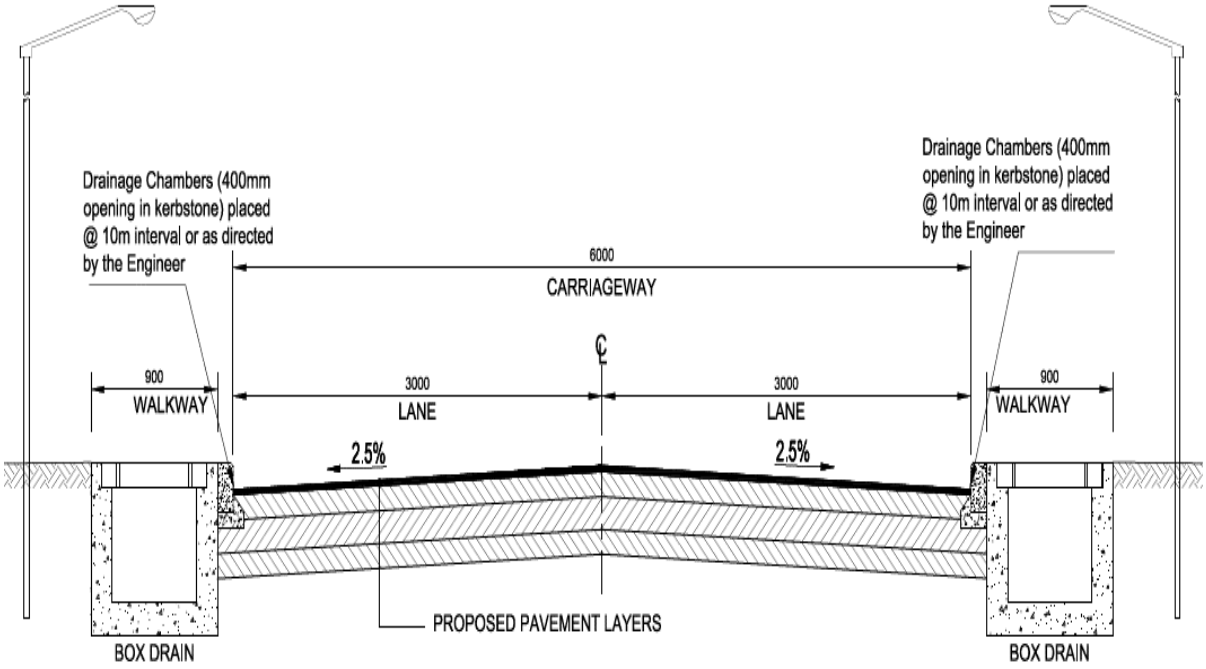


Figure 9: The features of the road cross section were proposed / designed based on the site observation of traffic and non-motorist traffic and pedestrian as well as the traffic study results of the road

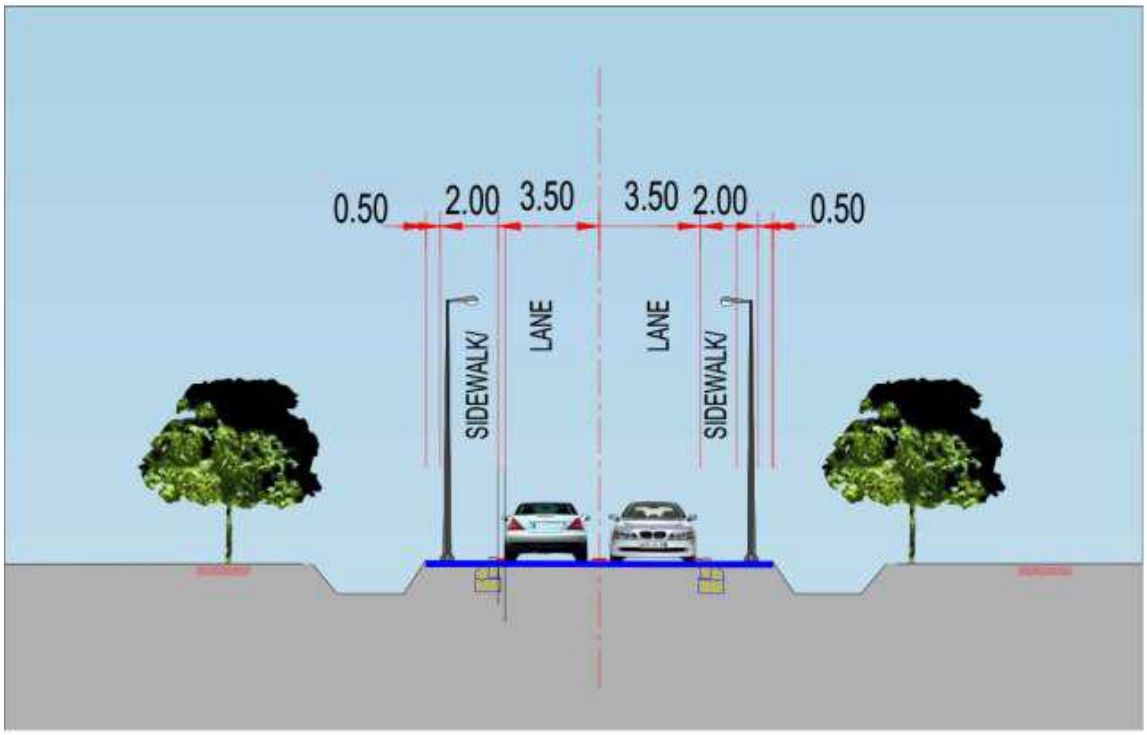


Figure 10: Proposed designs for the Kirumba market access roads (Source: Consultant, 2022)

2.7.3 Design Criteria for Buildings

The design criteria considered during the design of buildings are as follows:

- Studying, understanding and Local Compliance to legal and development conditions of each site.
- Site conditions and adaptability to its condition.
- Efficiency & Sustainability
- Long-term Operation and maintenance of the buildings
- Utilization of local materials and technology during construction
- Local weather condition on the regions, we provided open buildings e.g., open market buildings to maximize ventilation by air movement.
- Building orientation to cutter for local weather. To avoid hot temperature inside the buildings we have to discourage windows on the sunset side of the building.
- Occupant Comfort inside the buildings.

2.7.4 Material

Concrete: Concrete characteristics shall be in accordance with BS 8110 with a maximum aggregate size of 20mm with the following grades, subject to the detailed design.

- For buildings beams, slabs, columns, stairs, ramp and foundation structure shall be grade C25 as a minimum.
- All plain concrete blinding shall be Grade C15.

Reinforcement: Reinforcement shall be high yield deformed bars with minimum characteristic yield strength of 460 N/mm^2, in accordance with BS 4449: 1988 “Carbon Steel Bar for the Reinforced Concrete”.

Mesh in slabs shall be in accordance with BS 4483 “Steel Fabric for the Reinforcement of Concrete”.

Notes:

- **External:** Exposure to external environment
- **Internal:** Inside a controlled environment
- **Earth face:** Concrete face that is attached to earth but may (or may not) receive waterproofing protection

2.7.5 Loadings

Dead loads comprise of own weight of structural elements including cladding, partitions and finishing structures.

Material Specific Weight

- Concrete 24 KN/m^3
- Soil (saturated soil) 21 KN/m^3
- Lightweight concrete screed used in floor cover 14 KN/m^3
- Brickwork (light weight solid blocks) 7 KN/m^3
- Block work (light weight hollow blocks) 6 KN/m^3
- Steel structure 78.50 KN/m^3

Ground and Typical Floor Permanent Loads

- Floor cover in typical office floors (20 mm tiles on 50 mm) - 1.50 KN/ m^2
- Light weight screed with density - 14 KN/m^3
- Floor cover in accommodation building (If any) - 2.0 KN/m^2
- Floor cover for stairs - 2.50 N/m^2
- Services and false ceiling - 0.50 N/m^2
- Lightweight internal walls - 1.00 N/m^2
- Flooring used for mechanical areas - 1.00 N/m^2

Roof Dead Permanent Loads

- Lightweight screed (density = 14 KN/m^3), 100 mm avg.
- THK as slopped concrete 1.4 KN/m^2
- Heat insulation + thermal isolation 0.10 KN/m^2
- Services and false ceiling 0.50 KN/m^2
- 40 mm tiles on 40 mm bed mortar 1.50 KN/m^2

Imposed Live Loads

Excluding weight of lightweight partitions, loads shall be uniformly distributed loads in accordance with Table 1 of BS 6399: Part 1, concentrated loads shall be according to Clause 5.1.3. As a general guideline, the following imposed live loads shall be used, pattern loading shall be considered in load combination.

Floors

- Offices / accommodations 2.50 KN/m^2
- Corridors, staircases 4.00 KN/m^2
- Public areas 5.00 KN/m^2
- Stores 7.50 KN/m^2

Plant rooms load shall be according to supplier requirements but not less than 7.5 KN/m^2 and to be checked for concentrated loads.

Roofs

- Live loads on accessible roofs (including light equipment) - 2.50 KN/m^2
- Live load on inaccessible roofs - 1.0 KN/m^2
- Live load on steel light roofs - 0.75 KN/m^2

In case where A/C equipment, water tank or crane hook are present, the roof slab shall be checked for the actual load as per supplier data.

Equipment Loads

Equipment loads shall be specified in the calculation as per the manufacturer specifications and equipment data sheets, slab will be checked accordingly.

Temperature Loads

Temperature differential value for structural design = 20 ºC

Wind Loads

The building shall be designed to sustain wind loads calculated in accordance with BS 6399: 1995, Part 2, using the directional method.

- Basic wind speed V_b - 25 m/sec
- Altitude factor , Sa = 1.0
- Direction factor, S_d = 1.0
- Seasonal factor, S_s = 1.0
- Probability factor, S_p = 1.0

Seismic Loads

Earthquake loads shall be computed according to UBC: 1997, Chapter 16 – Part III Zone 2A with the following parameters:

Z = Seismic factor 0.15
I = Importance factor 1.0
S = Site coefficient for soil characteristic, taken as S_b according to the geotechnical report
R = Ductility factor (for concrete shear walls) 5.50

The Seismic dead load (W) shall be based on the following:

- Total weight of structure
- Total weight of permanent loads + equipment
- Imposed live loads in operational combinations as per UBC: 1997

Note:

The total base seismic shear load calculated from the response spectrum curve and modal analysis shall not be less than 0.90 the total base seismic shear load calculated from the equivalent static method as per UBC 1997.

Load Combinations

The structure shall be checked for load combination in accordance with Clause 2.4 of BS 8110, Clause 2.4 of BS 5950 Part 1, and UBC 1997 which will be as follows:

For Ultimate Limit State

- 1.40 D.L + 1.6 L.L. — BS 8110
- 1.20 D.L + 1.2 L.L + 1.2 W.L — BS 8110

• 1.0 D.L + 1.40 W.L	• BS 8110
• 1.10 x (0.9 D.L + 1.0 E)	• UBC 1997
• 1.0 x (1.20 D.L + 1.0 E + f_1 L.L)	• UBC 1997
• 0.75 x (1.40 D.L + 1.4 T + 1.70 L.L)	• UBC 1997
• 1.40 x (1.0 D.L + 1.0 T)	• UBC 1997

Where f_1 = 0.50 for live load less than 4.90 KN/m^2

For Serviceability Limit State

- 1. 0 D.L + 1.0 L.L.
- D.L + 1.0 W.L or + 1.0 E/1.40
- 0.90 D.L + 1.0 E/1.40
- 1.0 D.L + (1.0 L.L + E/1.40) x 0.75
- 1.0 D.L + (1.0 L.L + 1.0 W) x 0.75

Where:

D.L	=	Dead Load
L.L	=	Live Load
W. L	=	Wind Load
E	=	Seismic load
T	=	Temperature load

Construction Joints

Fuel structural continuity is assumed in design at construction joint locations. Reinforcement is fully continuous across the joint, surface treatment of joints shall be according to BS 8007 Clause 5.4 and ACI 224.3 R-95.

Deflection (Serviceability Limit States)

All deflections and displacements for concrete structures shall be based on the modulus of elasticity of concrete as mentioned in Clause 7.2 of BS 8110: Part 2.

Excessive deflections affect appearance and may cause damage to non-structural elements. The residual deflection after the initial camber shall be limited to the following:

- L/250 where no finishes or partitions may be affected.
- L/500 or 20 mm, whichever is the lesser for brittle materials supporting finishes or partitions.
- L/350 or 20 mm, whichever is the lesser for non-brittle materials supporting finishes or partitions.

Where (L) is the span or, in the case of a cantilever, its length, according to BS 8110: Part 2, Clause 3.2.

Long term deflection due to creep shall be calculated in accordance with BS8110: Part 2, Clause 7.3. Detailed long term deflection calculations shall be carried out for cases where span/depth ratio is close to the limiting value.

Limitation of Crack Widths

Excessive cracking and wide cracks affect both durability (corrosion of steel in aggressive environments) and appearance (for members that are visible).

The calculated maximum crack width shall not exceed the following values:

- Exposed elements: 0.3 mm (Clause 3.2.4 of BS 8110: Part 2) (Earth, weathering), where aesthetic appearance is critical a lower limit of 0.25 mm shall be used.
- Non-exposed elements: 0.3 mm and no calculation shall be needed unless as requested for durability (Clause 3.2.4) of BS 8110: Part 2.

Retaining aqueous liquids:

- Server or very severe exposure: 0.2 m
- Critical aesthetic appearance: 0.1 mm (Clause 2.2.3.3) BS 8007

Fire Resistance

- The design shall fulfill the fire requirements in accordance with British Code requirements.
- All structural elements shall be designed based on 2.0 hours fire rating resistance.

Water Proofing

All substructures shall be protected using SBS elastomeric bitumen membrane waterproofing approved by engineer. Durability of structures is achieved through proper concrete cover of steel reinforcement. Inside faces of water tanks to receive cement slurry internal type sika or fosrok or equivalent. For building foundation cold applied bitumen are used as there is no ground water table appeared.

2.8 The Temporary Market during Construction

During construction phase, it is planned that the existing vendors shall be relocated to the nearby area of Magomeni which will act as the host market for Kirumba traders (Figures 11 and 12). The area is generally flat in topography. IMC is committed to provide all the necessary temporary facilities to facilitate swift movement. The existing vendors shall be given the first priority to rent space after completion of construction.

Figure 11: Magomeni host market for Kirumba traders during construction phase (Source: Consultant, January 2022)

Figure 12: Magomeni Football Pitch where Kirumba traders are temporary reallocated to. (Source: Consultant, January 2022)

2.9 Project Activities

2.9.1 Mobilization or pre-construction phase

Activities

This phase entails mobilization of labour force, equipment and construction of offices/camps as well as acquisition of various permits as required by the law. 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 Hudraulic 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 VII**).
- **Geotechnical investigations**- done by the geotechnical engineers to determine the physical properties of rock and soil around the site (**Appendix VIII**) .
- **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 X**.
- **Environmental Impact Assessment** (EIA)- This ESIA report 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 200 workers who will be skilled and non-skilled labor.

Duration

The duration of this phase will be three (3) months.

Types and Sources of Project requirements

Types and sources of project requirements during the pre-construction phase are shown in **Table 2.**

Table 2: Types and sources of project requirements during the pre-construction phase

Requirements	Type	Source	Quantity (Approx)
Raw Materials	Gravel	Kisesa and Kwa Mansoor Commercial Quarries	7,800 - 10,000 tons
	Hard Stone	Mkolani Borrow Pit	30 – 35 tons
	Sand	Airport and Mkolani commercial sand pits	55 tons
	Water	Lake Victoria/ MWAUWASA	65,000 litres
	Cement	Commercial stores in Ilemela Municipality	3 tons
	Reinforcement bars	Commercial stores in Ilemela Municipality	9 tons
	Timber	Local vendors	1 ton
Energy	Electricity	TANESCO (National Grid)/ Generators	220 kV
	Fuel	Local vending stations	
Manpower	Skilled	Contractor	100
	Unskilled	Local People along the road	100
Equipment	Dump Truck	Contractor	2
	Graders	Contractor	1
	Dozer	Contractor	1
	Water Boozers	Contractor	5
	Vibrators	Contractor	1
	Excavator	Contractor	2

(**Source:** consultant's analysis, 2022)

Transportation

Materials (fine and coarse aggregates) from quarries will be transported by trucks to the construction site. Water will be moved by water boozers. Other materials like cement, timber and reinforcement bars will be transported by Lorries to the construction site.

Storage

Some of the materials from borrow pits will be used directly after delivery and as such no piling up is expected. Other materials like aggregates and sand will be stored at the backyard of the camp site/office ready for use. Cement and reinforcement bars will be stored in special storage rooms. Timber will directly be used at the required areas and consequently there will be no stockpiling of timber at the camp sites/offices. Fuel/oils used by vehicles and machines will be stored in drums at bunded areas.

Types, Amounts and treatment/disposal of Wastes

Types, amounts and treatment/disposal of wastes during the pre-construction phase are shown in **Table 3**.

Table 3: Types, amounts and treatment/disposal of wastes during the pre-construction phase

Waste	Types	Amount	Treatment/ Disposal
Solid Waste (Degradable)	Garbage: Food remains, cardboards and papers	40kg/day (based on generation rate of 0.1kg/day/ person and 200 workers)	Collected in a large skip bucket at the campsite/site office then to be composted and used as manure for the gardens at the camp site/site office
Solid Waste (Non-Degradable)	Scrap metals and plastics	3kg per day	Sold to Recyclers
	Tins and glasses	3kg per day	Taken to the Authorised dumpsite
Liquid waste	Sewage	6.4 m^3 (Based on 200 people, 40L/capita/day water consumption and 80% becomes wastewater)	Septic tank –Soakaway system at the campsites/ office
	Oils and greases	None	-Disposed in accordance to The Environmentla Management (Hazardous waste control and management) Regulations, 2021 and NEMC guidelines and permits. - In order to reduce these wastes car maintenances will be done at proper garages.

(**Source:** consultant's analysis, 2022)

2.5.2 Construction phase

Activities

The following are the main activities to be executed on the site during construction phase of the project.

- **Earthworks-**This involves clearing of the site to enable construction activities to take place, site clearance shall involve grass removal and cutting of trees where neccessary. The contractor shall ensure that clearance is confined within the areas requring parmanent construction.
- **Foundations' excavation**- This involves cutting of the land to a required depth for laying down the buildings' foundation, the excavation activities shall be limited to the required areas and the excavated soil shall be used for landscaping activities to match the surrounding environment.
- **Construction of site office and storage structures-** There shall be construction of the site office and storage room for materials like steel bars, and cement bags.
- **Material transportation**- Materials (fine and coarse aggregates) from quarries will be transported by trucks to the construction site. Water shall be supplied by

MWAUWASA at site other materials like cement, timber and reinforcement bars will be transported by trucks to the construction site.

- **Material Storage**- Materials like aggregates and sand will be stockpiled at the backyard of the camp site ready for use. Cement and reinforcement bars will be stored in special storage rooms. Timber will directly be used at the required areas and consequently there will be no stockpiling of timber at the sites.
- **Actual construction works**- This involves masonry, concrete works and related activities. Generally masonry and related activities will include stone shaping, concrete mixing, plastering, slab construction, construction of foundations, and erection of building walls and curing of fresh concrete surfaces. These activities are known to be labour intensive and will be supplemented by machinery such as concrete mixers.
- **Steel Structure works**- The buildings will be reinforced with structural steel for stability. Structural steel works will involve steel cutting, welding and erection.
- **Roofing and metal works**- Roofing activities will include sheet metal cutting, raising the roofing materials such as clay roofing tiles and structural timber to the roof and fastening the roofing materials to the roof.
- **Installation of power, communications lines, water, foul water systems**- This involves electrical work and plumbing activities. Electrical work during construction of the premises will include installation of electrical gadgets and appliances including electrical cables, lighting apparatus, sockets etc. In addition, there will be other activities involving the use of electricity such as welding and metal cutting.
- **Installation of pipe**- work for water supply and distribution will be carried out within all units and associated facilities. In addition, pipe-work will be done to connect sewage from the premises to the cesspit tank.
- **Landscaping**- Landscaping shall be done to match with the surrounding environment to improve the aesthetic value or visual quality of the site once construction ceases, the proponent will carry out landscaping. This will include establishment of flower gardens and lush grass lawns where applicable and will involve replenishment of the topsoil. It is noteworthy that the proponent will use plant species that are available locally preferably indigenous ones for landscaping.
- **Construction of surface water drainage system**- This shall involve excavation of trenches depending on the design requirements.
- Clearing the Corridor of Impact (CoI)
- Formation of the road embankment, establishment of sub-base and base, road surfacing
- Construction of drainage structures
- Installation of road furniture
- Pedestrian Crossings, Speed Humps and Rumble Strips shall be provided in all built up areas, near schools and trading centres
- The final finishing and cleaning up of the roads after construction, treating of old roads and temporary diversion

Duration

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

Types and Sources of Project requirements

Types, amounts and sources of project requirements during the construction phase are shown in **Table 4**. Table 4 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, as narrated in Table 12, 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 ESIAs, 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.

Table 4: Types and sources of project requirements during the construction phase

Requirements	**Type**	**Source**	**Quantity (Approx.)**
Raw Materials	Gravel	Kisesa and kwa Mansoor Commercial Quarries	As per the BOQ
	Hard Stone	Mkolani Borrow Pit	As per the BOQ
	Sand	Airport and Mkolani commercial sand pits	As per the BOQ
	Water	Lake Victoria/ MWAUWASA	As per the BOQ
	Bitumen	Contractors Apshalt plant	2 As per the BOQ
	Cement	Local Vendors in Ilemela/ Mwanza	As per the BOQ
	Reinforcement bars	Local Vendors in Ilemela/ Mwanza	80 tons
	Timber	Local Vendors in Ilemela/ Mwanza	10 tons
Energy	Electricity	TANESCO (National Grid)/ Generators	220kV
	Fuel	Local vending stations	
Manpower	Skilled	Contractor	25
	Unskilled	Local People along the road	75
Equipment	Dozer	Contractor	2
	Grader	Contractor	3
	Pay Loader	Contractor	3
	Excavator	Contractor	4
	Vibro Roller	Contractor	4
	Tandem Roller	Contractor	1
	Macadam Roller	Contractor	1
	Tire Roller	Contractor	2
	Dump Truck	Contractor	8
	Mixer Truck	Contractor	2
	Water Truck	Contractor	3
	Tractor w/Trailer	Contractor	4
	Tire crane	Contractor	2
	Cargo Crane Truck	Contractor	1
	Cargo Truck	Contractor	2
	Crusher Plant	Contractor	1
	Screen Unit	Contractor	1
	Concrete Batch Plant	Contractor	1
	Asphalt Plant	Contractor	1

	Asphalt Finisher	Contractor	1
	Asphalt Distributor	Contractor	1
	Air Compressor	Contractor	3
	Generator	Contractor	4
	Fuel Truck	Contractor	1
	Light Vehicle	Contractor	10

(**Source:** consultant's analysis, 2022)

Table 4 is also in tandem with the Environmental and Social Standard (ESS) 2 on Labour and working conditions. A number of project workers, both skilled and unskilled 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 guidance[1] regarding the COVID-19 situation in relation to stakeholder consultations, project worksites and related areas. Table 4 shows the estimated types and the amount of labour forces which will be needed during construction phase.

Transportation

Materials (fine and coarse aggregates) from quarries will be transported by trucks to the construction site. Water will be moved by water boozers. Other materials like cement, timber and reinforcement bars will be transported by Lorries to the construction site.

[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.

Storage
Some of the materials from borrow pits will be used directly after delivery and as such no piling up is expected. Other materials like aggregates and sand will be stored at the backyard of the camp site/office ready for use. Cement and reinforcement bars will be stored in special storage rooms. Timber will directly be used at the required areas and consequently there will be no stockpiling of timber at the camp sites/offices. Fuel/oils which will be used by machines and vehicles during construction activities will be stored in drums at bunded areas.

Types, Amounts and treatment/disposal of Wastes
Types, amounts and treatment/disposal of wastes during the construction phase are shown in **Table 5**.

Table 5: Types, amounts and treatment/disposal of wastes during the construction phase

Activity	Waste type	Amount	Treatment/ Disposal Method(s)
Demolition of existing Markets	Rubbles	125-150 m^3	Those which can be reused shall be sold to recyclers, the remaining shall be sent to the authorized dumpsite at Buhongwa which is operational
Excavation of Foundation	Spoil Soil	7-10 m^3	This soil shall be stock piled along the foundation trenches. The soils shall be used to reinstatement site at the end of the project
Actual Construction	Rubbles	Not Significant	Will be stockpiled and used to fill cut sections
	Scrap metals	Not Significant	Sell to recyclers
	Timber	Not Significant	Shall be sold to nearby community for reuse
	Cement bags	Not Significant	Sell to recyclers
Transportation and running machines	Oils and grease	N/A	-Disposed in accordance to The Environmentla Management (Hazardous waste control and management) Regulations, 2021 and NEMC guidelines and permits. - In order to reduce these wastes car maintenances will be done at proper garages.

(**Source:** Consultant's Analysis, 2022)

Domestic Wastes
Domestic shall include general refuse (food wastes etc.) and liquid wastes.

Solid Wastes

About 0.75kg per day of domestic refuse will be generated at the site by workers (based on 30 workers and generation rate of 0.25kg/person/day). A local solid waste transfer station shall be designated by the contractor to store domestic refuse before they are collected to the existing disposal facility at Ilemela.

Liquid waste

Sanitation system to be used at the site is the septic tank cum soak away pits;

Assuming that

- There will be 120 workers
- Water consumption =70l/capita/day
- 80% of the water consumed become wastewater
  Wastewater generation per day = 120x70x0.8

About 6.72m^3 per day of liquid will be produced from the construction site during construction period.

2.5.3 Demobilization phase

Activities

-Demobilization of temporary structures will be done for proper restoration of the site (e.g. removing/spreading top-soils piled along the road, removing all temporary structures, campsites/offices may be left to the local governments depending on agreements that will be reached during the mobilization phase.

-Other activities include rehabilitation of the workshop and stockpile yard, rehabilitation of campsite at least to the original condition, clearance of all sorts of wastes including used oil, sewage, sewage, solid wastes (plastics, wood, metal, papers, etc).

-Deposit all wastes to the authorised dumpsite.

-Restoration of water ponds to a natural and useable condition

-Termination of temporary Employment.

Duration

Demobilization stage will last for a period of two (2) months.

Types and Sources of Project requirements

Types, amounts and sources of project requirements during the demobilization phase are shown in **Table 6**.

Table 6: Types and sources of project requirements during the demobilization phase

Requirements	**Type**	**Source**	**Quantity**
Manpower	Skilled	Contractor	8
	Unskilled	Local People along the road	20
Equipments	Bull dozer	Contractor	1
	Motor grader	Contractor	1
	Tippers	Contractor	1
Energy	Electricity	National Grid	220V

(**Source:** consultant's analysis, 2022)

Types treatment/disposal of Wastes

The demobilization of the temporary structures will result mainly into solid wastes such as timber, iron sheets and rubbles from demolitions. Timber and iron sheets will be sold to people in the nearby communities for reuse while the rubbles will be sent to the authorised dumpsite for disposal.

2.5.4 Operation phase

This will include use of Kirumba market ad its access roads. 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 Ilemela 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 colection 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.

The actual usage of the roads is expected to commence after completion of the construction works. Management of the roads shall be under the Municipal Works Engineer. During the operational phase, the Ilemela Municipal council shall be responsible for routine maintenance of the roads including resurfacing of the (as may be needed), removal of debris from storm water channels and clearance of vegetation along the road. The following activities will be performed during the operation phase:

Activities during operation of roads

- Periodic maintanace of of the roads and storm water drains
- Removal of debris and silt from the trenches
- Sweeping and removal of dirt from the roads

Duration

The duration of this phase will be twenty years (20) years.

Types and Sources of Project requirements

Types and sources of project requirements during the operational phase are shown in **Table 7** and **8**.

Table 7: Types and sources of project requirements during the operational phase

Requirements	Source	Quantity
Water	MWAUWASA articulation system	$5m^3$/day (Based on 100 people (vendors and other users), water demand rate of 50L/capita/day)
Electricity	TANESCO (National Grid)	2,500-2,700MwHr/ month

(**Source:** consultant's analysis, 2022)

Table 8: Types and sources of project requirements during the operational phase (Road Maintenance)

Requirements	Type	Source	Quantity
Raw Materials	Gravel	Kisesa and kwa Mansoor Commercial Quarries	3,000 tons
	Hard Stone	Mkolani Borrow Pit	10 tons
	Sand	Airport and Mkolani commercial sand pits	200 tons
	Water	MWAUWASA	50,000 litres
	Asphalt	Contractors Apshalt plant	3,500 tons
	Cement	Commercial stores in Mwanza	4 tones
Manpower	Skilled	Contractor	10
	Unskilled	Local People along the road	20
Equipments	Excavator	Contractor	1
	Wheel loader	Contractor	1
	Water Boozer	Contractor	1
	Bull dozer	Contractor	1
	Motor grader	Contractor	1
	Roller Compactor	Contractor	1
	Plate compactor	Contractor	1
	Crasher	Contractor	1
	Tippers	Contractor	1

(**Source:** consultant's analysis, 2022)

Types, Amounts and management of wastes

Types, amounts and treatment/disposal of wastes exepected to be generated during the operational phase of the Kirumba market and its access roads are shown in **Table 9**.

Table 9: Types, amounts and treatment/disposal of wastes during the operation phase

Waste	Types	Amount	Treatment/ Disposal
Solid (Degradable) Waste	Vegetations (Trees, Grasses) and remnants of timber	300m^3/month of biomass	Source of energy for cooking for residents near the project roads
	Market garbage	45 kg/day (based on generation rate of 0.45 kg/day/ person for 100 people)	Collected in a large skip bucket at the campsite then to be composted and used as manure for the gardens at the camp site/office
Solid Waste (Non-Degradable)	Scrap metals and drums	2-3kg per day	Backfilling material in the borrow pits, fill the diversions.
	Plastics	3-4kg per day	Sold to Recyclers
	Tins and glasses	1-3kg per day	Taken to the authorized dumpsite at Buhongwa
Liquid waste	Sewage	Approximately 4m^3/ day (Based on; Water demand of 5m^3 per day, 80% of the water consumed become wastewater)	Septic tank –Soak away system at the camp site/office and mobile toilets along the route and conveyed to the nearby sewer.
	Oils and greases	N/A	- Disposed in accordance to The Environmentla Management (Hazardous waste control and management) Regulations, 2021 and NEMC guidelines and permits. - In order to reduce these wastes car maintenances will be done at proper garages.

(**Source:** consultant's analysis, 2022)

2.5.6 Decommissioning

Decommissioning at the end of its life or rehabilitation or up-grading an infrastructure or its component may involve demolition of structures and site restoration. Depending on the design, standard decommissioning for this asphalt road and the market is after 30 years where the road undergoes major rehabilitation and resurfacing.

Types and sources of project requirements

Types and sources of project requirements during the demobilization phaseareshown in **Table 10**.

Table 10: Project requirements during the demobilization phase

Requirements	Type	Source	Quantity
Manpower	Skilled	Contractor	10
	Unskilled	Local People along the road corridor	25
Equipment	Bull dozer	Contractor	1
	Motor grader	Contractor	1
	Roller Compactor	Contractor	1
	Plate compactor	Contractor	3
	Tippers	Contractor	1

(**Source:** consultant's analysis, 2022)

2.6 Construction Materials and Labour Force

Essential construction materials include gravel, stone aggregates, sand, iron bars, water and bitumen. All natural materials are available in the project area (in the region) while other are commercially available elsewhere (**Figure 2.13**).

Figure 13: Left: Nyanza Commercial Quarry. Right: Mkolani Borrow Pit.
(Source: Ilemela road report 2017)

Construction works are generally labour intensive. Apart from technical and skilled manpower, recruitment of unskilled labour will be done locally. A minimum of 120 people are expected to be employed by the project.

Borrow Areas

The construction materials like sand and aggregates to be used for the proposed building will be sourced within authorized borrow pits found in Mwanza Region.

Water Sources

Water will be supplied by Mwanza Urban Water and Sewerage Authority (MWAUWASA).

Sources of industrial materials for road construction

Traditional road construction materials that will be used in this project, generally have been tested by Approved Labolatories for compliance and many of them can be sourced from within the Mwanza region.

Cement, Iron Bars, Timber

Supplied by local vendors in Mwanza region. The Cement is easily available in the mainland, packed in 50kg bags and sourced from Mwanza region. The nearest industries include Twiga Cement, Dangote cement etc.

Reinforcement Steel

Reinforcing steel for structural works is also be supplied by local vendors in Mwanza region. Their strength and other properties of reinforcing steel will to be confirmed by testing of samples in approved testing laboratories before use.

Bitumen

Bitumen for road works will be obtained by the contractor from a registered vendor. Bitumen properties will be checked by testing representative samples in approved laboratories.

Lime

Industrial hydrated Lime can be obtained from nearest industry and other sources. The material is available in Tanzania. However, before the material is purchased for use in this projects, its properties will be checked by testing representative samples in approved laboratories.

2.7 Camp Site Location

The location of the campsite(s) has not been identified. The developer shall discuss with the contractor on proper location of the camp site, in agreement with the local community. Due to the nature of the project sites, it is possible that the project will rent accommodation for skilled labour may be sourced out of Mwanza. Local labourer will return to their homes at the end of working hours. If it turns out that the remaining subprojects need a campsite, the contractor shall rent land from the community. The developer will make sure that all legal issues are considered in order to have mutual benefits.

2.8 Waste Generation

Waste generated during all the project phases shall be handled in an environmentally friendly manner. Spoil soil shall be stock piled along the road alignment or at the borrow pits. The soils shall be used to reinstatement of sites at the end of the project implementation phase. Domestic wastes generated at the campsites and offices shall be disposed in VIP latrines connected to septic tank/soak away systems. Solid wastes shall be stored in waste bins at the sites/campsite, and later transported to designated disposal sites. Other contingent plans to handle the accidental oil spillages and general waste management shall be worked out during the preparation of the Environmental and Social Management Plan (ESMP).

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 National Policies

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), 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 National Land Policy, 1997

The National Land Policy states that, "the overall aim of a National Land Policy is to promote and ensure a secure land tenure system, to encourage the optimal use of land resources, and to facilitate broad - based social and economic development without upsetting or endangering the ecological balance of the environment". This ESIA partly responds to this requirement.

3.2.3 National Human Settlements Development Policy, 2000

Among the objectives of this policy that touch the investment sector are 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. The construction of the proposed new Kirumba market and its access roads shall increase service to people of Ilemela which is essential to increase productivity.

3.2.4 National Gender Policy, 2000

The key objective of this policy is to provide guidelines that will 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 quality and equal opportunity of both men and women to participate in development undertakings and to value the role-played by each member of society.

IMC has adopted the policy through the provision of equal opportunities to both men and women in construction of the new Kirumba market and its access roads.

3.2.5 National Policy on HIV/AIDS, 2001

The National Policy on HIV/AIDS (2001) was formulated by the Government of Tanzania (GOT) under technical support from the World Health Organization Global Programme on AIDS (WHO-GPA) that led to the establishment of National HIV/AIDS Control Programme (NACP) under the Ministry of Health. However, due to its multi-sectoral nature there was a need to involve all sectors and community participation was found to be crucial. One of the government strategic initiatives is to establish Tanzania Commission for AIDS (TACAIDS) under the Prime Minister's Office. The Commission provides leadership and coordination of

national multi-sectoral response to the HIV/AIDS epidemic. The management functions, institutional and organizational arrangement of TACAIDS are outlined in the National Policy.

The policy identifies HIV/AIDS as a global disaster, hence requiring concerted and unprecedented initiative at national and global levels. It recognizes HIV/AIDS as an impediment to development in all sectors, in terms of social and economic development with serious and direct implication on social services and welfare. Thus, the policy recognizes the linkage between poverty and HIV/AIDS, as the poor section of the society are the most vulnerable.

The main policy objective is reflected well in the establishment of TACAIDS. However, the policy has also set a number of strategic objectives to deal with specific HIV/AIDS problems:

- Prevention of transmission of HIV/AIDS;
- HIV Testing;
- Care for People Living with HIV/AIDS (PLHAS);
- Enhance Sectoral roles through participation and financial support;
- Promote and participate in research on HIV/AIDS-including dissemination of scientific information and development of HIV vaccine;
- Creating a legal framework through enactment of laws on HIV/AIDS-governing ethical issues and legal status of HIV/AIDS affected families;

Other objectives:

- monitoring and safeguarding rights of infected or affected people;
- prevent human rights abuse, discrimination and social injustice;
- provide effective treatment for opportunistic diseases;
- promote fight against drug substance abuse;
- Prohibit misleading advertisements of drugs and other products for HIV/AIDS prevention, treatment and care.

3.2.6 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. The proponent will ensure that the roads surrounding the market serve their purpose as the NTP provides.

3.2.7 National Health Policy, 2017

This Policy emphasized on the need for an adequate supply of water and basic sanitation to minimize water borne and water related diseases, which are among the major health problems in this country, and recognizes that the health of individuals, the family, and the community at large, is dependent on the availability of safe water supply, basic sanitation and improved hygiene practices. It should also be borne in mind that water resources infrastructure, such as

reservoirs and canals, can provide habitats for organisms carrying malaria and bilharzia. Further the policy encourages safe basic hygienic practices in workplaces, promotes sound use of water, promotes construction of latrines and their use, encourage maintenance of clean environment; working environment which are conducive to satisfactory work performance. The proponent shall ensure this policy is observed during project implementation.

3.2.8 National Energy Policy, 2015

The policy focuses on utilization of various energy resources including water, forests, gas, coal, petroleum, sun and wind in a sustainable and environmentally friendly manner. The policy states that energy is a prerequisite for the proper function of nearly all sub sectors of the economy. It is an essential service whose availability and quality can determine the success or failure of development endeavors. One major objective of the policy among others is to prevent degradation of land, water, vegetation and air, which constitute our life support systems, and to conserve and enhance our natural and man-made heritage, including biological diversity of the ecosystem of Tanzania." It also recognizes the importance of public awareness and understanding of the linkages between environment and development. The policy promotes environmental management for energy production in the sense that energy production should minimize environment impacts and adhere to environmental requirements. The proponent will adhere to the objectives of this policy.

3.2.9 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.

3.2.10 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.

3.2.11 National Investment Policy, 2006

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 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 country's development requirements.

3.2.12 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.

3.2.13 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.

3.2.14 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 construction of Kirumba Market and its surrounding roads will facilitate trading activities since it is an important infrastructure that will provide a marketing place for traders to sell their goods. The proponent will ensure that every resident with the desire and qualification to trade is given that opportunity to be party of the market and make a positive impact in the community.

3.3 Legal Framework

3.3.1 Environmental Management Act No. 20 of (2004), Cap. 191

The Environmental Management Act (EMA) is a piece of legislation that forms an umbrella law on environmental management in Tanzania. Its enactment has repealed the National Environment Management Council Act. 19 of (1983) while providing for the continued existence of the National Environment Management Council (NEMC).

Among the major purposes of the EMA are to provide the legal and institutional framework for sustainable management of the environment in Tanzania; to outline principles for management, impact and risk assessment, the prevention and control of pollution, waste management, environmental quality standards, public participation, compliance and enforcement; to provide the basis for implementation of international instruments on the environment; to provide for implementation of the National Environmental Policy; to provide for establishment of the National Environmental Fund and to provide for other related matters.

Part III, Section 15(a) states that "*in matters pertaining to the environment, the Director of Environment shall coordinate various environment management activities being undertaken by other agencies to promote the integration of environment considerations into development policies, plans, programmes, strategies projects and undertake strategic environmental assessments with a view to ensuring the proper management and rational utilization of environmental resources on a sustainable basis for the improvement of the quality of human life in Tanzania*".

Part VI of the EMA deals with Environmental Impact Assessments (EIA) and other Assessments and directs that an EIA is mandatory for all development projects. Section 81(2)

states that "*An EIA study shall be carried out prior to the commencement or financing of a project or undertaking*", while Section 81(3) states "*a permit or license for the carrying out of any project or undertaking in accordance with any written law shall not entitle the proponent or developer to undertake or to cause to be undertaken a project or activity without an Environmental Impact Assessment certificate issued under this Act*". This ESIA is conducted for this project in order to abide to this law.

3.3.2 The Land Act no 4 R.E 2019

These laws declare all land in Tanzania to be "Public land" to be held by the state for public purposes. The Acts empower the President of the United Republic of Tanzania, to revoke the "Right of Occupancy" of any landholder for the "public/national interest" should the need arise. The laws also declare the value attached to land.

The law as amended in 2004 recognizes the role of land in economic and urban development. The law provides for technical procedures for preparing land use plans, detailed schemes and urban development conditions in conformity with land use plan and schemes. The LGA has the power to impose conditions on the development of any area according to the land-use planning approved by the Minister. This project conforms to this law because it has followed all development conditions provided (Market).

3.3.3 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. The New Kirumba Market shall be constructed on the same area that exist the current one therefore there shall be no change of land use.

3.3.4 The Urban Planning Act (2007)

The law provides for the orderly and sustainable development of land in urban areas, to preserve and improve amenities; to provide for the grant of consent to develop land and powers of control over the use of land and to provide for other related matters. Section 29-(1) of the law states that "*Notwithstanding the provisions of any other written law to the contrary, no person shall develop any land within a planning area without planning consent granted by the planning authority or otherwise than in accordance with planning consent and any conditions specified therein"*. IMC shall apply for all permits from the planning authorities before starting construction.

3.3.5 Occupation Health and Safety Act (2003)

The law requires employers to provide a good working environment to workers in order to safeguard their health. The employers need to perform medical examinations to determine fitness before engaging employees. Employers must also ensure that the equipment used by employees is safe and shall also provide proper working gear as appropriate. This shall be adhered to during construction and operational phase of the new Kirumba market.

3.3.6 Employment and Labour Relations Act No. 6 R.E 2019

The Act makes provisions for core labour rights; establishes basic employment standards, provides a framework for collective bargaining; and provides for the prevention and settlement of disputes and provides. IMC shall see to it that the Contractor adheres to employment standards as provided for by the law.

3.3.7 HIV and AIDS (Prevention and Control) Act of 2008

The law provides for public education and programmes on HIV and AIDS. Section 8(1) of the law states that "The Ministry (Health), health practitioners, workers in the public and private sectors and NGOs shall for the purpose of providing HIV and AIDS education to the public, disseminate information regarding HIV and AIDS to the public". Furthermore, Section 9 states that "Every employer in consultation with the Ministry (Health) shall establish and coordinate a workplace programme on HIV and AIDS for employees under his control and such programmes shall include provision of gender responsive HIV and AIDS education…." This project shall abide to HIV/AIDS Act in the fight against the disease.

3.3.8 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.

3.3.9 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.

3.3.10 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.

3.3.11 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.

3.3.12 Social Security Regulatory Authority Act, 2015

The Social Security Regulatory Authority Act of 2015 provides that the Authority shall have powers to exercise and perform supervisory and regulatory functions over all managers, custodians, administrators and schemes. Among other things, it ensures efficiency in the management of social security sector by regulating, supervising and promoting growth of social security sector in Tanzania. The proponent shall ensure that this act is adhered to and all workers benefit accordingly.

3.3.13 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.

3.3.14 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 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.

3.3.16 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 Ilemela 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.

3.3.17 The Roads Act 2007

For purposes of this project, the Road Act 2007 serves as a guide to the use of the road reserve. Contrary to previous informal understanding, the reserve is exclusive to road related activities that do not include other utilities. However, clause 29 (2) does give provision for the request and terms of approval for use of the road reserve by utilities such as power lines and water pipes. On land acquisition the Act clearly states in part III, Section 16 that *'where it becomes necessary for the road authority to acquire a land owned by any person, the owner of such land shall be entitled to compensation for any development on such land in accordance with*

the Land Act and any other written law'. Ilemela Municipal Council shall observe this law for the conservation of the Road Reserve and Compensation of the PAPs.

3.4 Relevant Regulations and Guidelines

3.4.1 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.

Development like this one is one of the most important agents to enable Tanzania achieve its Development Vision objectives (both social and economic), such as eradicating poverty. Construction of the new Kirumba market and its access roads will contribute to the attainment of the 2025 Vision.

3.4.2 Environmental Impact Assessment and Auditing Regulations (2005)

These regulations set procedures for conducting EIA and environmental audit in the country. The regulations also require registration of EIA experts. This ESIA has been conducted following the above stated regulations.

3.4.3 Solid waste Management Regulation, 2009 GN. NO. 263

The regulation has been made under section 114, 115, 116, 117, 118, 119, 120, 121, 122 and 230 of Environmental Management Act, 2004. These regulations apply to all matter pertaining to solid waste management. They aimed among other things at setting standard for permit to dispose solid waste and license to own or operate solid waste disposal site. These regulations shall guide all the collection and disposal of solid waste from the Market.

3.4.4 The Environmental Regulations 2015 (Standards for control of noise and Vibrations)

Under these regulations NEMC is mandated, in consultation with the TBS, to establish criteria and procedure for the measurement of noise and vibration pollution; minimum standards for the emission of noise and vibration pollution into the environment and guidelines for the abatement of unreasonable noise and vibration pollution emitted into the environment from any source. The Regulations provide the detailed noise standards pursuant to this provision. The purpose of these Regulations is to ensure the maintenance of a healthy environment for all people in Uganda, the tranquillity of their surroundings and their psychological well-being by regulating noise levels, and generally, to elevate the standard of living of the people by prescribing the maximum permissible noise levels from a facility or activity to which a person

may be exposed; providing for the control of noise and for mitigating measures for the reduction of noise.

The permissible limits are provided for in the Schedule to the Regulations. It is evident that construction of the market shall produce too much noise and vibrations owing to the use of heavy machinery.

3.4.5 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. The proponent has ensured that the Environmental expert involved in the project is registered and has a valid practicing license.

3.4.6 The urban Planning (use group and use classes) Regulations, 2018

The Urban Planning (use group and use classes) Regulations of 2018 provides for any development that needs to be carried out in urban lands has to in accordance to the area's use group and class for proper plant and developmnt control. However, the planning authority may, under special circumstances; permit any use not classified under a separate use class in these regulations provided that such use is in the public interest. The proposed projects will be implmented in areas with the right use groups and classes as the regulations requires.

3.4.7 The Urban Planning (planning space standards) Regulations, 2018

The Urban Space Standards Regulations of 2018 includes standards for residential areas, unplanned settlements, building lines and setbacks, plot coverage and plot ratio, health facilities, education facilities, recreation facilities, beach facilities, golf courses, passive and active recreation, public facilities by planning levels, public facilities by population size, parking and road width, and agricultural show grounds. The proposed project's architects have complied with the Regulations in considerations of plot coverage ratio, parking lots, and specific standards for high rise buildings.

3.4.8 The fire and rescue force (safety inspections and certificates) amendment Regulations, 2012

The fire and rescue force (safety inspections and certificates) amendment Regulations of 2012 provides for every construction project and development premises to be inspected and have a fire cerificate to ensure that it is safe from fire accidents. There needs to a proper fire plan that shall be approved by the fire and rescue force during construction and inspections to be done prior operations and a fire certificate shall be issued after the required fees are paid. The proponent shal ensure that fire safety inspections are done and proper certificates are obtained to ensure a smooth and safe undertaking.

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 industrialized 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 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 World Bank Environmental and Social Framework

3.7.1 World Bank Environmental and Social Standards

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 11**.

Table 11: 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 ESIAs 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	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

ESSs	Yes/No	Application
		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 ESIAs, 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	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. Implementation of the Project is likely to trigger influx of workers or job seekers and their followers into a sub-project area. 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. 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 guidance[3] regarding the COVID-19 situation in relation to stakeholder consultations, project worksites, communities and related areas.
ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Yes	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. 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.

[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
ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	Yes	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. 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.
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.
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.

3.7.2 World Bank Safeguard Tools for the TACTIC Project in Ilemela Muncipal 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:

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

3.7.3 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) (**Table 12**). The World Bank Environmental Health and Safety General Guidelines containing quantitative limits and good international management practices to manage potential impacts.

Table 12: World Bank EHS Guidelines applicable

EHS Guideline	Content & Relevance to Kirumba market project and its access roads
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 Kirumba market. 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.

3.7.4 Other World Bank Instruments Applicable for TACTIC Project

Environmental and Social Framework - Guidance Notes for Borrowers[4];

The World Bank has developed several Guidance Notes to ensure the governments (borrowers) comply with the World Bank Environmental and Social Standards. These guidances are public documents that be accessed in the World Bank website[5].

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

3.8 Institutional Framework for the Management of Environment

3.8.1 Overall Management Responsibility

The institutional arrangement for environmental management in Tanzania is well spelt out in the EMA (2004). There are seven (7) institutions mentioned by the act, of which the Minister Responsible for the Environment is the overall in-charge for administration of all matters relating to the environment.

Part III, Section 13(1) of EMA (2004) states that the Minister responsible for environment shall be in overall in-charge of all matters relating to the environment and shall in that respect be responsible for articulation of policy guidelines necessary for the promotion, protection and sustainable management of environment in Tanzania.

The legal institutions for environmental management in the country include;

- National Environmental Advisory Committee;
- Minister responsible for Environment;
- Director of Environment;
- National Environment Management Council (NEMC);
- Sector Ministries;
- Regional Secretariat;
- Local Government Authorities (City, Municipal, District, Township, Ward, Village, sub village "Mtaa and Kitongoji")

3.8.2 The Overall Management of the Project

From an institutional point of view, IMC under PO-RALG has the responsibility of developing and operating the Market. During Construction phase the Major roles of the IMC shall be

[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

- To undertakes compliance inspections as necessary
- Attends environmental review meetings
- To oversee the Engineer and Contractor on the Implementation of the EMP

During operational phase the Overall management of the EMP shall be the responsibility of the IMC.

CHAPTER FOUR

BASELINE ENVIRONMENTAL AND SOCIAL CONDITIONS

4.1 Biophysical Environment

4.1.1 Climate

Ilemela experiences tropical climate which is mainly influenced by the wind patterns from Lake Victoria. The annual temperature ranges between 20^{o}C and 30^{o}C with annual precipitation ranging between 700mm and 1000mm. It receives two rainy seasons: short rains begin in August – October while long season spans from December to May each year. Due to its urban nature and human pressure, vegetation in IMC is highly disturbed and fragmented. Few and isolated protected natural forest patches are found in some hilly areas of Buhogwa, Ilemela, Sangabuye and Kitangiri wards. The Council has 396.8 hectares of forest which constitutes 1.6 percent of total landmass. The forest area is managed through community-based forest management (CBFN) approach. The proposed project designs shall take into consideration weather changes particularly temperature and rainfall patterns, so that they do not result to any impacts to the environment and the surrounding community. This can be by putting proper drainage, use of high-quality material to construct the market and roads and planting trees on the road sides.

4.1.2 Topography and Soil

Ilemela Municipality lies at an altitude of 1,140m above sea level. It partly has granites and grandiosity cover and gently undulating to level Physiographic with isolated hill masses and rock inselbergs. It is also characterised by well-drained sandy loamy soil generated from course grained cretaceous. The soil drains smoothly and is not saline. The soil ranges from yellow, red, gritty, sandy soils and loam that are delivered from course-grained cetaceans' rock. The soils are usually associated with Island of between 1100 – 1600 meters in height. The natural vegetation consists of isolated trees scattered on grassy hills. Project area is relatively flat. Observation shows that the nature of the top soil is red clay. The proposed subprojects are designed and shall be constructed by considering the topography and nature of the soil in the project areas.

4.2 Ethnicity and Gender Aspect

4.2.1 Ethnicity

Due to intermarriages in the last two decades, acculturation has taken place with merging culture and beliefs. The outcome of this process is that ratio distinctions have been broken and culture has been blended into different types of beliefs and customs. Few tribes still follow their respective customary beliefs diligently. Moreover, it seemed that, the main ethnic group found in the project areas are the Sukuma whom are the dominant tribe found in the whole region.

4.2.2 Gender aspects

As it is with most of the regions in the country, the number of women in Ilemela out numbers that of men. According to the 2012 Census women in Ilemela constitute 51.9 percent of the municipal's total population. Women development efforts have been made by both women and civil societies to make sure that women are engaged in economic activities to create basis for them to enter the mainstream of economic activities in the future. There are 128 women groups in Ilemela Municipal Council dealing with income generation activities such as agriculture, fish mongering, livestock keeping, "Mama Lishe" (food vendors), and restaurants. Other

groups are engaged in savings and credit. The proponent shall ensure that employment opportunity during the project implementation considers gender equality in that both women and men equally participate in the project.

4.3 Population, Income and Social Economic Activities

The National Population Census (2012) indicates that the IMC had a total Population of 343,001 people (164,718 males and 178283 females). Given its urban nature, the Council is inhabited by diverse ethnic groups, mainly Sukuma, Zinza, Kerewe, Kurya, Jita and Kara. People in Ilemela engage in various economic activities including: agriculture, livestock keeping, fishing, and beekeeping. IMC is also regarded as among the main suppliers of horticultural crops; greenhouse farming activities are also practiced in its outskirts.

The Council hosts significant number of industries. In 2015, Mwanza had 2,420 small-scale industries of which 23.9 percent were in IMC. These industries include fish processing, marine vessel manufacturing, steel, textiles, soft drinks, mineral processing, plastics, breweries, mining activities (precious metals, aggregate and quarrying extractive), meat processing, cotton ginneries, flour milling, dairy products, rice milling, and brick making industries. To promote industry activities, the Council has earmarked Industrial parks at Ihalalo (260 ha) and some 72.768 ha at Nyamhongolo Plot 559, Block A.

Despite the fact that people in Ilemela conducts multitude of activities, commerce and trade (formal and informal) is the main economic sector which contributes to around 41% of the GDP (**Figure 14**) (URT, Undated).

The proposed project will be of great importance to the community hence will lead to increased income due to increased economic activities and also result to population increase in different areas of Ilemela MC. Increased population may affect the community positively and negatively in that it will facilitate economic activities while it can also result to transmission of STIs and STDs respectively.

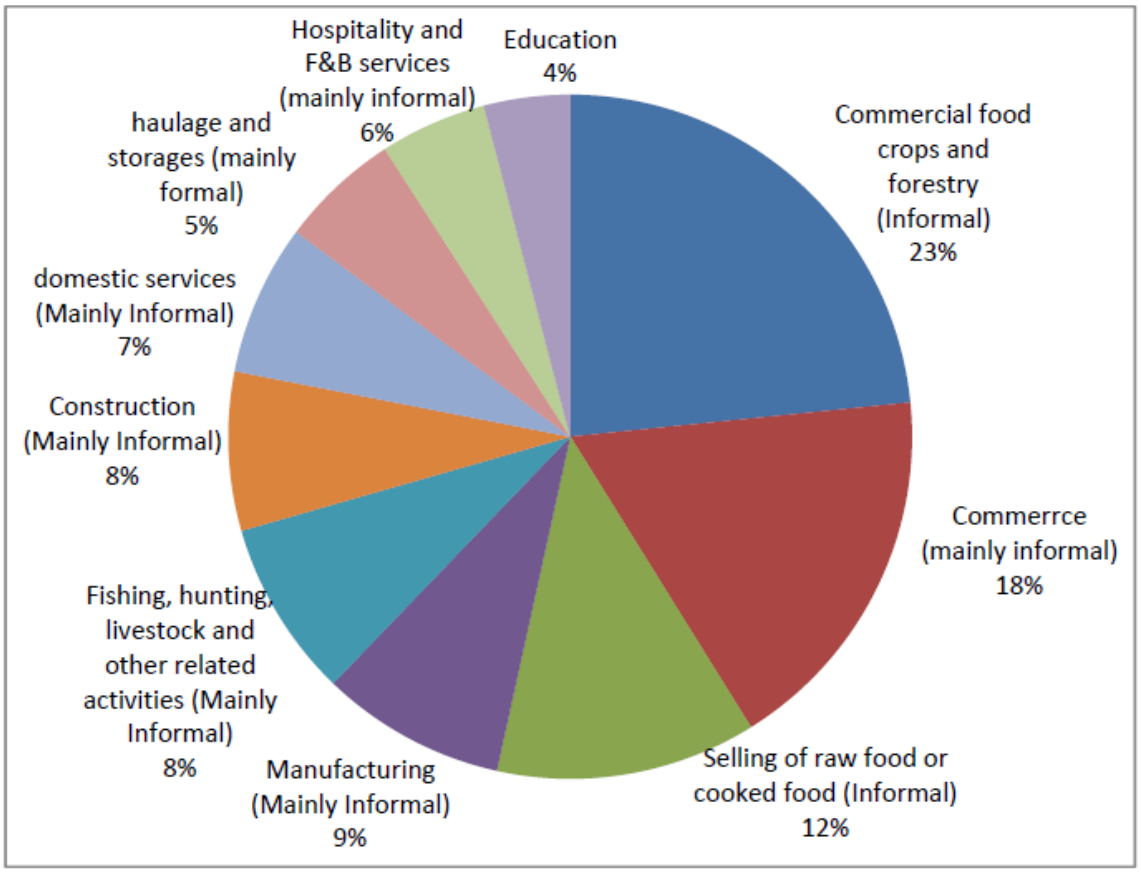


Figure 14: Sectors Contribution to Ilemela Municipal Council's GDP
(Source: IMC, Undated)

4.4 Social Services

4.4.1 Education, Market, and Health Services

The IMC has several social services which support its population to attain standard of living. It has about 115 pre-primary and primary schools and 91 secondary schools. It has one (1) hospital, eight (8) health centers and (nineteen) (19) dispensaries. The council has twelve (12) formal markets including Buzuruga, Nyakato NHC, Kamwanga, Kirumba, Sokoni, Kirumba Mwaloni, Kitangiri, Nyamanoro, Nyasaka Center, Nyasaka Katavi, Kitoleni, Pasiansi, Market, Msuka, and Sabasaba and Nafaka. Majority of them are congested and their infrastructures are in bad shape.

The proposed project shall be of importance to the community since it will improve the market and its surrounding roads hence increase accessibility.

4.4.2 Transport and Communication Services

The IMC is served with several transport services and infrastructure. It has a road network of 543.3 km of which only 4.9 percent are paved and cobbles roads while 95.1 percent are in poor condition. The Mwanza City is also served with air transport which is on the outskirt of Ilemela, located about 10 Km (6.2 mile) from the city center. Air Tanzania, a public airline, currently provides transport services from different destination to Mwanza on daily basis. Apart from Air Tanzania domestic flights, private sector companies also operate regularly from Mwanza Airport to places like Dodoma, Bukoba and Zanzibar.

Ilemela enjoys marine transport due to its access to the Lake Victoria. Public marine vessels are the major carriers of both passengers and cargoes destined for the neighboring lake zone regions - Kagera and Mara regions. There are also marine transport facilities connecting Mwanza Lake port with other lake ports of Kenya and Uganda. There are private marine vessels mainly ferries which move passengers to and from Sengerema landing ports to Mwanza city, Ukerewe landing port and Mwanza City. Mwanza region is also served by the central line railway system that connects Ilemela with Tabora, Kigoma and Dar es Salaam. The importance of the Central Railway system to the region is felt in hauling agricultural and industrial goods to and from the region.

The proposed road construction subproject will be advantageous since it will be an addition to the bitumen upgraded road network which means increased accessibility to the market and areas nearby.

4.4.3 Electricity, Water and Sewerage Services

The main sources of energy in IMC are electricity, gas, paraffin, solar, firewood and charcoal. Electricity is mainly used for lighting while charcoal and firewood are mainly used for domestic purposes. The council faces various challenges related to electricity including unstable power supply, low voltage, rationing, and outages. The situation affects production of goods and services and opening of heavy industries. Water and sewerage services are provided by the Mwanza Urban Water and Sanitation Services Authority (MWAUWASA). The authority has the capacity to generate 108,011 cubic meters per day, but has a storage capacity of 76,233 cubic meters, which is below production capacity. The MWAUWASA sewerage connections cover approximately 101 Km and has increased slightly from 3,835 connections in 2017/18 to 4,143 connections in 2018/19. The large segment of Ilemela population is still not connected to the sewerage line.

The proposed road project may negatively affect these utilities since some of them may need to be relocated during implementation which will make it hard for some residents to lack water, electricity and sewerage services for some time. The proponent shall ensure the affected utility authorities are consulted and relocated accordingly.

4.4.4 Existing utility facilities within/close to the project area

Just few meters near the market there are service line from TANESCO, Sewer system and water line which owned by MWAUWASA. These service lines will probably be affected during construction and in the ongoing phase hence the lines will need to be relocated. The specific attention should to be taken to avoid environmental hazards by minimizing pollution at the site. On the ecological status of the area there are several trees where other fauna like bird's nests for breeding. These trees some of them will be removed completely to provide more space for construction works to take place. It is therefore more likely going to affect the habitat of fauna like vultures who found in the area. During project operation, generated solid waste will be transported to nearby designated disposal sites. During transportation, bad odor and waste falling from the back of trucks are likely to occur due to improper solid waste handling. This may result into nuisance to road users and people along the route.

4.5 Economic activities

4.5.1 Fisheries

Fishing activities in Ilemela has a long historical background, with about 850sq covered by water the Municipal has about 1,200 fishing vessels and 5,430 artisanal fishers who depend directly from the Lake. The introduction of Nile perch in 1950s to the Lake changed both the social and economic natural history of the sector. Today fishing is done mainly for commercial purposes, contrary to the traditional fishing which focused on household consumptions. According to available statistics from the fish processing plants in Ilemela (Omega, Mwanza Fishing and Tan Perch), the fishing industry has created direct Employment for over 450 locals and outsiders and indirectly employed about 3000 others. The proposed project positively affects fisheries in Ilemela since the fish products will be easily transported to the market where people will sell and earn money.

4.5.2 Agriculture and livestock

IMC is predominantly urban with 75% of its population residing in urban centers engaging in business and full-time Employment activities while the remaining 25% reside in rural areas engaged mainly in agriculture and livestock as their major undertakings. Crops grown include rice, maize, sunflower, maize, cabbage, sweet, peas, tomatoes, paddy, and fruits. Livestock keeping is also done in both rural and urban centers. The agriculture land in Ilemela Municipal is estimated to be 11,074 hectors which is suitable for both crop production and as a grazing land. The proposed project will increase market for agricultural products.

4.5.3 Tourism and recreational activities

Mwanza region is one of the unique destinations in Tanzania that has yet to be discovered by many. It is a land of many wonders hubbing an unparalleled diversity of fauna, flora and many natural features. The wonders of Rockies, the scenery, topography and very friendly people harbour the growth of excellent cultural tourism beach holidays, game hunting, infrastructural ventures, historical and archaeological ventures – and certainly the best wildlife photographic safaris on the continent. The proposed projects will have significant contribution to the tourism sector of the Municipality since as one of the great investments will attract tourists as economic development increases.

4.5.4 Mining and quarrying

Ilemala Municipality is blessed with rocks, with rich mineral depositions, including granites and sands. All these are termed as building minerals. Currently extraction is made by private individuals, building and road contractors who extracting building materials. About 120,000 tons of sands and 500,000 tons of granites (stones) are produced per month. The extraction is done at Buhongwa, Mkolani, Igoma, Mahina and Butimba. It is expected that the proposed projects will source construction materials from these existing sources.

4.6 Biological Environment

Biodiversity conservation and management is a crucial aspect of maintenance of ecosystem services that are essential for the life support of plants, human and other animals. Environmental degradation results in reduced supply of crucial environmental resources such as clean water, air, as well as fertile soils. The main objective of Environmental assessment is to ensure that the proposed projects do not degrade the environment.

4.6.1 Flora

The Ilemela-Kirumba natural water ways traverse through the central part of the municipality. The riparian vegetation that exists within and along the water ways comprise a variety of scattered exotic tree species and wetland plants.

Terrestrial vegetation exists in the form of scattered trees and grasses. Tree species are mainly composed of exotic shades, ornamental as well as fruit trees. They include Accacia species (Mgunga), Albizia species (Mkenge), *Azadirachta indica* (Mwarobaini), Ficus species (Mkuyu), *Elaeis guineense* (Mchikichi), Citrus species (Mchungwa), *Mangifera indica* (Mwembe), *Psidium guajava* (Mpera) and *Syzygium cumini* (Mzambarau).

4.6.2 Fauna

Main fauna reported by locals include small animals such as hares, rats, reptiles, arthropods, butterflies, grasshoppers, ants of various kinds and other insects commonly found in urban areas. Birds seen and reported on site were mainly owls, swallows, pigeons and Marabou Stork (*Leptoptilos crumeniferus*) white – headed vultures with long beak (local name ndege mwarabu). No wild animals reported or observed in the project sites. Only domestic animals i.e., cattle, goats, sheep and poultry were observed and reported by stakeholders.

4.7 Land uses and other features of the project area

Project area is relatively flat. Observation shows that the nature of the top soil is red clay. Kirumba market is located in the urban environment whereby vegetation surround it is largely dominated by planted trees such as palms, pines, eucalyptus, mango trees and grasses. The land uses of the neighboring areas include residential houses, garages, business buildings shops, salon, petty businesses, skip bucket, cargo vehicles parking, mama lishe and offices. The Kirumba Market is located at a surveyed area with mostly planned settlements and paved access roads. The prospective project is linking the three TSCP supported roads which are Pasiansi - Buzuruga road, Sabasaba- Kiseke - Buswelu, Makongoro junction - Mwaloni Kirumba roads. The market is boarded with Mirongo River to east approximately 50M and Lake Victoria to the south about 500m.

4.7 Environmental Baseline Information

4.7.1 Water supply

Water supply and sewerage services in Mwanza City (Ilemela and Nyamagana) is provided by the Mwanza Urban Water supply and Sanitation Authority (MWAUWASA). The core responsibility of MWAUWASA is to supply safe and clean water abstracted from Lake Victoria mainly at Capri-point intake station treated by a modern Capri-point Water Treatment Plant to meet required water

quality standards and distributed through water piped networks to customers in Mwanza City and other designated operational areas such as Kisesa Township.

Due to topographical nature of Mwanza City, MWAUWASA operates about seven (7) booster stations located at different points of the City for pumping safe and clean water from the Treatment Plant to reservoirs (water storage tanks) at elevated or hilly areas in the City. The main booster stations are located at Mabatini, Kona ya Bwiru, and Nyegezi. Water distribution network pipes have now a total length of about 700 km with different pipe sizes ranging from 1.5" to 28". From the water storage tanks, safe and clean water is supplied to customers for consumption through piped networks. Water production stands at 85,000 m^3 per day, but currently the demand amounts to 105,000 m^3 per day on average.

According to National Bureau of Statistics census of 2012 in Tanzania, Mwanza City being the second largest urban centre in Tanzania has a population of approximate 800,000 people. Out of this number, about 73% are in the water service coverage area being served by MWAUWASA. The population includes that for Nyamagana and Ilemela Municipal. MWAUWASA also serves a population of 30,486 Kisesa people in Magu Municipal. Accessibility to water supply services in Ilemela is approximated at 90% in Urban and 30% in Rural.

The proposed project will have a water use permit to obtain water from Lake Victoria for construction activities which can result to the decreased water level if there will be over abstraction. Also, the proposed road construction works may affect water supply infrastructure causing cut-off and water shortages in some areas whereby these infrastructures may need to be relocated. During operation of the proposed market, water shall be obtained from MWAUWASA through the water supply pipes around the area.

4.7.2 Solid waste management

In Ilemela Municipality solid waste collection is done under the public private partnership concept (PPP). The Council has decentralized authority to the mitaa/ward level for all issues concerning tendering contracts on Solid waste management, in this case using the public procurement procedure, interested partners bid for the job.

Currently, there are 43 solid waste management private partners (CBOs & Companies) in 78 (46%) Mitaa which are responsible for street cleansing and solid waste collection from households, shops, markets and any other business premises and take them to the nearest collection point situated in each ward. The estimated solid waste production in municipality is approximately 692 tons per day including all types of wastes from households, industries, commercial areas and market. It is estimated that about 11.2% of the daily solid waste generated i.e. (77.5 tons) is used as recyclable material and animal feed. All hazardous waste such as healthcare infectious wastes are not accounted as municipal wastes because they are managed as a separate stream.

The council has a capacity of collecting 436 (63%) of total waste produced per day in 14 improvised collection points through CBOs and private companies; and due to limited resources; council has a capacity of disposing only 56 (13%) of total waste collected daily by using its own vehicles (1 vehicle). The rest of solid wastes collected 380 tons (87%) are attended by using contracted vehicles. Currently, Ilemela do not possess any final disposal point (land fill) although

there is land set aside for construction of landfill for safe and environmentally friendly treatment of solid and liquid waste. Therefore, the council uses the solid and liquid waste management facilities found in Mwanza City. Moreover, as part of solid waste management also within this unit there are activities of management of 23 cemetery yards allocated in 19 wards, all of them have no offices and not fenced as well as there is no cemetery attendant assigned/employed to take care of these areas as requirement of The Public Health Act No. 1 of 2009.

The proposed project will have a proper solid waste management plan during all phases so that it does not add a burden to the existing challenge.

4.7.3 Sanitation

Ilemela Municipal does not have good waste disposal system; therefore, there are no proper ways of disposing solid and water waste. Very few households have septic tanks and the most common way of disposing human waste is through pit latrines. Moreover, with lack of cesspool emptier and inadequate solid waste dump trucks, over flooding sewage and uncollected garbage pollute the environment of the municipality. However, the 2012 Population and Housing Census Report shows a slight decrease in households with no toilet facility from 12.2 % in 2002 to eight (8.3%) in 2012. Also, the use of traditional pit latrines in Mwanza region decreased from 81.7 % in 2002 to 68.3 % in 2012, while households with flush toilets increased from 3.6 % to 20.8 % in the same period. The status of sanitation in Ilemela MC at the end of 2015 indicates that out of 76,297 about 71,559 households had toilet facilities, equivalent to 93.8% of the total households in the council and 6.2% were households without toilets.

There are sewerage services provided by MWAUWASA sewage management and other liquid waste. The central sewerage system covers only the central part of Mwanza City and a few neighborhoods such as Kirumba and Pasiansi. The wastewater treatment plant located in Ilemela Municipality has a capacity of 7000 m^3/day. During the project implementation, the proponent will ensure that the project does not affect the sewers along the proposed roads and if it happens so, it should be known to ensure proper reallocation and people are made aware. The market shall be connected to the sewer in the area making it easy for wastewater to be managed Also, during construction, the workers will be provided with proper toilet facilities that may temporarily serve them to avoid polluting the environment by open urination and defecation.

4.7.4 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 two (2) to four (4) 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 noise source. The lowest and the highest values were recorded and then compared with local standards, Tanzania Bureau of Standards (TBS) as shown in **Table 13**. The study took place on 30th December, 2022 between 11:30am to 16:20 pm for proposed project areas in Ilemela Municipal Council.

Table 13: Sound Levels Monitoring Data at proposed project site – Kirumba Modern Market and access roads

Date dd/mm/yy	**Location**	**Coordinates** (Degrees)	**Sound level** (dBA) (Accuracy ±3.5 at 94 dBA)		
			Lowest	**Highest**	**Average**
29.12.2022	Furahisha	S02.501892 E32.900451	54.1	54.4	54.3
29.12.2022	Kirumba Kati	S02.501691 E32.899838	56.1	56.4	56.3
29.12.2022	Mwembe sangara	S02.503077 E32.898605	73.9	74.3	74.1
29.12.2022	Kirumba Market Centre	S02.503637 E32.898747	38.2	38.9	38.6
29.12.2022	Bismack street	S02.504284 E32.899110	66.8	67.4	67.1
29.12.2022	Pendeza/KVCC Road	S02.503473 E32896969	69.9	70.1	70.0
Tanzania Standards as per Tanzania Bureau of Standards (TBS) 70 dB(A)					
IFC Noise level Guidelines for Industrial and commercial receptors 70 dB(A)[6]					

Source: Consultant, 2022

4.7.5 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, NO_2 and CO_2 in ppm, PM_{10} in μg/m3, $PM_{2.5}$ in μg/m^3, TVOC in mg/m^3, temperature and humidity in the environmental air. The study took place on 30th December, 2022 between 11:30am to 16:20 pm for proposed Kirumba Market and its access roads. 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 PM_{10} found to range between 8 and 23 μg/m3 and 9 and 26 μg/m^3, respectively. Based on the results, the average $PM_{2.5}$ and PM_{10} 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 14**. The average measured concentrations of Total Volatile Organic Compounds (TVOC), Carbon monoxide (CO) in ppm, Nitrogen dioxide (NO_2) in ppm and Carbon dioxide (CO_2) presented in **Table 14**. All the measured parameters were within the stipulated guidelines, i.e., WHO/IFC 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 due to the construction activities.

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

Table 14: Ambient air quality concentrations measured at the proposed Kirumba market and its access roads

Location	**Coordinates** (Degrees)	**Measured Dust Parameter** ($\mu g/m^3$)		**TVOC** (mg/m^3)	**NO_2** (ppm)	**CO_2** (ppm)	**CO** (ppm)
		$PM_{2.5}$	**PM_{10}**				
Furahisha	S02.501892 E32.900451	8	9	0.12	0.1	395	0.0
Kirumba Kati	S02.501691 E32.899838	13	16	0.0	0.2	332	0.0
Mwembe sangara	S02.503077 E32.898605	23	26	0.13	0.0	390	0.0
Kirumba Market Centre	S02.503637 E32.898747	15	16	0.12	0.0	387	0.0
Bismack street	S02.504284 E32.899110	13	16	0.0	0.1	325	0.0
Pendeza/KVCC Road	S02.503473 E32896969	19	22	0.12	0.2	330	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 of exposure**	**400 - 1000**	**90 ppm for 15 minutes of exposure**

(Source: Consultant, 2022)

4.7.6 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 ±3/3.5% reading ±2°C (at -20°C~+200°C) and ±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 point and the selection of individual testing points included areas where people were working and also ensured to capture the centre of project as shown in **Table 15**. The values were recorded and then compared with meteorological data from Tanzania Meteorological Authority (TMA). The study took place on 29th December, 2022 between 10:30am to 18:20 pm for proposed project areas in Ilemela Municipality.

Table 15: Temperature and Relative Humidity Monitoring Data at proposed Kirumba market and its access roads

Date dd/mm/yy	Location	Coordinates (Degrees)	Temperature (◦F)	Relative Humidity (%)
29.12.2022	Furahisha	S02.501892 E32.900451	26.5	73.8
29.12.2022	Kirumba Kati	S02.501691 E32.899838	25.2	77.8
29.12.2022	Mwembe sangara	S02.503077 E32.898605	24.9	79.9
29.12.2022	Kirumba Market Centre	S02.503637 E32.898747	25.5	80.3
29.12.2022	Bismack street	S02.504284 E32.899110	24.8	79.4
29.12.2022	Pendeza/KVCC Road	S02.503473 E32896969	24.5	79.4

Source: Consultant, 2022

4.7.7 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 (SO_2), 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 – Specification[7] 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 in **Table 16**.

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

Table 16: Findings of Flue gases at proposed Kirumba market and its access roads

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)
29.12.2022	Furahisha	S02.501892 E32.900451	75.40	81.10	20.90	0.00	0.00	1.05	0.00	-5.7
29.12.2022	Kirumba Kati	S02.501691 E32.899838	74.30	79.30	20.90	0.00	0.00	1.05	0.00	5.0
29.12.2022	Mwembe sangara	S02.503077 E32.898605	73.80	76.60	20.90	0.00	0.00	1.05	0.00	-2.8
29.12.2022	Kirumba Market Centre	S02.503637 E32.898747	73.40	75.70	20.90	0.00	0.00	1.05	0.00	-2.3
29.12.2022	Bismack street	S02.504284 E32.899110	73.90	75.40	20.90	0.00	0.00	1.05	0.00	-1.5
29.12.2022	Pendeza/KVCC Road	S02.503473 E32896969	73.20	74.30	20.90	0.00	0.00	1.05	0.00	-1.1
Tanzania Bureau of Standards (TBS) Limits			**-**	**-**	**-**	**0.01**	**0.00012**	**0.00012**	**0.0005**	

Source: Primary data/Consultant, 2022

4.14.8 Ground Vibrations

Ground vibrations were measured at 6 locations of the proposed Kirumba Market and its access roads 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 ±5% ±2 digits, acceleration of 1-199.9 m/s^2, 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 levels were 1.05 mm/s at the proposed Kirumba Market and its access roads (**Table 17**). The proposed project has the potential to increase the ground vibration levels from its construction activities like movements of heavy equipment and trucks, etc. and later when the road starts operating.

Table 17: Ground vibrations levels along the proposed Buswelu – Busenga – Cocacola Road

Location	**Coordinates** (Degrees)	**Ground vibrations** (mm/s)
Furahisha	S02.501892 E32.900451	1.1
Kirumba Kati	S02.501691 E32.899838	1.0
Mwembe sangara	S02.503077 E32.898605	0.9
Kirumba Market Centre	S02.503637 E32.898747	1.0
Bismack street	S02.504284 E32.899110	1.2

Pendeza/KVCC Road	S02.503473 E32896969	1.1
Average		1.05
Environmental Management (Standards for the Control of Noise and Vibrations Pollution) Regulations, 2015		**5 mm/s PPV at all times**

(Source: Consultant, 2022)

CHAPTER FIVE

STAKEHOLDER CONSULTATIONS AND PUBLIC INVOLVEMENT

5.1 Overview

The process of stakeholders' disclosure and consultation is an ongoing overarching requirement that applies to the entire ESIA process. The consultation was of critical importance in gaining insights into the key environmental and social issues, concerns of communities and other stakeholders, and in aiding the development of potential strategies for addressing these impacts.

The consultant recognizes the importance of stakeholders' consultation, participation and disclosure during the life of the construction of new market of Kirumba and its access road in Ilemela Municipal.

Effective consultation with stakeholders is;

- Key to understanding the concerns and requirements of affected communities and ensure their participation in the formulation and refinement of the project design.
- A prerequisite for sustainable development of the market.

Effective disclosure through the release of timely accurate and comprehensive information to stakeholders is essential to ensure that the likely impacts (both positive and negative) are understood by stakeholders and allow the stakeholders to provide feedback to the project.

It also enables the consultant in;

- Determining the scope of the ESIA
- Deriving specialist knowledge about the site
- Evaluating relative significance of the likely impacts
- Improve project design and, thereby, minimize conflicts and delays in implementation;
- Proposing mitigation measures
- Ensuring that the ESIA report is objective, truthful and compete
- Facilitate the development of appropriate and acceptable entitlement options;
- Increase long term project sustainability and ownership;
- Reduce problems of institutional coordination;
- Make the resettlement process transparent; and
- Increase the effectiveness and sustainability of income restoration strategies, and improve coping mechanisms.
- Monitoring any conditions of the development agreement

5.2 Legal Requirement

The Environmental Management Act of 2004 requires that all ESIA Studies undertake Public Consultation as part of the study. The aim of the Public Consultation and Disclosure is to ensure that all stakeholders interested in a proposed project (including project beneficiaries and the general public in the vicinity of the proposed project) be identified and their opinions considered during project planning, design, construction, and operation and decommission phases. In compliance to the requirements of the regulations, the consulting team conducted Public Consultation starting with Ilemela Municipal Council Officers, Ward Executive Officers in respective wards, Counselors and community members in the whole project areas.

5.3 Methodology and Data Collection

The public consultation for the proposed project was conducted simultaneously with the field work targeting the various groups of stakeholders. The consultations were conducted through use of questionnaire and public forums. The consultants developed several formats of questionnaires/checklists to target the various groups of stakeholders which included the community members (elders, youth, and women), the local administration and ward and mitaa executive officers.

The key stakeholders were interviewed through holding consultative discussions and administration of questionnaires. Samples of questionnaires administered are annexed to this report. Consultation of community members was done at communal level. List of names of all those consulted is also annexed to the report. The household interviews were conducted inform of socio-economic survey by data Enumerators. The interviewers also targeted the general public residing in the vicinity of the proposed market square to be updated on the construction. Data collected during the public consultation included data on the particulars of the community members and their opinion on the proposed project.

Public forums were also held with the assistance of the local leaders in several areas within the proposed project areas. The agenda of the meetings were divided into five main sections namely:

- Project Introduction
- Questions and discussion sessions
- Project Socio-Economic and Environmental Impact Discussions
- Questions and discussion sessions
- Closing of the meeting

First section namely project description was conducted by the experts who introduced the proposed project stating its aim, components, area covered and locations as described in the Terms of Reference. After the project introduction phase, the community members were given a chance to comment on the proposed project. The socio-economic survey was conducted by data enumerators through the use of predefined questionnaires targeting the various groups including the would-be PAPs, women, youth, elders, vulnerable members of the community. The stakeholders were identified and consulted with the objective of understanding the existing socio-economic conditions of the area of influence and the immediate surroundings of the proposed project. The questionnaires were administered in Kiswahili. The responses received from the local community, the local administration and departmental heads from the public consultation and socio-economic survey.

5.4 Stakeholders Consulted

The main stakeholders consulted include the following;

- Ilemela Municipal Council
- Mwanza Urban Water Supply and Sanitation Authority (MWAUWASA)
- TANESCO Mwanza Regional Office
- Tanzania Forest Services Agency (TFS)
- Lake Victoria Basin Water Board (LVBWB)
- Kirumba ward leaders (Ward executive officer)
- Kirumba Kati Mtaa leaders (Mtaa Executive officer)
- Business Men at Kirumba Market (Meeting)

- Kirumba ward Community (**Figure 15**)

Figure 15: Stakeholder meeting at Kirumba area (Source: Fieldwork, January 2022)

5.4.1 Response of Municipal Administrators on the Proposed Project
Consultation at Municipal level included discussions with municipal officers, specialists and other knowledgeable people and key informants were made through interviews.
These consultations were conducted through:

- Presenting the Project;
- Presenting the proposed alternative road (using maps);
- Defining the Regional/District institutional framework;
- Discussing recent experience in the Region/District with respect to compensation eligibility criteria and entitlement packages;
- Obtaining from the authorities their environmental and socio-economic concerns and perceptions regarding the proposed road; and
- Discuss the role of the authorities in public information dissemination, monitoring and management plan.

This section below summarizes the views collected from the key stakeholders in the project area which includes Municipal administrators\ and WEOs.

5.4.2 Results of Consultation with the Public in the Project area
These included Ward and Mitaa leaders and the community living in the vicinity of the project areas, which are mostly likely to be directly affected by the market project. A number of public meetings were held at selected venues. During the field work, the ESIA team took advantage of knowledge of the local people to gather specific knowledge about the project site, such as presence and location of cultural sites, concealed public services/utilities, which are likely to be affected by the project, potential sources of construction materials, which are likely to affect the environment etc.

5.4.3 Consultation with Utility Companies

TANESCO and MWAUWASA were also consulted during this ESIA Study. Typically, the Agenda for these consultations included:

- Presenting the Project:
- Obtaining their environmental and socio-economic concerns and perceptions regarding the proposed project.

The Major issue raised was;

- **Temporary relocation of traders:** Traders at both markets raised the issue that IMC must provide a temporary area which is conducive for their business so that they can still earn their daily bread. It was also stressed that, after construction priority must be given to those who are trading at the markets to rent space into the new market.
- **Waste Management:** Most stakeholders had the opinion that the market can be new, yes, but if waste (especially solid waste) is not handled well, the aesthetic value of the market and surrounding area shall be compromised.
- **Labour issue:** Stakeholders around the market wish the contractor to employ locals especially labourers in order to improve the livelihood of an area

The **Table 18** summarizes the views of all key stakeholders.

Table 18: Stakeholders concerns on the construction of Kirumba market and its access roads

S/N	Stakeholder	Views, Concerns / Questions	Response
Views of the Municipal Director's Office on the proposed TACTIC projects			
1.	**Municipal Director's Office** - Jumanne Maseke (Social Focal Person) - Phinias B. Marcon (Environmental Management Officer) - Juma T. King'ola (Project Coordination Engineer)	• The Municipal Council have made all necessary preparations for the execution of the project. • The local communities are aware of the project as they have been involving them from the beginning) • The proposed subprojects including the markets in line with the master plan. • The land where the proposed subprojects are located belongs to the Municipal Council though relocation and compensation might be needed in some few areas. • All structures currently existing at the market belongs to the Council. • The traders from Kirumba Market will be temporarily relocated to Magomeni area to pave the way for market construction. • The relocation is already selected by Kirumba Market traders themselves. • No any preparations have been made to the temporary site. The traders will construct their own stalls. • They are not aware if a temporary relocation plan is required to guide the traders' temporary relocation process. • They made it clear that, they need Consultant's guidance on this and they are willing to preparing. • The market design is not prepared yet but they think it will be a storey building.	Temporary relocation plan should be prepared by the MC to guide the process and ensure smooth relocation of the traders.
A. Construction of Kirumba Central Market			
2.	**Kirumba Ward, Kirumba Kati Mtaa**	• The ward and Mtaa leaders are aware of the project and the forthcoming temporary relocation.	• The proponent shall ensure that the designs

	- Wessa Juma (Ward Councilor) - Christina B. Mwanilwa (Ag. WEO) - Ally Mbaraka (Mtaa Chairperson) - Hawa J. Kinyaki (Member of Mtaa government Office) - Ramadhani S. Magege (Member of Mtaa government Office)	• Currently, the market is very congested you whereby traders are compelled to share a stall which is very small in size. • Traders are also aware of temporary relocation and they are ready to move to the selected relocation as long as all necessary facilities are provided. • After the completion of the market, the relocated traders (PAPs) should be given a priority in space allocation before the new ones. • The market design should consider the types of business undertaken at the market i.e., space requirements for whole sellers and retailers. • There should be zones for wholesale and retail businesses depending on the type of goods. • The new market should include zones for shops and butchery (they shouldn't be mixed in the same area). • The market committee should be involved accordingly on each stage of project implementation to avoid unnecessary tensions and conflicts between the Committee and the MC, and between the traders and the market committee. • Currently, food vendors (Mama Lishe) do not have a proper place for their business in the market. They are using small tables and are surrounded by other businesses which may cause safety risks resulting from fire outbreaks. • There should be an area for Mama lishe provided with all necessary facilities such as cooking area/stoves, hand wash and cooking utensils cleaning basins etc.	accommodate the needs of the users of the market and the surrounding roads. • The PAPs that were relocated shall be given a priority once the market construction is over.
3.	**Kirumba Market Administration** - Elias Daudi (Market Chairperson) - Steven C. Chapa (Ass. Market Chairperson)	• The market currently is facing a lot of problems including congestion, small size of stalls, lack of zoning, very narrow walkways, flooding during rainy season. • The Market committee and the traders are aware of the project and the forthcoming temporary relocation as they were consulted and involved in the enumeration and taking photos of traders.	• Once the designs are complete will be presented to all stakeholders including the market leaders and traders

	- Jarufu Swalehe (Market Secretary) - Aron Andrea (Ass. Market Secretary) - Yusuph Manga (Market Security Chairperson) - Jumanne Sankala, Jemackson Johansen, Kebacho Wangwe, Meja Mtibu, Mele Walioba), Joseph Zakayo, Bakari H. Mwengere, Godfrey Mukuba, Musa I. Mohamed and Dominic S. Rubao (Members of Market Committee)	• The traders proposed two relocation sites i.e. Furahisha grounds and Magomeni area but not information which one have been selected. • There are some traders who's their photos were not taken, therefore the list and photos of traders should be presented to the market leaders for inspection before using them in the allocation of space at the relocation site and the new market after its completion. • They want to know when exactly the current market will be demolished and move to the selected site so that they get prepared to avoid the business losses as the traders usually order large stocks of goods. • The market leaders wanted to know who will be responsible for constructing the sheds and other basic facilities at the temporary site for smooth business operations as the traders do not have the capacity to do so. • The market leaders can assist in identification of the traders eligible for allocation of space at the relocation site and the new market after its completion. • The proposed market architectural drawings and maps should be presented to the traders so that, they can give their recommendations to accommodate their business needs. • In the new market there should be a special room for nursing mothers to breast feed their babies and putting them for a nap. • In the market, there are some structures that were constructed by traders in agreement with the municipal council. Some of the traders have completed their contracts and now the stalls belong to the council but there are few who haven't finished the contract hence they may require compensations. • Currently there are people who were allocated with stalls but they are not traders, they lease them to traders with high rents. This shouldn't occur in the relocation site and new market. The stalls should be given to traders only.	and they will be involved on each stage of project. • The issue of relocation site was responded by the Ward Councilor who said that, "Furahisha area was not chosen because the area is also used for other community functions such as public meetings, religious seminars, sports and music bonanza etc. • Magomeni area was selected because of its potentiality in business activities. The area is currently used for football exercises but they were consulted and are willing to move to other grounds such as Furahisha.

4.	**Traders at Kirumba Market** (The Participants List is attached)	• The traders are aware of the project and the forthcoming temporary relocation as they were consulted, enumerated and participated in the exercise of taking photos. • The market currently is facing a lot of problems including congestion, small size of stalls, lack of zoning, very narrow walkways, flooding during rainy season. • The market design should consider the types of business undertaken at the market i.e., space requirements for whole sellers and retailers. • There should be zones for wholesale and retail businesses depending on the type of goods. • The new market should include zones for shops and butchery (they shouldn't be mixed in the same area). • Currently, food vendors (Mama Lishe) do not have a proper place for their business in the market. They are using small tables and are surrounded by other businesses which may cause safety risks resulting from fire outbreaks. • There should be an area for Mama lishe provided with all necessary facilities such as cooking area/stoves, hand wash areas etc. • The current market does not have a dumping area therefore, a new market should consider waste management facilities. • The new market should consider provision of parking area for vehicles bringing goods to the market, motorcycles (bodaboda), tricycles (Bajaj) and wheel barrows and private cars for customers coming to the market. • The walkways should be wide enough to allow smooth passage of people and wheel barrows. • There should be separate ways for motorcycles and tricycles • There are products such as fruits, onions and banana which require large, open and flat area as they are perishable.	The proponent will ensure that all the market is designed and constructed according to the needs of the traders and other users so as to ensure its smooth running.

		• Chicken slaughtering area is should be allocated far from chicken vendors because of the issue of smoke. • Chicken slaughtering area should be provided with waste water system connected to the septic tank for collecting the blood and chicken process water. • There should be an area large enough for processing and selling fresh fish provided with adequate water, cleaning surface, and a waste water system that will accommodate fish process water mixed up with scales without clogging. • All small shops should be allocated in the ground floor • Vegetable zone should be located near to fruit area • The vegetable area should be provided with drainage channels to drain process water from the area. • The new market should include a large number of butchery rooms provided with clean water supply and waste water management system. • There should be adequate shop rooms • The design should consider other businesses such as potato chips, hand crafts, tailoring, dried fish and sardines. • The rents should be reasonable as currently they are paying a rent fee of 9000 Tshs., cleanliness fee of 1000 Tshs. and security fee of 1000 Tshs. per month.	
5.	**MWAUWASA** Eng. Salim Lossindilo (Director of Water Supply and Sanitation - DWSS)	• There are MWAUWASA infrastructures for water supply and sewerage in the proposed project area. • The proposed Kirumba Market can be connected to the sewerage system. • Kirumba area has many infrastructures that may need to be relocated during construction of roads and market too and the implicated cost should be covered by the contractor of the proposed project. • The pipes must be placed in the road sides and not anywhere else.	The proponent shall liaise with the contractor to make sure that all the necessary procedures are followed to avoid any losses or effects to the community that may result from affected

			MWAUWASA infrastructures.
6.	**Lake Victoria Basin Water Board (LVBWB)** • Eng. Renatus Shinhu (Basin Water Director) Batuli Seif (Community Development Officer – CDO)	• The proposed project is beneficial to the city and the country at large. • The proponent shall make sure that the contractor obtains water use/ abstraction permit during the mobilization phase prior construction for water obtained directly from sources. This is necessary because a lot of water is used during construction activities such as compaction in road works which cannot be from MWAUWASA but can be obtained either directly from Lake Victoria by using boozers. • The proponent should ensure people living around the proposed project are aware of the project and its purpose to avoid conflicts that may arise. • Water from MWAUWASA is readily available in all areas hence if the proponent may require connection especially during operation phase, they can all get connected.	The proponent will take necessary actions to ensure permits are obtained on time and the water sources are not affected by the project activities throughout the implementation phase.
6.	**TANESCO - Mwanza Region** Eng. Abdallah Mitenda (Ag. Regional Manager)	• The proposed project will be beneficial since the number of customers will increase and through relocation in some areas TANESCO infrastructures shall be upgraded. • The proposed market will require its own transformer. • There are polls with the reserves of the proposed roads hence may require relocation. The proponent has to bear all the costs for relocation and all works shall be done by the contractor and supervised by TANESCO.	The proponent will make take all these into consideration and work on them accordingly.
7.	**Tanzania Forest Services Agency (TFS)** • Bakari S. Mohamed (Zonal Manager) Thomas Moshi (Assistant Zonal Manager)	• There are no forest reserves in the proposed project area. • Solid waste should be well managed so that no waste is disposed of into the lake or rivers. Where necessary, dustbins and skip buckets should be places along those areas. • Environmental conservation education should be provided among the communities this will make the city upgrade of infrastructures more meaningful.	The environment shall be well conserved by tree and grass planting where necessary and waste from the project activities shall be well managed.

		• Plant trees within the market to provide shade and increase air circulation and ventilation especially during hot seasons. • Plant trees along the road reserves to protect against possible soil erosions resulting from floods during rainy seasons. • There should be stormwater drains along the roads.	

5.5 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 Ilemela 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.

CHAPTER SIX

IMPACT ASSESSMENT AND IDENTIFICATION OF ALTERNATIVES

6.1 Introduction

This section outlines the process of impact identification and assessment of the impacts in each stage of the proposed project. It takes into account all relevant environmental and social risks and impacts of the project. This chapter 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.

6.2 Impact Assessment

Superimposing project elements/activities onto the existing social and environmental natural conditions has identified the potential environmental impacts of the proposed road development. The checklist method used to identify the impacts. Further, the environmental impact matrix method has been adopted to predict impacts of major concern. A key guiding assumption in this study is that the project will be designed, constructed, operated and maintained with due care for safety and environmental matters using current and practical engineering practice and/or Best Available Technology Not Entailing Excess Cost (BATNEEC). The implementation schedule of the mitigation measure summarizes in the Environmental Management Plan (ESMP).

The environmental assessment undertaken in close interact engineering, planning and design team. In this process, environmental impacts evaluated for various alternatives. Several project alternatives considered including that of not implementing the project. The fundamental environmental protection strategy and environmental considerations influencing engineering design incorporated. However, reasonable regard to technological feasibility and economic capability were taken into account. *Inter alia*, the assessment entailed the following:

Collection of Baseline Data

The collection of baseline data was conducted subsequent to defining the scope of the EIA. These data allow the study team to determine whether more detailed information on environmental conditions at the development site and its surroundings are needed, where such information can be obtained, and how. Both primary and secondary data collected. Primary data collected by direct measurement, observations and using semi-structured interviews with respective and targeted parties (as explained in the previous section). Secondary data obtained from various relevant sources of information such as Municipal profiles, wards and streets reports, education and health reports and many other official and non-official documents.

Review of Policies, Legal and Institutional Framework for Environmental Management

This allowed the study team to update and enhance their understanding of National policies, legislation and institutional arrangements for environmental management in Tanzania and relevant international procedures to ascertain the optimal management of impacts.

Impact Identification and Evaluation

The Upgrading of Infrastructure cause a wide range of environmental and social impacts on a number of receptors. The ESIA identify these impacts for the purposes of mitigating the

adverse ones or enhancing the benefits. Impact *identification* is a process designed to ensure that all potentially significant impacts are identified and taken into account in the EIA process. A number of 'tools' are available to assist in impact identification. The simplest, and most frequently used, are *checklists* of impacts, although *matrices*, *network diagrams* and *map overlays* are also commonly used. In this EIA *a matrix* were used.

The matrix consists of a horizontal list of development activities against a vertical list of environmental factors. Thus it identifies impacts by methodically checking each development activity against each environmental consideration to ascertain whether an impact is likely to occur. Taking a step further, the ranking in all phases (mobilization, construction and demobilization/decommissioning) signified the magnitude of each and combined phases. As a result the more the score illustrated the severity the impact the road project or section has. The following factors were used to ascertain the significance of the impacts;

General
-Magnitude
-Extent
-Non-conformity with environmental standards
-Level of public concern
-Social impacts resulting from environmental change
-Scientific and professional evidence concerning:
-Sesource loss/ecological damage
-Negative social impacts
-Foreclosure of land and resource use options
-Environmental loss and deterioration
-Probability and acceptability of risk
-Environmental sensitivity

Ecological
-Reduction in species diversity
-Habitat loss, degradation or fragmentation
-Affecting threatened, rare and endangered species
-Impairment of ecological functions

Social

-Displacement of people
-Human health and safety
-Decline in important local resource
-Loss/gain of valued area
-Disruption of community livelihoods
-Demands on services and infrastructure
-Public concern
-Political concern

The above factors were used to create six criteria which 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 19** describes the ratings used in the Simple Matrix as far as spatial scale is concerned.

Table 19: 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 20** describes the ratings used in the Simple Matrix.

Table 20: Temporal Rating

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

-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. **Table 21** show types of cummulative impacts;

Table 21: Types and Characteristics of Cumulative Impacts

Type	**Characteristic**	**Example**
Time crowding	Frequent and repetitive effects	Forest harvesting exceeds rate of re-growth
Time lags	Delayed effects	Bioaccumulation of mercury
Space crowding	High spatial density of effects	Numerous small mining enterprises on river
Cross-boundary	Effects occur away from the source	Atmospheric pollution and acid rain
Fragmentation	Change in landscape pattern	Fragmentation of habitat by agriculture
Compounding effects	Effects arising from a multiple sources or pathways	Synergistic effect of POPS in humans and rivers
Indirect effects	Secondary effects	Forest areas opened up as a result of new highway
Triggers and thresholds	Fundamental changes in system functioning	Climate change

-Residual Impacts- These are long term impacts which go beyond the lifetime of the project in other words Residual impacts refer to those environmental effects predicted to remain after the application of mitigation suggested by the ESIA i.e. they are non-mitigable.

-Timing- During which phase of the construction is the impact likely to occur. The phases included Mobilization, Construction, Demobilization and Operation.

Identifying Mitigation and Management Options

The options for dealing with identified and predicted impacts were considered after comprehensive evaluation. This enabled the study team to analyze proposed mitigation measures. A wide range of measures have been proposed to prevent, reduce, remedy or compensate for each of the adverse impacts evaluated as being significant. Analysis of the implications of adopting different alternatives was done to assist in clear decision-making.

6.3 Spatial, Institutional and Temporal boundaries

6.3.1 Spatial Boundaries

The spatial dimension encompasses the geographical spread of the impacts regardless of whether they are short term or long term. The spatial scale considers the receptor environmental component and can be local or broader. Following this, three zones of impacts considered:

The core impact zone: This includes the area immediately bordering the project (local). In the case of this project local impacts will include the site of the construction, (borrow areas, quarries and the actual sub projects)
Immediate impact area**:** These are immediate surrounding areas (project wards)
The zone of influence: This includes the wider geographical areas that influenced by this project.

6.3.2 Institutional Boundaries

Institutionally, IMC have the mandate to develop and maintain the urban infrastructures within the Municipality. Its primary function includes the maintenance and development of the infrastructures to support the economic and social development of in the Region. They will also be responsible for addressing the environmental issues posed by the subprojects. The proposed infrastructures will be under the Municipal engineers while solid waste collection and disposal will be under the Municipal health officers.

From the central government line of administration, by virtue of their location, the urban infrastructures to be developed by this project in Ilemela Municipal Council is under the jurisdiction of the Municipal Director.

6.3.3 Temporal Boundaries

Temporal boundaries refer to the lifespan and reversibility of impacts. For example, the impact of construction work for the project may be short-lived, but the presence of this infrastructure may have implications that stretch far into the future. Therefore, some of the impacts that may occur during construction, e.g., noise caused by bulldozers will disappear ESIA as soon as the construction phase completed. The construction period will last for not more than 3 years while the operational phase designed for 20 years unless unforeseen event occurs. Also, for a number of reasons the Government may wish to do one or several decisions. For instance, abandoning a portion of the infrastructure and creating another one or an alternative portion; and diverting the original course and substituting it with a new one. Other measures are expanding the

infrastructure because of several reasons; and if there is a decision for closing the infrastructure permanently then the required activities for decommissioning process will be obligatory.

6.4 Impact Identification

The impacts are categorized into Pre-Construction phase impacts, Construction phase impacts and Operational phase impacts. The main receptors of impacts associated with the anticipated Infrastructure Upgrading include physical resources (hydrology, surface water quality, soils, air quality and noise); ecological resources (vegetation); material assets, public health and safety, aesthetics and landscape.

The following impacts were identified to be likely to occur during pre-construction phase;

Positive Social Impacts during pre-construction phase;

- Job creation and
- Increased income

Negative Social Impacts during pre-construction phase;

- Change of scenery view of the project areas
- Increased generation of dust and air pollution
- Loss of property (shop structures)
- Traffic flow disruption and congestion

Positive Social Impacts during construction phase;

- Benefits to communities resulting from employment

Negative Social Impacts during construction

- Loss of Employment and Income
- Disturbance to traders and community
- Gender Based Violence
- Sexual Exploitation and Abuse
- Population influx
- Overburdened local authority

Negative Environmental Impacts during construction

- Dust pollution
- Noise and Vibrations
- Safety and Health of workers and nearby residents
- Waste management problems during construction
- Construction Vibration
- Soil Erosion
- Loss of definite materials and land degradation
- Impacts due to operation of the asphalt plant and campsite
- Hazardous waste generation

Positive Social Impacts during operational phase;

- Benefits to communities and municipality at large resulting from employment and other economic activities linked to project

- Availability of Conducive space for business
- Improved accessibility and connectivity of the project areas
- Improvements in collection of road surface runoffs
- Increased property and land values around the project areas
- Increase of health and hygiene
- Increased revenue to the IMC and Country as a whole
- Health and safety risks due to fire hazards
- Enhancement of safety and security status of the project areas through the provision of traffic lights, walk ways and road signs
- Hazardous waste generation

Negative Social Impacts during operational phase

- Increased pressure on the Municipal services
- Possibility of Sexual Exploitation and Abuse
- Risks for increase in road accidents

Negative Environmental Impacts during operational phase

- Waste management problems during operations
- Environmental hazards resulting from waste deposition into storm water drains
- Increase in risks for pollution of surface and ground water

Negative Environmental Impacts during Demobilization Phase phase;

- Increased noise, vibration and dust
- Occupational Safety and health risks
- Increased Waste

6.4 Impact Evaluation

Impact assessment and evaluation was done using simple methods (checklists) and procedures (existing structures at local authorities). It is envisaged that the anticipated impacts from development of the infrastructure sub-projects in Ilemela Municipal will be short-term, site specific, confined, reversible and can be managed through the application of a set of mitigation and monitoring measures presented in the Environmental and Social Management Plan (ESMP). The ESMP clearly indicates the institutional responsibilities with regard to implementing mitigation measures, monitoring of the implementation of these mitigation measures and related cost estimates and time horizons. Further, the ESIA has assessed the capacity of the Municipal Council to implement the proposed screening process and mitigation measures. The Council has previous experience with management of environmental and social issues related to construction/ civil works under Ilemela Municipal Council. The interaction between the intended project activities and the different environmental receptors are summarized in a simplified matrix presented in **Table 22**.

6.4.1 Impact Rating

Taking into account the criteria stated in methodology section, A simple matrix with the following ratings was used to determine significance of the identified impacts.

+3 Very high positive impacts
+2 High positive impacts
+1 Minor positive impact

0	No impacts
-1	Minor negative impact
-2	High negative impacts
-3	Very high negative impact

Table 22: Environmental and Social Impacts Matrix for the Proposed Kirumba Market and its access roads

		Impact Rating Criteria					Impact Significance Rating			
S/N	**Environmental parameters/Impacts**	**Spatial Scale**	**Temporal Scale**	**Reversibility**	**Cumulative Effects**	**Residual Impact**	**Mobilization Phase**	**Construction Phase**	**Demobilization Phase**	**Operation and Maintenance**
1.	Benefits to communities resulting from employment	R	MT	R	✓		+1	+3	+1	+2
2.	Loss of business and Income	L	ST	R			0	-3	0	0
3.	Disturbance to traders and community	L	ST	R			0	-3	0	0
4.	Waste management problems	L	MT	R	✓		-1	-2	-1	-3
5.	Dust	L	ST	R	✓		-1	-2	-1	-1
6.	Noise pollution	L	ST	R	✓		-1	-2	-1	-1
7.	Vibrations	L	ST	R			-1	-2	0	0
8.	Safety and Health of workers and nearby residents	L	ST	R	✓		-1	-2	-1	-2
9.	Soil Erosion	L	ST	R				-2	-1	0
10.	Improve health and hygiene	L	LT	R			0	0	0	+3
11.	Availability of Conducive Business Space for rent	R	LT	R	✓		0	0	0	+3
12.	Increased revenue to the IMC	R	LT	R	✓		0	0	0	+3
13.	Health and safety risks due to fire hazards	L	LT	R	✓	✓	-1	-1	-1	-2
14.	Increased pressure on the municipal services	L	MT	R			0	-1	0	-2
15.	Increased storm water	L	ST	R	✓		0	-1	-1	-2
16.	Hazardous waste generation	L	LT	R	✓	✓	-2	-2	-1	-2

Key: Spatial Scale: Local (L), Regional (R), National (N)
Temporal Scale: Short Term (ST), Medium Term (MT), Long Term (LT)
Reversibility: Reversible (R), Irreversible (IR)
Significance: Highly Adverse (-3); Adverse (-2); Mild Adverse (-1); No impact (0); Mild Beneficial (+1); Beneficial (+2); highly Beneficial (+3)

Source: Consultant's Evaluation, 2022

6.5 Impacts Analysis

The team focused on significant positive and negative impacts that were rated +2, +3 and -2, -3 respectively and proposed mitigation measures. The impacts during mobilization were found to be not significant (duration and magnitude) and therefore are not discussed here. The impacts are also analyzed in line with the World Bank environmental and social framework (ESF).

6.6 Significant Impacts during construction phase

Positive Social Impacts

Benefits to communities resulting from employment
The proposed project development will benefit nearby communities and the region at large in terms of employment and creating linkages with local economy by the supply of goods and services during construction. The local people either shall be employed directly by the contractor or indirectly by other businesses linked to it (i.e., selling of food to workers. About 30 people are expected to be employed during this phase.

Negative Social Impacts

Loss of Employment and Income
Currently there are about 120 traders doing business on the existing market. All of them shall be given notice to vacate to pave way for the construction of the proposed new market. Construction phase shall cause loss of employment/business and eventually income to these traders. This market is the source of income and livelihood to more than 120 families. On top of that there are matching guys, taxi drivers and bodaboda drivers who earn their income at the existing market due to availability of readily customers shall suffer during the construction phase of this project.

Disturbance to traders and community
The project shall involve shifting of the existing market to another area which is to be determined in the future. The temporary market might not have some of the services and utilities which are available at the existing market, including paved roads, shades, water supply, toilets, mama lishe etc. This shall cause disturbance to the traders and community that shall use the temporary market during construction phase.

Negative Environmental Impacts

Increased Noise pollution
Construction activities normally generate a lot of noise. Noises will also arise from various construction machinery at site. During construction noise levels are expected to reach 100dBA if not controlled. Most of the deterrent noises shall be confined during the construction period only, which is rather a shorter period compared with the lifetime of the proposed market.

Increased Dust
Construction activities such as transportation and offloading of materials, site clearance, and foundation trench excavation always involve production of a lot of dust. During construction dust levels are expected to be around 0.2ppm if not well controlled.

If not properly controlled, the dust can cause bronchitis to the workers at site and people living/working near the project site.

Construction Vibrations

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.

Waste management problems during construction

Site clearance and construction activities will generate a lot of rubble and spoil soils. The waste generated need adequate haulage facilities and at the right time. Inadequate management of the waste shall create unsightly condition on site. The quantities of wastes expected have been described in earlier Sections of this chapter.

Safety and health risks

Construction of the market will expose the labourers and the general public to bronchial and other respiratory tract diseases. Also, poor use (or not using at all) of the safety gears during construction phase will result into loss of lives or injuries during construction. The incidence rate of water borne diseases such as cholera and diarrhoea will increase if there will be no proper sanitation practices at the construction site. Operation of heavy-duty machines at the site will result into a small significant impact of vibration. This vibration has got no effect to the human health and his/her properties as the machine are not that huge.

Erosion of Cleared Areas

Clearance and excavation work related to construction of the proposed market will expose soils in the project areas which may leave area vulnerable to erosion by surface run-off or wind and create the threat of water turbidity and sediment deposition in nearby storm water drainages and eventually to the water bodies. This situation will exist only for the duration of the construction works before landscaping.

Hazardous waste generation

During construction activities, hazardous waste that may be produced will include medical waste from first aid and spillage of petroleum from vehicles. These may have significant on the health of the workers as well as the people living nearby. These wastes may result to long term health effects such as cancer and short term such as diarrhea and other communicable diseases.

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 of the roads 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.

Population Influx
The proposed project in the city will attract population increase especially in the areas where the project will be carried out. This is because the project will increase employment opportunities as well as opportunities for other income generating activities. The population influx into the areas would also increase pressure on both resources and social services due to increased demand on the services and resources. This may lead to extra demands for resources which might cause conflicts in the community.

Increased Traffic congestion and Road Accidents
Increased traffic congestion during construction and poor road safety measures like absence of diversion (where necessary) during construction and road safety awareness campaigns will result into unnecessary road accidents to people especially schoolchildren and old people.

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.

Risk of SEA/SH in project areas
Female labourers are at risk of SEA/SH while participating in construction works. This can include expectations of sexual favours in return for work favours from supervisors, sexual assault, verbal sexual harassment amongst others. SEA/SH may affect female labourers and perpetrators can also include male supervisors, other male labourers and none project workers. The identification of SEA/SH risks during operation will be considered further as part of the GBV Action Plan.

6.7 Significant Impacts during operational phase

Positive Social Impacts

Benefits to communities resulting from employment
The proposed project development will benefit nearby communities in terms of employment and creating linkages with local economy by the supply of goods and services to the users of the market during operational phase. The local people either shall be employed directly (cleaners, labourers) or indirectly by market users or other businesses linked to it.

Availability of conducive business space for rent
The new market building can accommodate more customers than what the municipality can do at the moment. This is a very good news to people of Ilemela where the there is a problem of business spaces for rent.

Increased revenue to the Municipality and Country as a whole
As discussed earlier, the programme is intending to capacitate Urban Local Government Authorities to implement projects for improving urban physical

infrastructures so as to enhance self-sustainability of LGA through increasing their capacity for revenue collection and proper financial management. The proposed project shall improve revenues to IMC trough increased collection from the new Kirumba Market (Monthly fees from businessmen).

Improved Health and Hygiene
The existing market is outdated and always overcrowded with retail sellers. Hygienically the market is dirty and the situation becomes worse during rainy season when mud can be seen all over the market. The water supply system is also not sufficient for the users of the market. Waste collection system is also very poor since it is done manually. The proposed Kirumba Market shall be a modern market that shall take care all of the above shortcomings. This shall improve the hygiene of the area and improve the health of the sellers and buyers.

Negative Social Impacts

Increased pressure on social services and utilities
The proposed construction of new Kirumba market is expected to accommodate a more people at a time as compared to the number of people that were accommodated by the present market. The increase in the size and people it accommodates has the potential to increase pressure on social services and utilities such as water, electricity, roads etc. The demand may strain the existing service delivery system in one way or the other.

Health and safety risks due to fire hazards
Market structures such as buildings which accommodate many people 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 markets 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.

Negative Environmental Impacts

Increased wastes during operations
This is the Major impact that is associated with Market business. During the operation phase it is expected a lot of solid and liquid wastes will be generated from the activities that will be taking place in the market. Solid waste will mainly comprise of market wastes, garbage, food waste, papers, boxes etc. Liquid waste will mainly consist of wastewater from bathrooms, kitchen, pantry and lavatories. If these wastes are not properly managed, they have the potential to change the aesthetic scenery of the Market and the surrounding areas as well as cause public health problems.

Increased Storm water during operations
The project shall involve rooving of the market building and paving of the open space. This shall reduce the percolation of the rain water to underground. Currently about 40% of the project area is a natural ground is unpaved and therefore allow water to percolate rather that becoming storm water. After construction the whole area shall be roofed/paved and hence 100% of the water shall become storm water. These storm

water if not collected and directed to the proper channels it may cause floods and endanger people's properties and life.

Hazardous waste generation
During the operational phase, hazardous waste that may be produced will include medical waste from first aid and spillage of petroleum from vehicles. These may have significant on the health of the workers as well as the people living nearby. These wastes may result to long term health effects such as cancer and short term such as diarrhea and other communicable diseases.

6.9 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:

6.9.1 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 Kirumba Market and missing all the positive benefits such as Benefits to communities resulting from employment, Improved health and hygiene, Increased Income to IMC etc.

6.9.2 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 IMC, (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

6.9.3 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.

6.9.4 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 market 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).

6.9.5 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

CHAPTER SEVEN

IMPACTS MITIGATION MEASURES

7.1 Introduction

This chapter is devoted to describing measures or interventions that shall be implemented so as to minimize the potential impacts identified in the preceding chapter. Many of the mitigation measures put forward are nothing more than good engineering practice that shall be adhered to during all the project phases.

7.2 Enhancement Measures for Positive Impacts during Construction Phase

7.2.1 Benefits to communities resulting from employment

- The contractor shall be encouraged to employ local, unemployed yet willing to work hard, manpower to the extent viable subject to a maximum of 60% unskilled labour. This will ensure that local people are more benefited out of the project.
- Employment should be on equal opportunities for both gender
- Contractor shall provide on job training
- Local communities shall be encouraged to produce quality goods and services in the shops surrounding the project site

7.3 Mitigation Measures for Impacts during construction phase

7.3.1 Loss of Employment and Income

- IMC shall provide enough space that can accommodate all the existing traders currently doing business at Kirumba Market to be used as a temporary market during construction at Magomeni area.
- Traders at Kirumba market shall be involved in the process of arranging the Magomeni area for the temporary host market
- The existing businessmen at the current market shall be given first priority to rent space in the new proposed Magomeni market area.
- The temporary market shall have ample space for taxi, bajaji and bodaboda.

7.3.2 Disturbance to traders and community

- IMC shall at any cost provide all necessary services (water, toilets etc) at the temporary market
- Early notice shall be given to the public concerning the construction of the new market and where the temporary market shall be located at Magomeni area.

7.3.3 Increased Noise Levels

- Vehicles carrying construction materials shall be restricted during peak hours of the day.
- 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.
- The workforce shall be educated on the issue of maintaining tranquility.

7.3.4 Increased Dust

- Water sprinkling shall be applied to open earth construction areas to reduce dust emission; this will be done twice a week.
- Trucks transporting construction materials shall be covered if the load is dry and prone to dust emissions.
- The construction area shall be fenced by iron sheets; this will prevent the dust at the ground to be picked up by the wind.
- Building under construction shall be covered by hessian net to prevent dust from reaching the neighbouring area

7.3.5 Construction Vibration

- Demolition, earth moving and ground impacting operations shall be phased so as not to occur in the same time period because vibrations are additive.
- Night time activities shall be avoided as people feel more vibrations during night time hours.
- Demolition methods not involving vibration impacts shall be selected
- Vibratory rollers and packers shall be avoided near vibration sensitive areas
- The Earth moving equipment shall be operated as far away from vibration sensitive areas as possible.

7.3.6 Waste management problems during construction

- The contractor shall have adequate facilities for handling the construction waste (i.e., collection points and separation units for hazardous and non-hazardous materials) before transported to dumpsite at Buhongwa.
- Topsoil shall be stock piled and used for reclamation or re-vegetation practice at the site during landscaping.
- Demolition debris shall be sold to recyclers. Other materials shall be reused or recycled.
- Wastewater shall be treated in a septic tank and disposed via soak away system at the Site.
- Permits shall be obtained and NEMC guidelines and regualtions for hazardous wast management shall be followed for proper disposal of hazardous waste such as oils and greases as well as medical waste from first aids.

7.3.7 Safety and health risks

- Appropriate working gear (such as nose, ear mask and clothing) and good construction site management shall be provided as per the health and safety management plan attached as **Appendix VII**.
- 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.
- The contractor may be required to drill a borehole (when and where possible) for obtaining water for construction. This will help to increase quantity of water required for sprinklings and minimization of dust at site
- A well-stocked First Aid kit (administered by medical personnel) shall be maintained at each construction site.
- 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.

7.3.8 Erosion of Cleared Areas

- The contractor shall deliberately re-cover exposed soils with pavements for smooth operations and unpaved area shall be covered with grass to overcome erosion by moving water in the area.
- IMC shall monitor areas of exposed soil during periods of heavy rainfall throughout the remaining construction phase.
- The project site shall be fenced by iron sheets to prevent the effect of wind.
- Proper drainage channels shall be provided to direct water to designated area.

7.3.9 Increased Incidences of Diseases and ill Health

- A safety, health and environment induction course shall be conducted to all 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
- Medical facilities shall be increased at dispensary close to project areas so as to meet the population demand.
- 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 check up to reduce new cases. Hand washing facilities will be provided at site.

7.3.10 Risk of SEA/SH in project areas

- A GBV Action Plan will be drafted, approved and implemented which will include the following:
- 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.
- Map out GBV prevention and response actors at the project level, and the City levels.
- 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.
- Define the GBV measures needed to protect female workers and communities surrounding project areas including the need for Mwanza City Council 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.

7.4 Enhancement Measures for Positive Impacts during Operational Phase

7.4.1 Benefits to communities resulting from employment

- IMC should engage local people for maintenance and cleanliness of the market during operations.

7.4.2 Availability of conducive spaces for business

- The rent shall be affordable.
- Enough parking shall be provided within the project area.
- Adequate and reliable utilities shall be guaranteed.

7.4.3 Increased revenue to the Municipality and Country as a whole

- IMC shall pay all required taxes promptly and on time.
- IMC shall improve and perform all necessary maintenance of the market on timely basis.

7.4.4 Improved Health and Hygiene

- IMC shall employ experienced cleanliness firm to undertake cleanliness of the market premises on daily basis.
- Enough solid waste collection facilities shall be provided.
- Enough toilet rooms shall be provided.

7.5 Mitigation Measures for Impacts during Operation Phase

7.5.1 Increased pressure on social services and utilities

- Alternative measures like use of solar power shall be explored and implemented if found feasible. For instance, use of energy savers bulbs shall be given high priority.
- Consultation with the utility companies to determine their capacity to service the market shall be made and modalities of service delivery shall be established.
- Potentially use of ground water and rain water harvesting will be explored.

7.5.2 Health and safety risks due to fire hazards

- All traders shall be educated about the fire hazards, firefighting methods and precautionary measures against fire outbreak.
- 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 the market shall strictly adhere to the Fire Safety Standards.
- Fire escape routes have been conveniently located for ease of evacuation in case of emergencies.
- A clearly marked emergency assembly point shall be provided at Kirumba open space just adjacent the project area.
- A health and safety management plan is attached as **Appendix VII** to guide all safety features.

7.5.3 Increased wastes during operations

- A large refuse containers/skip buckets shall be provided.
- The skip bucket shall be emptied at the authorized dumpsite at Buhongwa. Collection and disposal will be the responsibility of the IMC.
- All liquid wastes shall be directed to the Septic Tank and disposed into the land via Soak away Pit.

7.5.4 Increased Storm water during operations

- The project shall involve construction of storm water drains all around the market to intercept water from the inside and outside.
- The storm drain shall direct water to the main channel along Sokoni Road.
- The storm drains shall be cleaned on weekly basis.

CHAPTER EIGHT

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

8.1 Impact Management plan

Plans for the implementation of mitigation measures for the proposed project are provided below. The Plans indicate institutional responsibilities, time to take the action and estimated costs. The proposed costs are only indicative, should the proposed development proceed with the suggested changes, 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 23** IMC 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 IMC Management. During the Operation Phase, IMC Management will manage the market and will implement the ESMP.

8.3 Environmental and Social Cost

The principal environmental and social cost includes the cost for implementing the mitigation measures proposed. These costs are indicated in **Table 23** IMC shall cover all the costs proposed in the ESMP.

Table 23: Environmental and Social Management Plan (ESMP) for the Proposed construction of Kirumba Market and its access roads

Identified Impact	Mitigation Measure	Responsible Institution	Time of mitigation	Relative Annual cost (TZS)
Construction Phase				
Loss of Employment and Income	○ Traders were given a rental holiday of three months to enable them find other areas of their choice for temporary relocation. ○ IMC shall provide enough space that can accommodate all the existing traders currently doing business at Kirumba Market to be used as a temporary market during construction. ○ Traders at Kirumba market were involved in the process of selecting area for the temporary market at Magomeni ○ The IMC should make all necessary preparation of the temporary site before relocating the traders to the area e.g., toilet facilities, water supply, electricity and a large shed for vegetables, fruits, tubers and other goods sold on the tables or stalls. ○ The existing traders at the current market shall be given first priority to rent space in the new proposed Kirumba market ○ The temporary market shall have ample space for taxi, bajaji and bodaboda	Ilemela Municipal Council	Construction phase	20,000,000
Disturbance to traders and community	○ IMC shall provide all necessary services (water, toilets etc) at the temporary market ○ Early notice shall be given to the public concerning the construction of the new market and where the temporary market shall be located.	Ilemela Municipal Council	Construction phase	4,000,000
Increased Noise	○ Vehicles carrying construction materials shall be restricted during peak hours of the day. ○ 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. ○ The workforce shall be educated on the issue of maintaining tranquillity	Ilemela Municipal Council	Construction phase	5,000,000
Increased Dust	○ Water sprinkling shall be applied to open earth construction areas to reduce dust emission. ○ Trucks transporting construction materials shall be covered if the load is dry and prone to dust emissions.	Ilemela Municipal Council	Construction phase	7,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of mitigation	Relative Annual cost (TZS)
	○ The construction area shall be fenced by iron sheets; this will prevent the dust at the ground to be picked up by the wind. ○ Building shall be covered by hessian net to prevent dust from reaching the neighbouring area			
Construction Vibration	○ Earth moving and ground impacting operations shall be phased so as not to occur in the same time period because vibrations are additive. ○ Night time activities shall be avoided as people feel more vibrations during night time hours. ○ Demolition methods not involving impact shall be selected ○ Vibratory rollers and packers shall be avoided near sensitive areas ○ The Earth moving equipment shall be operated as far away from vibration sensitive areas as possible	Ilemela Municipal Council	Construction phase	8,000,000
Waste management problems during construction	○ The contractor shall have adequate facilities for handling the construction waste. At least 1 skip bucket shall be provided. ○ Topsoil shall be stock piled and used for reclamation or re-vegetation practice at the site during landscaping. ○ Demolition debris shall be sold to recyclers. Other block materials shall be reused or recycled. ○ Wastewater from toilets shall be treated in the properly designed temporary septic tank before discharged into the soak away pit.	Ilemela Municipal Council	Construction Phase	8,000,000
Safety and Health risks	○ Appropriate working gear (such as nose, ear mask and clothing) and good construction site management shall be provided. ○ 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 first aider) shall be maintained at each construction site. ○ The first aider shall also be responsible for primary treatment of ailments and other minor medical cases as well as providing some health education to the workforce. ○ An emergency response and preparedness plan shall be developed and adhered to	Ilemela Municipal Council	Construction phase	8,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of mitigation	Relative Annual cost (TZS)
Erosion of Cleared Areas	○ The contractor shall deliberately re-cover exposed soils with pavements for smooth operations and unpaved area shall be covered with grass to overcome erosion by moving water in the area. ○ IMC shall monitor areas of exposed soil during periods of heavy rainfall throughout the remaining construction phase. ○ The project site shall be fenced by iron sheets to prevent the effect of wind ○ Proper drainage channels shall be provided to direct water to designated area	Ilemela Municipal Council	Construction phase	6,000,000
Operational Phase				
Increased pressure on social services and utilities	○ Alternative measures like use of solar power shall be explored and implemented if found feasible. For instance, use of energy savers bulbs shall be given high priority ○ Potential of using ground water and rain water for water supply shall be explored ○ Consultation with the utility companies to determine their capacity to service the market shall be made and modalities of service delivery shall be established	Ilemela Municipal Council	Operation phase	7,000,000
Health and safety risks due to fire hazards	○ 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 the office building shall strictly adhere to the Fire Safety Standards	Ilemela Municipal Council	Operation phase	6,000,000
Increased wastes during operations	○ A private cleanliness firm with adequate number of staff shall be commissioned to clean the market daily. ○ A large skip bucket shall be provided at a strategic area to collect all the waste from the market and premises ○ The skip bucket shall be emptied by Municipal truck to the authorised dumpsite at Buhongwa ○ All liquid wastes shall be treated in the septic tank before being discharged into the land via Soak away pit	Ilemela Municipal Council	Operation phase	6,000,000
Increased Storm water during operations	○ The project shall involve construction of storm water drains all around the market to intercept water from the inside and outside ○ The storm drain shall direct water to the main channel along Mirongo river ○ There will be internal drainages to convey the storm flow toward the external drainage system which will further be connected with the existing drainage system	Ilemela Municipal Council	Design, Construction and operation phase	7,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of mitigation	Relative Annual cost (TZS)
Increased sexual harassment due to high interaction among market users	○ The IMC will strengthen the existing grievance redress mechanism to ensure that all concerns related to high interaction of people at the market are addressed ○ The IMC will encourage market traders and users to make use of police where necessary to reduce concerns related to high interaction	Ilemela Municipal Council	Operation phase	7,000,000
Total cost of mitigation measure (TZS)				**99,000,000**

Source: Consultant's Analysis, 2022

CHAPTER NINE

ENVIRONMENTAL AND SOCIAL MONITORIG PLAN

9.1 Environmental and Social Monitoring

Monitoring of the anticipated environmental and social impacts in the receiving environments is important. It helps in determining the effects of the project activities on the environments enhancing understanding of cause effect relationships between human activities and environmental changes, and verifies the accuracy of prediction about the environmental impacts. It ensures compliance with regulatory measures and understanding the degree of implementation of ESPM and its effectiveness. The monitoring results are also used extensively during the environmental auditing.

The Tanzanian ESIA regulations require the developer to prepare and undertake monitoring plan and regular auditing. Monitoring is needed to check if and to what extent the impacts are mitigated, benefits enhanced and new problems addressed. Recommendations for monitoring have been included in the ESMP (**Table 24)**. It is the duty of Ilemela Municipal Council's responsibility to carryout implementation of monitoring activities. However, the divisional/ward/village environmental committees and supervisory consultant will participate in the long-term daily monitoring of the Kirumba Market especially during operation.

Monitoring Parameters

The selection of the parameters to be monitored is based on the high likelihood of occurrences of the selected parameters. Monitoring of these parameters will be done in various stages of the project as follows;

- *Pre construction stage* – Monitoring of the parameters at this stage is meant to establish the baseline information of the target parameters in the project area.
- *Construction stage* - Monitoring at this stage is meant to establish the pollution levels that arise from the construction activities.
- *Operation stage* - Monitoring at this stage is meant to check on the impacts that might arise as the result of normal use of the infrastructure.
- *Decommissioning* - Decommissioning is not anticipated in the foreseeable future. However, if this will happen, may entail change of use (functional changes) or demolition triggered by change of land use.

Table 24: Environmental and Social Monitoring Plan for the Proposed construction of Kirumba Market and its access roads

Environmental Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility for monitoring	Annual costs estimate (Tshs.)
Pre-construction Phase (For Baseline Data)								
Air Quality	Dust (PM_{10})	Once, before construction	Project site	mg/m^3	*Micro-dust Pro (TZS 837 Part 3)*	<250	Ilemela Municipal Council	4,000,000
Noise Baseline	Noise level	Once, before and after construction	Project site	dBA	*Noise Level Meter*	<55 (Day Time) <45(Night Time)	Ilemela Municipal Council	5,000,000
Provision of adequate temporary space to be used as a market	Enough space with all utilities	Once, before and after construction	Temporary area	-	Observations	-Large area -Electricity -Toilets -Water supply	Ilemela Municipal Council	4,000,000
Construction Phase								
Air Quality	Dust (PM_{10})	Once in 3 months	Project site	mg/m^3	*Micro-dust Pro (TZS 837 Part 3)*	<250	Ilemela Municipal Council	4,000,000
Noise pollution	Noise level	Once in 3 months	Project site	dBA	*Noise Level Meter*	<55 (Day Time) <45(Night Time)		4,000,000
Waste Management	Solid and Liquid waste collection facilities	Once a week	Project site	No of Skip Buckets and Number of Septic tanks and Soak away pits	Observations	2 Skip buckets 2 septic tank and Soak away	Ilemela Municipal Council	5,000,000
Job Creation and Increased Income	Percentage of local construction laborers	Twice a year	Project site	Number of local people employed in the project	Records, inquiries and observation	>50	Ilemela Municipal Council	6,000,000
Safety and health risks	Number and type of safety equipment such as mask, helmet gloves and ear plugs.	Twice a year	Project site	Number of safety measures provided	Records, injuries and inspection	PPE for every worker	Ilemela Municipal Council	6,000,000

Environmental Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility for monitoring	Annual costs estimate (Tshs.)
	Health and sanitation facilities in site.							
Operation stage								
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	No fire outbreak	Ilemela Municipal Council	6,000,000
Waste Management	Solid and Liquid waste	Once a week	Project site	Presence of 2 skip buckets and a well performing septic tank system	Observations	Premises are very clean	Ilemela Municipal Council	6,000,000
Total monitoring costs								**50,000,000**

Source: Consultant's Analysis, 2022

9.2 Grievances Redress Procedures

As part of the Environmental and Social Monitoring Plan, the project will establish or strengthen the GRM mechanism at the Ilemela Municipal Council which will be adopted by the contractor undertaking the construction of Kirumba Market and its access roads. This is the response to one of the concerns raised during stakeholder consultation.

9.2.1 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.

9.2.2 Principles

A functional GRM has to be established and/or strengthened at Ilemela 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.

9.2.3 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 more simple 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 compliant 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 Ilemela project implementing level or PIU at PO-RALG, the complainant will be advised of their right to legal recourse.

CHAPTER TEN

COST BENEFIT ANALYSIS OF THE PROJECT

10.1 Introduction

This chapter presents the cost benefit analysis (CBA) of the proposed Kirumba market and its access roads to be built at Ilemela Municipal Council. The estimation of cost benefit analysis reflects 20 years of the project design period. The details are not disclosed since they are still confidential in accordance to the Tanzania Procurement Act that prevents a detailed cost benefits analysis to be undertaken before tendering process. For that case, presented costs in this section are indicative and elementary qualitative description of the costs and benefits. The total operation cost have considered the indicative costs for implementation of mitigation measures as well as the cost of monitoring. The total cost of the project is **4.6 billion** TZS.

10.2 Benefits related to the project

Benefits from the proposed Kirumba market can be classified as direct benefits and indirect benefits to the IMC, neighbour and the government at large. However, primary benefits of this project is further classified as direct benefits and indirect benefits. Market construction projects may generate negative benefits though; they are usually minimal compared to the positive benefits. Some of those impacts are non- quantifiable thus cannot be used in the benefit-cost analysis estimations. Generally, the benefits of the project is experienced in all phases from mobilization, construction, operation to decommissioning phase. To mention few, employment opportunities and public benefits will occur during both the construction and the operation phases. 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.

10.2.1 Direct benefits

The proposed project will create many job opportunities, good aesthetic view, good environments for market users, entrepreneurial opportunities to the surrounding community as well as increase the number of traders in the market. Most of the non-quantifiable impacts are directly benefits to the project receptors.

10.2.2 Indirect Benefits

Indirect benefits from a proposed project mainly include increase in government revenue through different sectors like; TANESCO, MWAUWASA, IMC, TRA etc. cultural interactions, infrastructural development, and economic growth. But since the construction project requires inputs from other sectors to produce this output, and the other sectors subsequently require inputs themselves, there will be multiple rounds of interaction among the sectors resulting in additional output from each sector of the economy.

Benefits to Ilemela Municipal Council

The proposed project has positive impacts to IMC since its benefit is a lifetime process throughout the project life span (20 years). The completion of these projects will be one of the pooling factor for increased traders and users of the market thus in monetary cost its value has potential to increase annually. IMC financial capacity and sustainability are going to improve by far. Further, the improved financial standing is not only going to promote enrolment but also good governance and efficient running of the Municipal. The project will also have several intangible benefits to IMC which will lead to improving the IMC's image.

Benefit to the Neighbourhood

The proposed construction of Kirumba market and its access roads meant to increase the capacity of IMC in infrastructure for provision of public services. This improvement may lead to the increase in staff requirement that is technical and administrators. During and after construction phase the project is going to provide additional employment opportunities for people surrounding Kirumba market area related to operation and maintenance. However, non-skilled labourers will benefit from the daily wages. Business opportunities will be supporting government initiatives to create employment opportunities for Tanzanians as advocated by the current Government. Notwithstanding that now salaries are yet to be specified, it is envisaged that from employment, workers will get incomes, which will improve quality of their lives and perhaps improve their lifestyles. However, employment opportunities and income from salaries provided will extend beyond the workers and benefits many other people including dependants.

Moreover, employment opportunities and the benefits therein will depend on whether suitably qualified local personnel that can take up positions are available. Capacity building therefore is a prerequisite for these benefits to be realized. Alongside capacity building, there shall be a need for putting in place deliberate policies that would compel contractors of the market in Kirumba to employ local labour with the requisite skills and experience. In addition, the project will also have following economic and social benefits:

- Utilization of locally available resources;
- Revenue to the Government will increase through payment of the various taxes (indirect and direct).
- Boosting the infrastructure and economy of the country and Ilemela Municipality in particular Kirumba in which the project is located.

10.2.3 Benefit to the Government

The project will benefit the government in different aspects. These includes budget saving due to the relatively decrease in IMC financial dependence on the government. It is anticipated that during the operation phase the project will improve Ilemela Municipal Council financial capacity and sustainability resulting from project earnings. For that case, the government will have the opportunity to use the share of the budget which was supposed to go to IMC for other government development plans. Further the ability of IMC in contributing towards the realization of National Policies such as provision of better social services to its citizens is going to increase. The increase in the number of traders at Kirumba market mean the increase in financial capacity of the IMC.

10.3 Costs related to the project

The estimated costs for implementing enhancement measures, impact management as well as monitoring process as outlined in earlier chapters sum up to **TSH 149,000,000** could not be accurately calculated. 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. The construction costs for all the projects are detailed in Bills of Quantities.

10.3.1 Costs to community

The resulting negative environmental and social impacts such as noise, impairment of air quality, and Safety and health risks due to project activities will be absorbed by the surrounding communities. However, the introduction of mitigation measures will reduce the anticipated impacts. Apart from the above, no any community activities will be disrupted. IMC is committed to mitigate the negative social and environmental impacts.

10.3.2 Costs to Government

The Government of the United Republic of Tanzania through the PORALG has secured fund from World Bank to implement TACTIC project in selected municipalities and cities. As already mentioned, the Government will directly and indirectly benefit from taxes generated during both phases of the project. Apart from tax generation, the investment will also enhance the economic growth, enhancement of industrialization and businesses.

10.3.3 Environmental Cost

Environmental cost benefit analysis is assessed in terms of the negative and positive impacts. Furthermore, the analysis is considering whether the impacts are mitigatable and the costs of mitigating the impacts are reasonable. The total cost for the mitigation of identified impacts and monitoring will be **TSH 99,000,000** and **TSH 50,000,000** per year, respectively.

10.4 Project cost benefit analysis

As it has been mentioned in earlier chapters, the potential benefits of the project, in terms of financial and social benefit are substantial. The environmental impacts are reasonably mitigatable and the financial resources needed to mitigate negative impacts, when compared to the required investment are relatively small. However, the benefit cost ratio concluded the project to have more benefits compared to the total cost of the project, this implies that the project is viable and the proponent is encouraged to develop it.

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 proponent prior to the decommissioning works. Should it occur, 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 Deccommissioning Plan which merely sheds some light on 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 project components on the site incase it happens. 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 Components to be Demolished

The project components to be demolished shall generally be constructed with load bearing masonry walls with steel or timber framed roofs and metal roofs.

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 methods 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.
- The 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 done by mechanical plant (including excavators and wheel loaders) loaded into trucks (bogie tippers and semi trailers). The debris will be hauled offsite to an approved waste facility or recycling centre.

The contractor shall submit a Demolition Waste Management Plan to IMC, which outlines the objectives of:

- Maximisation, reuse and recycling of demolition materials
- Minimisation of waste disposal
- Evidence of implementation for specified arrangements of waste management

Reusable materials will be stored at the 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 first. Service amenities will then be removed including air conditioning, pipework and conduits. The facades will be removed where necessary and the structure will then be demolished using the larger plants 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. Scaffolding will be erected to facades where materials could fall in excess of 4m. The scaffolding will be clad with chainwire and shadecloth to enclose debris and dust onto the site. During the demolition, dust control measures will be used to minimise the spread of dust from the 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 deccommissioning 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 measures 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 pertaining to demolition works will be provided by the Contractor prior to the commencement of the work.

11.3 Potential Impacts and Mitigation Measures

11.3.1 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

i. Water sprinkling shall be applied to open earth to reduce dust emission;
ii. Trucks transporting construction materials shall be covered if the load is dry and prone to dust emissions;
iii. The demolition area shall be fenced with iron sheets; this will prevent the dust at the ground to be picked up by the wind;
iv. Public notifications shall be posted where appropriate especially in nearby residential areas likely to be impacted by dust;
v. Construction equipment, with noise sinks, shall be used;
vi. Machine operators in various sections with significant noise levels shall be provided with noise protective gear; and
vii. Construction equipment shall be selected, operated and maintained to minimize noise.

11.3.2 Increased Waste

A lot of demolition waste is expected to be generated as a result of demolition of buildings. These shall include blocks, concrete, reinforcements, pipes, etc. Most of the building materials shall be salvaged and recycled.

Mitigation Measures

i. All materials which can be reused shall be reused;
ii. Materials that cannot be reused shall be sent to an authorised dumpsite.

11.3.3 Loss of Employment

Many people shall suffer loss of employment if it happens that the market has to be decommissioned, including traders, buyers, service providers, security guards, cleaners, etc.

Mitigation Measures

i. Prior notice shall be given to all those who are going to be affected;
ii. Credit and Savings account shall be established; and,
iii. Proper compensation shall be given to those who deserve it.

CHAPTER TWELVE

SUMMARY AND CONCLUSION

10.1 Summary

The ESIA study results show that although there are some limited negative environmental implications of the project, the modern Market will have high socio-economic benefits to the people of Ilemela Municipality and Ilemela in totality. The associated negative impacts, to a large extent have been minimized through good engineering design and envisaged construction practices. Specific mitigation measures have been suggested in this report to offset some of the inherent adverse impacts. Implementing these mitigation measures would increase environmental soundness of the project Market.

10.2 Conclusion

It is, therefore, concluded that, implementation of the proposed project will entail no detrimental impacts provided that the recommended mitigation measures are adequately and timely put in place. The identified adverse impacts shall be managed through the proposed mitigation measures and implementation regime laid down in this EIS. IMC is committed in implementing all the recommendations given in the EIS and further carrying out the environmental auditing and monitoring schedules.

REFERENCES

Ilemela Socio Economic Profile (2013/2014)

United Republic of Tanzania (2005), EIA and Audit Regulations

United Republic of Tanzania (1997), Regional and District Act No 9, Dar es salaam , Tanzania.

United Republic of Tanzania (2008), The HIV and AIDS (Prevention and Control) Act, Dar es salaam , Tanzania.

United Republic of Tanzania (1997). National Environmental Policy (1997), Dar es salaam , Tanzania.

United Republic of Tanzania (2003). Construction Industry Policy (2003), Dar es salaam , Tanzania.

United Republic of Tanzania (1995). Land Policy (1995) , Dar es salaam , Tanzania.

United Republic of Tanzania (2000). National Human Settlements Development Policy (2000), Dar es salaam , Tanzania.

United Republic of Tanzania (2002). National Gender Policy (2002), Dar es salaam , Tanzania.

United Republic of Tanzania (1992). Energy Policy (1992), Dar es salaam , Tanzania.

United Republic of Tanzania (2004). Environmental Management Act No. 20 (2004), Cap. 191, Dar es salaam , Tanzania.

United Republic of Tanzania (2009). Water Supply and Sanitation Act No. 12 (2009), Dar es salaam , Tanzania.

United Republic of Tanzania (2007). The Land Act, 1999, Dar es salaam , Tanzania.

United Republic of Tanzania, (2007), The Urban Planning Act, Dar es salaam , Tanzania.

United Republic of Tanzania (2003). Occupational Health and Safety (2003), Dar es salaam , Tanzania.

United Republic of Tanzania (2004). Employment and Labour Relations Act No. 6 (2004), Dar es salaam , Tanzania.

United Republic of Tanzania (2007). Engineers Registration Act and its Amendments 1997, Dar es salaam , Tanzania.

United Republic of Tanzania (1997). The Contractors Registration Act (1997), Dar es salaam , Tanzania.

United Republic of Tanzania (1997). The Architects and Quantity Surveyors Act (1997), Dar es salaam, Tanzania.

United Republic of Tanzania (2009). Public Health Act (2009), Dar es salaam , Tanzania

United Republic of Tanzania (2000). The Tanzania Development Vision (2000), Dar es salaam , Tanzania.

United Republic of Tanzania (2005). Impact Assessment and Auditing Regulations (2005), Dar es salaam , Tanzania.

APPENDICES

Appendix I: Terms of Reference

TERMS OF REFERENCE
ENVIRONMENTAL AND SOCIAL IMPACT ASSESMENT REPORT FOR THE PROPOSED UPGRADING OF KIRUMBA MARKET AND ITS ACCESS ROADS AT KIRUMBA KATI STREET IN KIRUMBA WARD, ILEMELA MUNICIPALITY, IN MWANZA 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 0f 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 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.

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.

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 genetic 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 un-interpreted 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 COUNCIL
(NEMC)

In reply please quote:
Ref: **EC/EIA/2022/6183** **Date: 08/06/2022**

ILEMELA MUNICIPAL COUNCIL,
P.O.Box 735
ILEMELA.

RE: SCOPING REPORT AND TERMS OF REFERENCE (ToR) FOR PROPOSED UPGRADING OF KIRUMBA MARKET AND ITS ACCESS ROADS AT KIRUMBA KATI STREET IN KIRUMBA WARD, ILEMELA DISTRICT, IN MWANZA REGION

Reference is made to the above captioned subject.

2. The National Environment Management Council (NEMC) acknowledges receipt of Terms of Reference (ToR) and Project brief for undertaking an EIA for the above mentioned project.

3. The Terms of Reference have been reviewed and found generally to be adequate and therefore can guide the Environmental and Social Impact Assessment (ESIA) study of the named project. The ESIA report should therefore observe requirements of ESIA and Audit Regulations, 2005 specifically Regulation 51 and 52. Furthermore the following should also be included in the ESIA report:-

i. All key stakeholders are consulted including neighbors and the Local Government Authorities. Their views and concerns should be addressed. Records of meetings, communication and comments should be provided with proof of service. Consultation forms should bear **date** and each consulted stakeholder should **sign** against his/her **name** as the law requires;
ii. Ensure all copies of relevant documents/certificates including the land acquisition process documents showing properties impacted by the project are appended to the report
iii. Compliance status of all applicable legal and policy frameworks and their respective requirement is addressed in the ESIA report.
iv. The EIA report should discuss the management of the hazardous waste i.e used oil;

All correspondence should be addressed to the Director General

4. Upon submission of the ESIA report, the Council will arrange for a technical review of the document by the Cross-sectoral Advisory Committee (AC). Prior to review, representatives of the AC will visit the project area to inspect the site and verify adequacy of the ESIA Report. As you submit the ESIA report you will be required to as well pay to the Council review cost through a control number to be generated by the system.

5. We look forward to your cooperation on this matter.

A. N. Sembeka
***For*: Director General**

Cc: DAR AL HANSADAH

All correspondence should be addressed to the Director General

Appendix III: Certificate of Occupancy

Land Form 51

TANZANIA

CERTIFICATE OF OCCUPANCY

(*Issued under Section 9 of the Land Ordinance*)

Date of Issue:

Title Number: 033060/31

Land Officer Number: 24521.

Land: 68,600 sq.ft., in Block 'AVI' , Mwanza Township.

Term: Ninety-nine years.

Certified True Copy of the Original
Sign: ... Date: 7/31/2022
JANETH CO STANTINE
Advocate, Notary
Public & Commissioner for Oaths

13th March 69.
10.359.
Mbaya

L.O. No.24521.

L.D. No.59973.

Stamp Duty on 2/= Paid
and Levy Receipt No. 064768
25-6-68

CERTIFICATE OF OCCUPANCY

The 10th day of March Asst Mbaya.

One thousand nine hundred and sixty-nine.

Title No. 033060/31.

THIS IS TO CERTIFY that MWANZA TOWN COUNCIL (hereinafter called "the Occupier") is entitled to a 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 years from the First day of October One thousand nine hundred and sixty-eight according to the true intent and meaning of the Land Ordinance and subject to the provisions thereof and to any regulations made thereunder and to any enactment in substitution therefor or amendment thereof and to the following special conditions :-

In this Certificate the Mwanza Town Council is called "the Authority".

1. The Occupier having paid rent up to the thirtieth day of June 1969, shall thereafter pay rent of One thousand and thirty Shillings (Shs.1,030/-) a year in advance on the first day of July in every year of the term without any deduction PROVIDED that the rent may be revised by the Minister for the time being responsible for Lands (hereinafter called "the Minister") on the first day of July in each of the years 1989, 2009, 2029 and 2049 or within five years thereafter in each case.

2. The Occupier shall :-

(i) Erect on the land buildings (hereinafter called "the buildings") to the value of not less than Shs.150,000/- designed for use in accordance with the conditions of the Right and which conform to the building line (if any) decided by the Authority

(ii) By the thirtieth day of March 1969, submit to the Authority such plans for the buildings (including block plans showing the position of the buildings) and such drawings, elevations and specifications of them as will satisfy the Authority and as are in accordance with the building condition in sub-paragraph (i) above which said plans and specifications shall be submitted in triplicate.

Certified True Copy of the Original
Sign: Date: 9/3/2022
JANETH CO STANTINE
Advocate, Notary
Public & Commissioner for Oaths

(iii) Within three months from the date of notification by the Authority of approval of the plans and specifications referred to in sub-paragraph (ii) above begin building on the land in accordance with such plans and specifications;

(iv) Complete the buildings according to the plans and specifications so that they are ready for use and occupation by the thirtieth day of September 1970;

(v) At all times during the term of the Right after the thirtieth day of September 1970, have on the land existing buildings as approved by the Authority to the value of not less than Shs.150,000/- and maintain them in good order and repair to the satisfaction of the Commissioner for Lands (hereinafter called "the Commissioner");

(vi) Not erect or commence to erect on the land any building except in accordance with building plans and specifications which shall have been first approved by the Authority as hereinbefore provided;

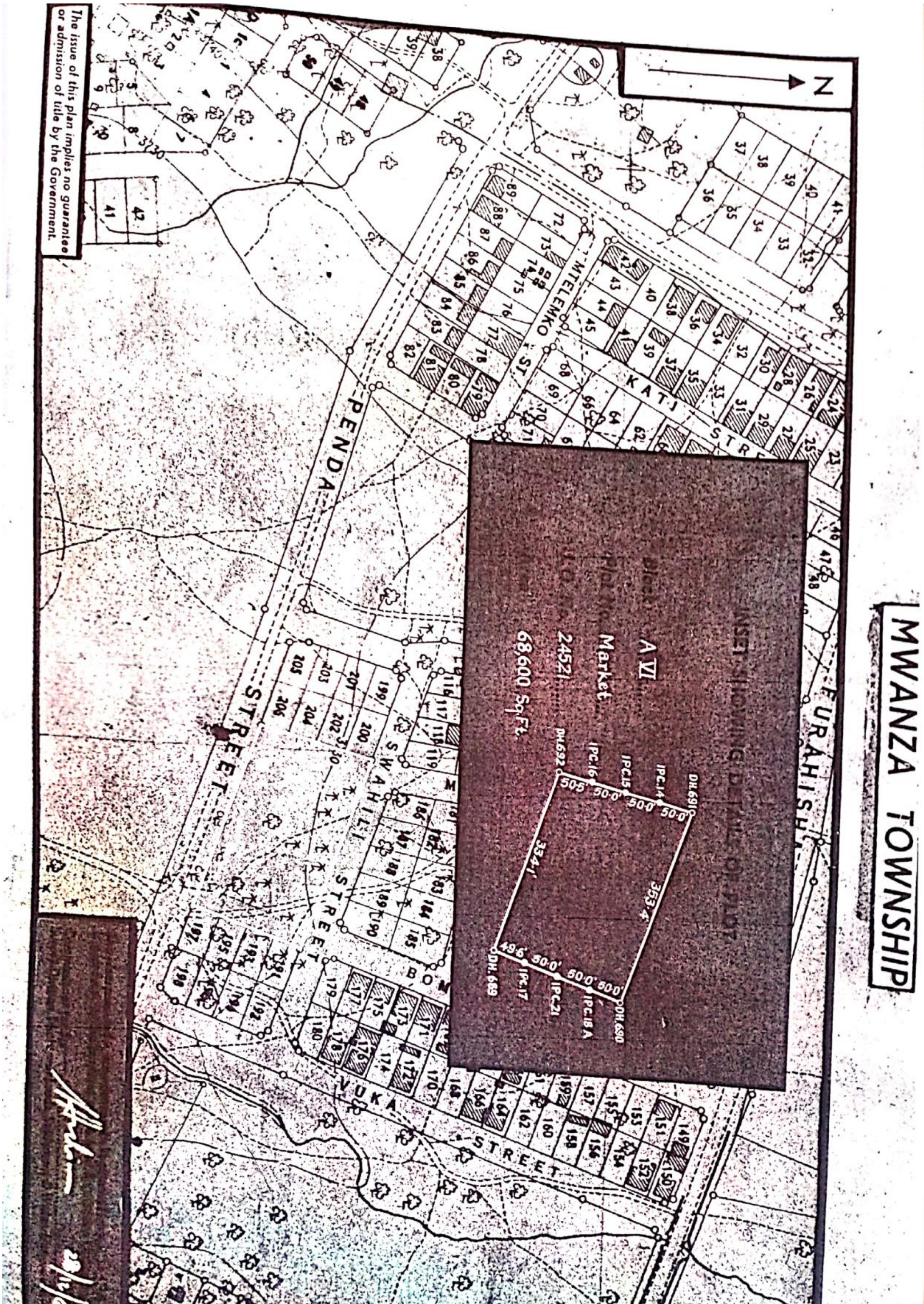
(vii) Be responsible for the protection of all beacons on the land throughout the term of his Right. Missing beacons will have to be re-established at any time at the Occupier's expenses as assessed by the Commissioner for Surveys and Mapping.

Approval of plans of any building by the Authority shall not imply that the construction of such a building will satisfy the Occupier's obligation under the conditions of the Right and shall not imply waiver or modification of any condition in the Right.

3.(i) The Occupier shall not sub-divide the land or assign, sublet or otherwise dispose of or deal with the whole or any part of it or of any building on it without the previous written consent of the Commissioner.

(ii) Occupation or use of the whole or any part of the land or buildings on it by any person other than the Occupier or his employees or agent or contractor shall be deemed a dealing with the land or buildings.

4. The Commissioner shall have an absolute discretion to give or withhold consent under condition 3. Any dealing or agreement (other than a mortgage or charge) entered into before compliance with condition 2(iv) will


MWANZA TOWNSHIP
N
INSET SHOWING DETAILS OF PLOT
A VI
Market
24521
68,600 Sq.Ft.
PENDA STREET
SWAHILI STREET
VUKA STREET
MTELEMKO ST
KATI STREET
The issue of this plan implies no guarantee or admission of title by the Government.

not receive consent except in special circumstances of which the Commissioner shall be the sole judge.

5. The Occupier shall pay to the Minister on demand made by the Commissioner on his behalf :-

(i) any further fees or stamp duties which may be discovered to be payable by him in connection with the Right;

(ii) an amount equal to any contribution in lieu of rates which may be payable by Government for the land during the term of the Right;

(iii) such sum as the Commissioner shall assess as a proper share payable for the land of the cost of making up the road or improvement of same upon which the land fronts, abuts or adjoins whether such demand is made before, during or after such making or improvement thereof. This condition does not oblige the Government to make or improve roads.

6. The land and buildings to be erected thereon shall be used as a Retail Market - Use Group 'E', Use Class (c) as defined in the Town and Country Planning (Use Classes) Regulations, 1960.

7. The land shall be maintained in a clean and tidy condition and the existing trees on the land shall, where possible, be preserved.

8. The President may revoke the Right for good cause.

S C H E D U L E

ALL that land known as Market in Block 'AVI', Kirumba Area, Mwanza Township containing Sixty-eight thousand six hundred (68,600) square feet shown for identification only edged white on the plan attached to this Certificate and defined on registered survey plan numbered 13394 deposited at the Office of the Commissioner for Surveys at Dar es Salaam.

Given under my hand and seal and by Order of the

Minister the day and year first above written.

COMMISSIONER FOR LANDS

The within-named MWANZA TOWN COUNCIL hereby accepts the terms and conditions contained in the foregoing Certificate of Occupancy.

SEALED with the COMMON SEAL of the said MWANZA TOWN COUNCIL and delivered in the presence of us this 25TH day of FEBRUARY 1969.

(Signature) A.M. MAMIZO

(Postal Address) P.O. BOX 1333. MWANZA

(Qualification) CHAIRMAN.

(Signature) A.M. KISSAGA

(Postal Address) P.O. BOX 1333 MWANZA

(Qualification) TOWN CLERK

Certified True Copy of the Original
Sign: Date: 9/3/2022
JANETH CO STANTINE
Advocate, Notary
Public & Commissioner for Oath

Appendix IV: List of Stakeholders Consulted

ORODHA YA WADAU WALIOSHIRIKI KATIKA MAJADILIANO KUHUSU UJENZI NA UBORESHAJI WA MIUNDOMBINU KATIKA MANISPAA YA ILEMELA

STAKEHOLDERS CONSULTATION FOR THE PREPARATION OF ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT, STAKEHOLDER ENGAGEMENT PLAN, RESETTLEMENT ACTION PLAN, LABOR MANAGEMENT PROCEDURES AND DESIGN DRAWINGS OF THE PROPOSED INFRASTRUCTURE CONSTRUCTION IN ILEMELA MUNICIPAL COUNCIL

TAREHE NA MUDA / DATE AND TIME: 13/01/2022 **SIKU/DAY:** THURSDAY

PARTICIPANTS LIST

No	Jina / Name	Cheo / Position	Namba ya Simu / Tel. Number	Anuani ya barua pepe / Email Address	Sahihi / Signature
01	JUMAANNE MASEKE	SOCIAL FOCAL PERSON	0756960106	jumannemaseke@gmail.com	
02	PHINIAS B. MARCON	EMO-ILEMELA MC	0755248479	marcon1123bwire@gmail.com	
03	Juma T. Kingóla	Project Coord. Engineer-IMC	0784231905	thking34juma@gmail.com	

KIRUMBA MARKET

ORODHA YA WADAU WALIOSHIRIKI KATIKA MAJADILIANO KUHUSU UJENZI NA UBORESHAJI WA MIUNDOMBINU KATIKA MANISPAA YA ILEMELA

STAKEHOLDERS CONSULTATION FOR THE PREPARATION OF ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT, STAKEHOLDER ENGAGEMENT PLAN, RESETTLEMENT ACTION PLAN, LABOR MANAGEMENT PROCEDURES AND DESIGN DRAWINGS OF THE PROPOSED INFRASTRUCTURE CONSTRUCTION IN ILEMELA MUNICIPAL COUNCIL

TAREHE NA MUDA / DATE AND TIME: 13/01/2022 **SIKU/DAY:** THURSDAY

PARTICIPANTS LIST

No	Jina / Name	Cheo / Position	Namba ya Simu / Tel. Number	Anuani ya barua pepe / Email Address	Sahihi / Signature
01	WESSA JUMA	MH: DIWANI	0753376899	2641	
02	CHRISTINA-B-NWANILWA	KAIMU WEO	0688707975		
03	JUMAANNE MASEKE	Social Focal Person IMC	0756960106	jumannemaseke@gmail.com	
04	PHINIAS B. MARCON	EMO-ILEMELA MC	0755248479	marcon1123bwire@gmail.com	
05	RAMADHANI S. MAGEGE	MTUMBE MWANZA	0688-460978		
06	JARUFU SWALEHE	KATIBU WA SOKO	0755017557		
07	STEVEN - C - CHAPA	MKIT-MSAIDIZI WA SOKO	0753988209		S: CHAPA.
8	Hawa J. Kinyaki	Mjumbe	0759263472		Hawa
9	YUSUPH MANGA	MKUU UKINZI	0767560115		

KIRUMBA MARKET

10	MARY JOHN	MJUMBE	0755627607		
11	JUMANNE STANISLAUS	MJUMBE	0754895211		
12	ARONI AMBREA	KATIKU MSAMBAZI	0753285254		
13	ESERY KALISA	MJUMBE	0755323642		
14	ALLY MBARAKA	MKITI KATIKE	0767985260		
15	ELIAS DAUDI	MWIKITI WA SOKO	0754246957		
16	JEMACKSON JOHANSEH	MJUMBE	0758779394		
17	KEBANCHO WAMOGWE	MJUMBE	0758220197		
18	Nuja Mtabu	"	0755-477041		
19	MELE WALIOBA	MJUMBE	0764325013		
20	JOSEPH ZAKAYO	MJUMBE	0757920448		
21	BAKARI H. MWENGERE	MJUMBE	0786993133		
22	GODFREY MUKUBA	-"-	0769037357		
23	MUSA I. MOHAMEDI	MJUMBE	0758609198		
24	DOMINIC S RUBAO	MJUMBE	0756549811		

25	RAMADHANI JILLUM	BAJAJI DEREVA	0753536583		
26	Imelda Lawrens	Mfanyabiashara	0755419620		
27	Angelesi tonesti	Mfanyabiashara duka	0757935110		
28	BAHATI P. LYIMO	Mfanyabiashara duka	0787-19606		
29	PASIORY. KAJALA	Mfanyabiashara	0764-520090		
30	AISHA MLIGA	Mamalisho	0768466615		
31	BENEDICTOR. FELX	SAMAKI MFANYABIASHARA	0769277780		
32	SIJAONA MIHAYO	MSUKUMA TOLORI	0745750910		
33	JONAS JAPHATH	Nunua matunda	0757252850		
34	SHABAN SHEDRAK	MBASI	0782978819		
35	WILLIAM M. MAHENYA	KUKU	0757556261		
36	MAMA REYA	MGAHAWA	0756950977		
37	FARAJI - MAJIJI	MCHINJAJI KUKU	0758288622		
38	KOSTANSIA - KOROGO	MEZA	0762550035		
39	Pili Saiji	MGAHAWA	0685057535		

AFISA MTENDAJI
KATA YA KIRUMBA

KIRUMBA MARKET

40	MOSSA SELEMANI	USHONAJI GAMEBI	0765194304		[illegible]
41	YOCKITAN ANDREW	NAFAKA	0748010422		[illegible]
42	Elly [illegible]	MADUKA	0754093903		[illegible]
43	LUCY NKUBA	SAMAKI KAVU	0768709596		LUCY
44	Grace Felix	Samaki Kavu	0746364470		[illegible]
45	ZEHA JUMA	SAMAKI KAVU	0766220831		[illegible]

AFISA MTENDAJI KATA YA KIRUMBA MANISPAA YA ILEMELA

ORODHA YA WADAU WALIOSHIRIKI KATIKA MAJADILIANO KUHUSU UJENZI NA UBORESHAJI WA MIUNDOMBINU KATIKA JIJI LA MWANZA

STAKEHOLDERS CONSULTATION FOR THE PREPARATION OF ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT, STAKEHOLDER ENGAGEMENT PLAN, RESETTLEMENT ACTION PLAN, LABOR MANAGEMENT PROCEDURES AND DESIGN DRAWINGS OF THE PROPOSED UPGRADING OF BUSWELU - BUSENGA - COCA COLA ROAD/MUSOMA ROAD AT IGOMA AND BUSWELU-NYAMADOKE-NYAMHONGOLO ROADS LOCATED AT BUSWELU AND NYAMHONGOLO WARDS, ILEMELA MUNICIPALITY IN MWANZA REGION

TAREHE NA MUDA/ DATE AND TIME: 28/02/2022 SIKU/DAY Wednesday

LIST OF STAKEHOLDERS

S/N	Jina/ Name	Taasisi/ Institution	Cheo/ Position	Namba ya Simu/ Phone No.	Anuani ya barua pepe/ email address	Sahihi/ Signature
1.	Eng. Salim Lossindela	MWAUWASA	DWSS	0756291529	salim.lossindala@mwauwasa.go.tz	[illegible]
2.	Renatus Shinhu	LVBWB	Basin Water Director	0752220142	renatus.shinhu@lvbwb.go.tz	[illegible]
3.	Baruli Seif	LVBWB	CDO	0755 443696	baruliseif2013@gmail.com	[illegible]
4	Eng Abdallah Mitenda	TANESCO	Ag. RM	0714583007	abdallah.mitenda@tanesco.co.tz	[illegible]
5	Bakari Salim Mohamed	Tanzania Forest Services Agency (TFS)	Zonal Manager	0787720566	bakari.mohamed@tfs.go.tz	[illegible]
6.	THOMAS MOSHI	TFS	Asst. Zonal Manager	0754436616	thomasjesse@yahoo.co.uk	[illegible]

Appendix V: Minutes of the meeting with market traders

HALMASHAURI YA MANISPAA YA ILEMELA
MUHTASARI WA KIKAO CHA UJENZI WA SOKO LA KIRUMBA LEO TAREHE 13/01/2022.

AGENDA.

1. KUFUNGUA KIKAO
2. MABORESHO YA SOKO
3. KUFUNGA KIKAO

AGENDA 01: KUFUNGUA KIKAO.

Mwenyekiti amefungua kikao mnamo saa 11:30 Asubuhi Ndugu Wessa Juma kwa kuwashukuru wajumbe wote waliofika kwenye kikao hicho.

AGENDA 02: MABORESHO YA SOKO.

Mwenyekiti aliwajulisha wajumbe kuwa wakati wa ujenzi wa soko lazima kuna faida na hasara na moja ya faida ni kupata sehemu nzuri ya kufanyia biashara pia na hasara ni huwezi kujenga watu wakiwa ndani ya soko hivyo wafanyabiashara wote lazima waondolewe na watafutiwe sehemu ya kufanyia biashara kwa muda wakati wanajenga soko.

Mzee Ally Mbaraka Mwenyekiti wa serikali ya mtaa aliuliza je? amesikia soko la muda litahamia Magomeni ni kweli au siyo kweli?

Mwenyekiti wa soko yeye anaomba azungumzie mambo matatu kwanza hali ya soko ni mbaya halina mpangilio hivyo nashauri kwa soko jipya liwe na mpangilio maalumu kila kundi na sehemu yao. Pia

Anaomba wapangwe anaomba ajue muda ni lini wanaondoka na wanakwenda wapi kwa sababu walipendekeza sehemu mbili (1) Magomeni na (2) Uwanja wa Furahisha kwa hiyo hawaelewi watakwenda wapi.

Pia akaomba wao hawana uwezo wa kufanya maboresho ya mfano Choo na mitaro hivyo anaomba kama marekebisho yatakuwepo wanaomba wasaidiwe.

AFISA MTENDAJI KATA YA KIRUMBA MANISPAA YA ILEMELA

Pia akaomba ushirikishwaji katika uongozi wa soko ili ili kusimamia na uvamizi wa soko ambao siyo wafanyabiashara.

Mjumbe wa soko aliomba waonyeshwe ramani ya soko.

Kaimu Mwenyekiti aliomba wanaohamia sehemu nyingine wawe ni wale wafanyabiashara tu wa soko la Kirumba

Afisa Maendeleo toka Manispaa Ilemela alijibu kuwa wataondoka majibu mpaka upembuzi yakinifu utakapofikiwa au kukamilika kwa matokeo ni takribani miezi minane

Eneo lililopangwa ni Magomeni kwa sababu Uwanja wa Furahisha ni wakufanyia matukio mbalimbali ya kitaifa

Mh. Diwani yeye aliomba waende uwanja wa Magomeni kwa sababu ni sehemu rafiki kwa biashara zao.

Mwenyekiti wa soko aliomba kuwa wafanyabiashara wa Soko la Kirumba ndo wapewe kipaumbele kwanza afu eneo likibaki ndo wapewe kwengine.

Mh. Diwani aliomba ofisi ya mtendaji wa kata ya Kirumba iwepo ndani ya soko la Kirumba litakalojengwa.

Afisa Maendeleo toka Manispaa Ilemela. Alijibu: Kuwa pesa ya Bank kuu haihusiki na kujenga sehemu watakazo hamishiwa wafanyabiashara hilo ni la Mkurugenzi

Mwenyekiti wa soko aliomba ofisi ya soko na chumba cha kubadilishia nguo na kunyonyeshea.

Maswali kutoka kwa wafanyabiashara

- Vyumba vyote vinamilikiwa na Halmashauri

Ndiyo vinamilikiwa na Halmashauri

- Meza zinahitaji fidia

Hapana hawahitaji fidia

Soko la Kirumba lina jumla ya wafanyabiashara 650

* Wafanyabiashara wa Matunda nanasi anaomba soko liwekwe njia za bajaji au gari

* Wafanyabiashara wa Machungwa wanaomba wapewe eneo lao la kushushia matunda ya jumla na sehemu yao ya kuuzia

Godfrey anaomba mitaro itengenezwe kuelekea ziwani dampo nalo liangaliwe

Meja muuzaji wa Vitunguu anaomba waongezewe maeneo ya Vizimba vime vikubwa na siyo vidogo wao wanauza rejareja na Jumla.

Mfanyabiashara wa kuku anaomba mwendombinu iwe rafiki maana machinjio yawe mbali na kizimba cha wauza kuku idadi ya Wako 40

Katibu wa wachinja kuku anaomba watengeneze we machinjio ya kisasa iliyo organishwa na mfumo wa maji taka wakichinja damu iende moja kwa moja

Wabeba Mizigo kelo yao kubwa ni njia pia Paa ni fupi kwa sasa hivyo Wanaomba kafika soko hilo jipya wanaom ba watengenezewe mazingira rafiki na kazi yao ya kubeba mizigo kwe sasa wanapata shida sana.

Wasokuma toroli wanaomba Pakingi pia kuwekewa njia za kupitisha toroli moja kwa moja kwenye meza ya kushusha Mzigo.

Wauza Samaki wabichi na kibambala Shida yao ni meza kwa sasa wana meza saba tu (7) na wako zaidi ya 40 pia mfumo wa maji taka kwa sasa siyo mzuri unasumbua hivyo Wanaomba kuongezewa meza na kube kwa mfumo mzuri utakao kuwa hawasumbui kuzibua mara kwa mara.

Wafanyabiasha wa maduka wanaomba flemu za maduka ziwe Chini kuto kana na uhalisia wa biashara yao huwezi kumpandisha mteja juu kutafuta mahitaji

- Wafanyabiashara nafaka wanaomba wawekwe Sehemu moja Kwa sasa wanachangamoto Kila sehemu nafaka Kwa hiyo kwao ni changamoto.
- Wafanyabiashara wa mbogamboga wanaomba wawekwe karibu na matunda na watengenezewe miundombinu maana mboga zinamajimaji wanapokata.
- Wafanyabiashara wa karoti, ndizi, nyanya, vitunguu, tikiti na matunda wawekwe pamoja.
- Wafanyabiashara wa nyama/bucha anaomba wajengewe mabucha ya kutosha pia miundombinu iwekwe imara
- Wafanyabiashara wa matunda/Maduka anaomba waongezee vyumba vya maduka.
- Wafanyabiashara wa parachichi wanaomba meza zao ziwekwe fuloo ya chini maana wanauza rejareja.
- Mama lishe watengenezewe sehemu rafiki kulingana na biashara yao.
- Mh. Diwani aliwaomba kuwa wasisite tena mara waitwapo tena.

AFISA MTENDAJI
KATA YA KIRUMBA
MANISPAA-IL EMELA

KATIBU
[signature]
CHRISTINA B. MWANILWA
0688 707779

KATA YA KIRUMBA
MANISPAA-IL EMELA

MWENYEKITI
MH: MESSA JUMA
[signature]
13/01/2022.

Appendix VI: Resettlement Action Plan

1. INTRODUCTION

The President's Office, Regional Administration and Local Government (PO-RALG) has received fund from the World Bank to implement the Tanzania Cities Transforming Infrastructure and Competitiveness Project (TACTIC). The project intends to support urban management performance and deliver improved basic infrastructure and services in participating urban local government authorities.

Ilemela Municipal Council (IMC) is among the four (4) beneficiary LGAs under TACTIC Tier 1. Among the three sub-investments projects the council plans to implement is the reconstruction of Kirumba Market with its access roads. This Resettlement Action Plan is prepared to address relocation impacts associated with the reconstruction of Kirumba Market and its access roads the process required to be followed to implement temporary relocation. Social Framework Standards (ESS5) and the TACTIC project's documents including Resettlement Policy Framework (RPF).

1.1 Project Objectives

The main objective of the proposed subprojects investments is to improve urban transport infrastructures, community services and the storm water drainage in the city. Specifically, the proposed sub-investment has the following objective: the envisaged modern Kirumba Market aims to provide high quality, accessible and conducive business environment to Kirumba market vendors and ensure attractive shopping environment to Mwanza City Community.

1.2 Description of the Proposed Sub-investments in the Ilemela Municipal Council

1.2.1 Project Location and Sites

The Kirumba Market is located at Kirumba Kati Street in Kirumba ward. The ward is strategically located and a focal point for business activities in Ilemela District and Mwanza city in general. The surrounding roads to be constructed include: Vuka (0.37Km), Msikitini (0.289Km), Zenze (0.239Km), Bismarck (0.209Km) Furahisha Uwanjani (3.70), KVCC (0.35Km), Mbugani (0.24Km), Kirumba Sokoni (0.883Km) in total making a network of 2.9Km.

1.3 Rationale and Objective of the RAP

The proposed construction of Kirumba market requires temporary relocation of traders to a temporary site. A total of PAPs 713 will be affected Kirumba Market. Preparation of RAP is done to ensure that, the project sub investments comply with the national laws and the World Bank Environmental and Social Framework Standards (ESS5). Specifically, this RAP is meant to address the following objectives:

- Put in place Compensation Schedule which will detail affected assets, magnitude of impacts and subsequent entitlements.
- Define the valuation process and methods of compensating impacted assets;
- Identify the consultation approaches to be employed in RAP process;
- Define the monitoring and evaluation arrangements including Grievance Redress Mechanisms (GRM);
- Define the institutional and implementation arrangements to effect RAP and temporary relocation of traders.

Consequently, the aforementioned objectives define the scope of this RAP and Temporary Relocation Plan (TRP).

2. RAP METHODOLOGY

The World Bank ESS5 requires for project implementers (Client) to prepare RAP regardless of the number of affected populations. This RAP therefore has been developed in accordance with WB ESF-ESS5 and it captures two dimensions.

- Temporary relocation of vendors and their businesses at the Kirumba Market.

Diverse methods were employed in the preparation of this RAP such as review of project documents; stakeholders' consultation meetings; and key informant interviews. Asset, census, and socio-economic surveys were also employed to collect baseline information on affected assets along corridor of impact.

3. RELEVANT LEGAL FRAMEWORK

The consultant reviewed all relevant laws related to compensation and construction in Tanzania. The PIU is required to abide to them during execution of different sub investment projects in Ilemela Municipal Council and during effecting compensation. The following are the legislations and regulations which should be adhered to during project implementation: Environmental Management Act (2004) of the Land Act (No. 4 of 1999) and The Land Act, Cap 113 R.E. 2002, as amended from time to time, Land Acquisition Act (1967) (and its subsequent amendments), Land (Compensation Claims) Regulations, 2001, Land (Assessment of the Value of Land for Compensation) Regulations of 2001, Land (Compensation Claims) Regulations, 2001, The Land Disputes Court Act. 2002 (Act No.2/2002) and The World Bank Environmental and Social Framework (ESS5), Comparison of National Legislation and WB ESS5.

4. PUBLIC CONSULTATION AND DISCLOSURE OF INFORMATION

PAPs and other stakeholders' consultation formed an essential part in the development of this RAP. It is a requirement of both, the Tanzanian laws and the WB-ESF' Standards. The latter requires a meaningful, continuous, transparent and communication between the project implementers, PAPs and other interested stakeholders. About 82 stakeholders were consulted and their views and suggestions have been summarized and accommodated by this RAP. Consultations mainly covered PAPs at the project areas and along the proposed road corridors and drainages, local government officers, government agencies, and other interest groups from project areas. In addition, regular meetings were held with IMC and PO-RALG to discuss specific issues that required particular attention in the preparation of RAP.

Disclosure of information and participation of PAPs will continue in the whole period of RAP implementation, monitoring and evaluation of RAP Completion Audit. This will assist in achieving outcomes that are consistent with the requirements of the RAP.

4.1 Stakeholders' Identification

The identification of stakeholders for this RAP followed the procedures outlined in WB-ESF ESS10, ESS5 and the SEP prepared specifically for TACTIC subprojects investments in IMC The identified stakeholders include directly affected persons, indirectly affected persons and interested parties. In this regard, the identification of stakeholders under this RAP was based on Stakeholder's roles and responsibilities and possible influence/interest of the stakeholder on the proposed sub-project.

4.2 Methods of Stakeholders Engagement

The stakeholders were engaged by using different technics such as key informant interviews, formal meetings, FGDs, public meetings, and one-on-one meetings. Key informant interviews and

discussions were being guided by a checklist of questions and questionnaires. Therefore, a number of regular formal and public meetings were held often as was deemed necessary with the PAPs, government authorities/departments, and other stakeholders to discuss RAP-specific arising issues and procedures. There were separate consultation meetings for the PAPs during the whole period of RAP preparation.

To ensure maximum participation, PAPs including women and vulnerable groups were effectively informed and invited to attend the meeting through village leaders. The village leaders invited their people by using speakers, word of mouth and phone calls. Minutes of meeting were recorded and documented accordingly as guided in the RPF.

4.2 Key Issues Raised By PAPs and Other Stakeholders During Consultation Meetings

The following were the key issues raised by stakeholders during consultation meetings which are also detailed in Table 4.

1. ***Economic Benefits to be realized after Completion of Project:*** All consulted stakeholders including the PAPs were in the opinion that the proposed subprojects investments will reduce transport cost and open the project areas for other economic opportunities and foster economic growth for IMC.
2. ***Public Awareness:*** Public awareness should be a key of this project to avoid unnecessary grievances and conflicts.
3. ***Market Design:*** The design of the market should consider the types of business undertaken at the market i.e., space requirements for whole sellers and retailers as there are groups of vendors who need large open space e.g., the traders group registered as "Umoja wa Wauza Tikiti na Nanasi Kirumba (UWATINAKI).
4. ***Road Design: The designs of*** the proposed roads should consider provision of storm water drainage channels with proper end points to avoid flooding of people's residents in the lowland's areas during the rainy season.
5. ***Temporary Relocation Site:*** The MC should make all necessary preparation to the temporary relocation site including toilet facilities, water, electricity and sheds. Security of the areas should also be ensured, and the market vendors should be given enough time to prepare themselves before vacating the current market.
6. ***Compensations of assets that may be affected during construction phase:*** The PAPs were keen to know if the properties that will be affected during construction works will be compensated and the procedures that will be put in place as in most cases procedures are not clear and the contractors are reluctant to compensate the damages.
7. ***Allocation of Business Spaces:*** All traders currently doing business at the market should be given a priority in the allocation of business spaces at the temporary site and in the new market and there should be a special committee to supervise the process whereby the market committee is part of it.
8. ***Previous Land (Road) Survey by the IMC:*** *In* 2005 the IMC conducted road survey to establish the RoW. Under this survey some of the plots were valued and compensated e.g., from RC to Uhamiaji; and other plots were valued but were not compensated.
9. ***Community Health and Safety:*** During construction phase, the issues of community health and safety should be well considered especially in areas with high population to avoid possible accidents and ill health due to air pollution from dusts generated by construction works.

10. ***Access Road:*** During construction period, the Contractors has a tendency of closing large sections of the road without providing alternative temporary access roads/divergence roads or providing informative temporary road signs which causes a disturbance to road users.
11. ***GBV and sexual harassment:*** The experience shows that road projects are usually associated with the issues of early pregnancies of young girls, child labor, GBV and sexual harassment. These issues should be well addressed to safeguard our communities.
12. ***Employment of local people:*** Local people in the project areas should be considered and given priority in the employment opportunities especially during mobilization and construction phases. Contractors in collaboration with IMC, Ward and Street offices to ensure that hired staff are fairly paid according to provisions of existing legislations.
13. ***Commercial buildings:*** PAPs wanted to know the compensation procedure for the houses that are used for residential and commercial uses, i.e., the rooms used for commercial will be considered in compensations?
14. ***Compensation procedure for Graves and deceased properties:*** PAPs wanted clarification on who will stand to represent the family during valuation exercise and compensation especially if the deceased didn't write the will.

5. ASSET INVENTORY AND VALUATION

5.1 Asset Inventory

Survey for asset inventory was conducted in May 2022. The consultant Land surveying team, Valuation teams, urban planners from IMC and street leaders worked hand in hand to identify the affected plots and structures within project areas. The land surveying methodology based on the adjudication methods. Where the adjacent PAPs jointly identified the size, area and locations of their common neighbor. Each PAP had to be recognized by his/her surrounding neighbors to claim the ownerships of his/her property unit. The coordinates of the edges /corners of an adjudicated parcel were taken by using handheld GPS. The surveyors recorded the coordinates of each parcel and sketch its geometrical figure.

5.2 Marking of the property

The marking of the properties involved enumeration of each asset and assigning of unique identification number for reference. The reference numbers include details on project type, location and parcel. These numbers are marked on the front wall of the affected structures.

5.3 Identification of the owners and other users

Census and identification of owners of individual assets was conducted. During this census details of the owners' information including names, location contact and their photograph were recorded. And every PAP was assigned a unique reference number. In addition, tenants were also identified and assigned a unique identification number different from that of the owners as they include an additional letter to indicate their status.

5.4 Valuation Methods

Under the existing land laws in Tanzania, land can be acquired by the state for public purposes. The Land Acquisition Act No. 47 of 1967 is the main piece of legislation that governs land acquisition in Tanzania. It is the 'Mother Act' when it comes to land acquisition. The Land Act of 1999 has not amended any of the land acquisition provisions in Land Acquisition Act No. 47. However, the provisos on assessment are elaborated by the Land Act 1999, Part II; Section 3(1) paragraph "g" of the Land Act No.4 and 5 of 1999 which provides:

"To pay full, fair prompt compensation to any person whose right of occupancy or recognized long standing occupation or customary use of land is revoked or otherwise interfered with to their detriment by the State under this Act or is acquired under the Land Acquisition Act."

The Land (Assessment of the Value of Land for Compensation) Regulations, 2001 made under Section 179 of the Land Act No. 4 of 1999 which became operational in May 2001 provide assessment of compensation on land to be based on the following:

a. Market value of unexhausted improvements
b. Disturbance Allowance
c. Transport Allowance
d. Loss of Profit
e. Accommodation Allowance

5.4.1 Basis of Valuation

The basic principle governing valuation for compensation is that none of the affected people should be made worse or better off compared to the situation he was in before the land was acquired. The element of compulsory acquisition of land is well treated in most legislation worldwide including Tanzania emphasizing the right to receive a fair compensation to those who occupy land that is subject to acquisition by the State for specific declared objectives.

Decision on what Valuation Methods to adopt was guided by a provision in the Land Act No. 4 of 1999 and Valuation and Valuer Registration Act 2016 which provides for market value as the basis of valuation.

5.4.2 Valuation of Building Improvements

Guided by the above inquiry, and experience in valuing similar properties in the subject area, the Replacement Cost Method was adopted to arrive at the replacement values of various building units. The Replacement Cost method refers to the cost of re-building similar building/improvements at the date of valuation. This implies rebuilding a similar building to the same standard of workmanship and specifications, design and layout, inclusion of an allowance for professional fees.

5.4.3 Land Valuation

Direct Sales Comparison Method was applied to assess the land values. Recent sales of similar parcels of land in the subject area were analyzed and compared with the subject to arrive at the value of the subject sites. The resultant land values were added the improvements value to arrive at property values.

5.4.4 Disturbance Allowance

Disturbance Allowance is payable as a percentage of land and buildings value in compliance with the provisions of the Land Act of 1999. It is calculated by charging interest on the value of Land and Buildings by average percentage rate of interest offered by commercial banks on fixed deposits such as the 12 Months fixed deposit at the time of loss land.

Hence:

Disturbance Allowance = (Land Value + Building Value + Crops Value) x i.

Where: i. = interest rate offered by commercial banks on 12 Months fixed deposits.

In this valuation, the average rate of 6% per annum was used in calculating disturbance allowance.

5.4.5 Accommodation Allowance

According to the Land (Assessment of the Value of Land for Compensation) Regulations, 2001 Accommodation allowance is calculated by considering market rents of affected properties. These are multiplied by 36 months being the duration of constructing another house thus:

Accommodation Allowance = Rent/p.m. x 36 Months.

5.4.6 Transport Allowance

Transport allowance is calculated by considering the actual cost of transporting 12 tons of luggage by rail or road (whichever is cheaper) within 20 Kilometers from the point of displacement. i.e.

Transport allowance = 12tons x Actual Cost/ton/km x 20km

5.5 Rates Used in Land Price and Construction Materials per Square Meters

Land value rates was decreased from Main Road business center towards the neighbourhood/locality starting from Tshs. 10,000 per square meters up to Tshs. 8,000 per square meters depending on the location of such land, and ongoing transaction of land of the same location. Building constructed with sand cement block walls and corrugated iron sheets roof coverings material ranges from the rate of Tshs. 300,000-500,000 per square meters depending on quality of finishing and fittings.

6. ELIGIBILITY AND ENTITLEMENT

6.1 Types of PAPs

As explained earlier, this RAP has identified two major types of PAPs:

(i) Individual Land Owners which include individuals having crops, trees and structures within the project sites;
(ii) Tenants and workers: PAPs who obtain their livelihood from the affected land/structure/resources.

However, within these groups a third group of PAPs that requires special attention, i.e., Vulnerable PAPs is also found. This includes PAPs with additional and special needs – poor households, people with disabilities, old PAPs, female headed households, children headed households, chronically ill.

6.2 Eligibility

All individual PAPs that will be affected by sub-project investments in terms of asset loss, loss of livelihoods, and temporary loss of access to community facilities are eligible for compensation and or assistances. The Tanzania national laws and ESS5 suggest the following types of affected people eligible for compensation and their respective entitlement:

(i) Those who have formal rights to land (including customary/village land, traditional, and religious rights recognized under Tanzanian law);
(ii) Those who do not have formal legal rights to land at the time when census began, but have a claim to such land or assets, provided that such claims are recognized under the national; and
(iii) Those who have no recognizable legal right or claim to the land they are occupying, using, or obtaining their livelihood from.

From the identified groups, all PAPs who have occupied the land before cut-off date, irrespective of their status will be eligible for some kind of assistance and or compensation. However, people who will encroach the area after the census and valuation are not eligible for compensation or any form of resettlement assistance.

7. LIVELIHOOD AND INCOME RESTORATION PLAN

In IMC there are no major impacts on livelihood as most of affected assets are residential houses and plots most being partially affected. In this regard, there will be no direct Livelihoods Restoration Programs that will be implemented in the area. However, PAPs will be allowed to salvage construction materials from their buildings and trees remains from their plots. PAPs who are able and willing to work in the project shall be given priority at the construction site.

Additionally, to ensure judicious use of money PAPs will be provided with financial literacy to avoid misuse of compensation fund. The financial literacy will cover issues on:

(i) Guidance and counseling on investment options.
(ii) Opening bank accounts for PAPs who don't have one;
(iii) Investing in time deposit scheme offered by formal financial institutions. These are reliable instruments for investment with guaranteed returns.
(iv) Purchasing of income generating assets: This can be done by using a part of compensation amount and invest on economic asset such as cattle, farm tools or even take lands on rent if available.

7.1 Identification of Vulnerable Groups (VG):

The identified vulnerable groups will be eligible for additional support to enable smooth relocation and settlement in new areas as recommended by the ESS5. In addition to their compensation amount, the vulnerable groups will receive the following:

- An allowance of 20% of the total compensation amount or a lump-sum equivalent to 6months to one year of living subsistence allowance rates provided by TASAF programme (Whichever is higher)
- Enrolment in special livelihood restoration programs
- Logistical support during movement.

8. INSTITUTIONAL ARRANGEMENT FOR RAP IMPLEMENTATION AND COMPENSATION

The following entities will be involved in implementation of this RAP implementation: WBCU Safeguards Unit, Local Government Authorities (Sub-ward and wards), Ministry of Finance, Project Implementation Unit (PIU), District Commissioner, Regional Commissioner, and Chief Government Valuer, The Bank (RAP Paying agent). The preparation of compensation schedule along with PAPSs involvement in the whole process will be done by the Council. The WBCU Safeguards Unit will oversee the process. The roles and responsibilities of each involved part is detailed in Table 1.

Table 1: Institutional Arrangements for RAP Implementation

Institutions	Description of responsibilities	Remarks
WBCU Safeguards Unit	• Oversee RAP implementation through quality control and ensuring that national laws and WB ESF standards are observed. • Ensure that the LGAs have done meaningful stakeholders Consultation • Identifying training needs of all parties involved in RAP implementation.	• To be supplied with RAP document. • To be supplied with stakeholders' consultation reports (evidence)
Sub-ward/Streets Local Governments	• To participate in stakeholders' consultation meetings • To participate in asset inventory and census, • To sign compensation schedules • To participate in identification of missing PAPs • Identification of relocation sites • To participate in grievance management.	• To be integrated throughout the project cycle • To commence consultations prior to project start
Ministry of Finance	Approve and disburse to LGAs the requested compensation funds	The MoF is the highest government structure to approve for utilization of the public funds. Thus, it has a lead role in decision making.
Local Government Authorities	• Ensure compliance to the WB safeguard standards and Got rules and procedures • To work with consultant in preparation of sub project design and drawing • Undertaking stakeholders' consultation with relevant PAPs • Ensure PAPs needs and concerns are integrated • To identify corridor of impacts and owners of different assets along way leave • Prepare compensation schedules • Agreement with PAPs about expropriation. • Publication of the notice for the expropriation – declamation • Grievance management • Submit compensation schedules to relevant approval organs. • Identification of special groups and determine the required assistances • Make due compensation to PAPs before civil works begin in coordination PO-RALG and WBCU	• Ensure fair evaluation of the properties • The procedure must be followed carefully and respecting the right of the third persons to prevent the complaint to the Court • The expropriation will be done for the persons who will accept to be compensated with the conditions published. • Ensure that compensation is done with respect (amount and time) of agreements signed by interested parties and before starting the project implementation

Institutions	Description of responsibilities	Remarks
	• Information sharing to all eligible PAP regarding compensation amount and size of land offered for compensation before effecting of cash payment or land compensation • Sign the compensation agreements and issuance of PAP ID cards • Help in the identification of alternative land for those PAPs displaced from within the way leave • Monitoring and evaluation • Contribute to the GRM by designating members to the committees	
PAPs	• Participate in consultation meetings • To participate in asset inventory and valuation exercise • To participate in choosing restoration sites and livelihoods restoration programs • Opening a Bank Account • To vacate the site after compensation	The PIU to coordinate
PIU	• Spearhead RAP preparation and implementation process • Ensure that they work closely with PAPs • Formulate GRM and communicate it to the PAPs • Formulate Resettlement Committee • Participate on Monitoring and evaluation • Participate in Grievance management • To implement SEP • Arrange and coordinate PAPs financial literacy awareness	
Design consultants and LGA engineers	Providing designs to the RAP development team including explanations of the critical section that may require additional PAPs	coordinating with the RAP team to make sure the two processes are well aligned to (i) ensure that resettlement impacts are minimized at an early stage, (ii) ensure that designs reflect the findings of the RAP and stakeholder inputs.
District Commissioner	• To oversee RAP implementation • To endorse compensation schedules • To participate in GRM	To be supplied with compensation schedules on time.
Regional Commissioner	• To oversee RAP implementation • To endorse compensation schedules • To participate in GRM	To be supplied with compensation schedules on time

Institutions	Description of responsibilities	Remarks
Chief Government Valuer	• To assess and endorse compensation schedules	To be supplied with compensation schedules on time
Land Resources and urban Planning Department	• Identifying and verifying property boundaries and ownership • Consistence of the proposed projects with urban planning	To be supplied with project designs To be involved in valuation exercise
The Bank (RAP Paying agent)	• Train PAPs on their financial services and management of compensation money • Ensuring PAPs are paid timely and in accordance to the payment schedule • Confirm eligibility of PAPs for compensation on the basis of his/her national identity card, driving license, or passport • Notify the PIU when payment has been done and proof of PAPs payments and their photographs	To be provided with payment schedule
Contractor	• Provide to PIU the final schedule of construction to be communicated to the communities in the wayleave and project areas • List and communicate all possible obstruction sections. • Prepare Site Specific Environmental and Social Management Plans • Provide labor requirements and consider employing local population and pay wages as per applicable norms • Compensate for any damages to assets outside of wayleave, in accordance with rates established in the and final RAP. • Traffic management during construction • Observe grievance redress procedures for construction-related impacts • Implement codes of ethical conduct to protect local population and contractor's workers against spread of HIV/AIDs, STDs, GBV and COVID-19.	To observe ESIA, RPF, and RAP

8.1 RAP Implementation Committee

To implement this RAP, Consultant propose three committees:

a) Resettlement Committee: This will constitute of PIU Coordinator, Representatives from the Ministry of Land and Housing and Human Settlement Development, Representative of District Commissioner, Municipal Valuer, Representative of street/ward office, RAP Consultant, paying agent (Bank), and Representative of PAPs.

b) Compensation Committee: This will involve Representative of District Commissioner (Chair), Representative of Principal secretary of PO-RALG, Independent lawyer from recognised NGOs, RAP Consultant, payment agent, Valuator, and Representative of PAPs.
c) District Grievances Redress Committee: Municipal Director (Chair), Representative of Ministry of Lands/chief valuator, Valuator, Representative from PO-RALG, Street leader, Facility grievance committee chair, Representative of PAPs, and Representative of a local NGOs.

9. RAP IMPLEMENTATION ACTIVITIES AND SCHEDULE

This section presents the RAP implementation activities and schedule to be followed as detailed below:

9.1 Necessary Activities for RAP Implementation

The necessary activities for implementation are grouped into three phases: preparations for compensations; activities prior to construction works; and activities for the completion of RAP.

A. Preparations for compensations:

i) Disclosure of the RAP document with subsequent creation of RAP implementation committees, Grievance Management Committees.

ii) Familiarization and operationalization of the GRM and RAP. This will be done through workshops to be organized by the PIU in collaboration with the RAP consultant.

iii) Arrangement and finalization of contracts with RAP implementation supporting agencies. This includes the bank responsible for disbursement of compensations as well the financial education agency; the contractor who will be responsible for construction of replacement houses in case of replacements in kind; and consultant for RAP implementation.

iv) Disclosure of compensation amount to the individual PAPs and signing of compensation agreements forms. In addition, PAPs will be given a final chance to confirm their selected mode of payments. Any change will be updated in RAP database and shared to the payment agent and construction contractor.

v) Provision of financial education to PAPs. This will be organized by the PIU in collaboration with the resettlement and compensation committees and procured financial agent. The PAPs will be required to open Bank Account or present their bank details, and issued with identity cards.

vi) Creation of Livelihoods Restoration Committee (LRC) and subsequent involving PAPs in selection of livelihood restoration options and trainings.

B. Activities to be completed before the beginning of construction works

i) Provision of livelihood restoration trainings to PAPs. This will involve procuring relevant professionals and conduction of trainings. The PIU will be responsible for this.

ii) Conduction of additional Outreach Activities such as posters, radio programs. Additionally, some *streets* meetings will be held to counsel PAPs and inform them on the compensation processes, RAP implementation and expected dates for the beginning of construction works.

iii) Payment of compensation, Provision of notices to PAPs on duration to vacate the project sites and subsequent vacation of land: The payment agent will affect compensations to PAPs. During this exercise, the payment agent will have to confirm eligibility of PAPs through checking of PAPs IDs or government IDs (NIDA). Selection of modes of monetary payment will be based on the compensation thresholds indicated in Table 2.

Table 2: Payment Modes by Threshold Amounts

Amounts payable (in Tanzanian TZS)	Payment Modes/Options
Below 200,000	Cash
200,000 to 500,000	Cheque
Over 500000 to 2,000000	Cheque or bank account
Above 2,000000	Only bank

iv) Handover of vacated site to contractor: Once all properties on the wayleaves and project areas are vacated, the site will be handed over to constructor ready for commencement of civil works.

C: Activities for completion of RAP and Livelihoods Restoration Plans

i. *Conduction of HIV/AIDS sensitization awareness and campaigns*: This will be done to the local community and project workers. A combined report of these campaigns will be prepared by the RAP implementation agency as part of its monthly report and handed to the PIU.

ii. *Preparation of Periodic Internal Monitoring Reports***:** PIU will undertake internal monitoring to see whether all PAPs have vacated the site and there is no pending compensation and grievances. During this time an assessment on whether PAPs have judiciously spent compensation money will be done along with assessing condition of vulnerable people. Monitoring activities and generation of reports will commence soon after approval of the RAP.

iii. *Annual Project Review Workshop:* Review of RAP implementation at Annual Workshop will be carried after one year of RAP implementation.

iv. *RAP/LRP Implementation Completion Audit*: Implementation Completion Audit will be carried out at the end of all RAP related activities to ascertain whether the RAP objectives have been met. RAP/LRP Implementation Agency and Payment Agent (PA) shall separately produce Implementation Completion Report and submit to PIU. These reports together with the internal monitoring reports will be combined into a single Implementation Completion Report and submitted to the World Bank.

9.2 RAP Implementation Schedule

This RAP will be implemented in 14 months. Table 4 summarizes the month-wise activity schedule.

Table 3: RAP Implementation Schedule for TACTIC sub-projects in Ilemela Municipal Council

S.NO.	ACTIVITY	MONTHS													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Activities for the Preparations for Compensations															
	Disclosure of the RAP document														

S.NO.	ACTIVITY	MONTHS													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Creation of RAP implementation committees, Grievance Management Committees														
	Familiarization and operationalization of the GRM and RAP														
	Arrangement and finalization of contracts with RAP implementation supporting agencies														
	Disclosure of compensation amount to the individual PAPs, signing of compensation agreements forms and confirmation of mode of payments														
	Procurement of financial expert and provision of financial education to PAPs														
	PAPs opening of Bank accounts or provision of account details														
	Creation of Livelihoods Restoration Committee (LRC)														
Activities to be completed before the beginning of construction Works															
	Procurement of training														

S.NO.	ACTIVITY	MONTHS													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
	professionals and conduction of livelihood restoration trainings														
	Conduction of outreach activities and streets counselling meetings														
xi	Payment of compensation and vacation of land														
Xii	Handover of vacated sites to contractors														
Activities for Completion of RAP															
Xiii	Preparation of Periodic Internal Monitoring Reports														
Xiv	Annual Project Review Workshop														
Xv	Preparation of RAP Implementation Completion Audit														
Xvi	Submission of RAP Implementation Completion Report														

10. GRIEVANCE REDRESS MECHANISM

TACTIC project in Ilemela Municipal Council will use the existing grievance resolution procedures through local government system i.e., grievance resolution through negotiation and mediation at local government offices and through existing laws (court of law). All PAPs will be informed on the existence of a Grievance Redress Mechanism (GRM). These will include information on accessibility of the GRM; the procedures involved in logging of grievances; and the right and procedures to appeal if not satisfied with the resolution made. This information will be provided through respective "*Street"* leaders and awareness meetings that will be held during the preparation of the detailed RAP.

10.1 Grievance Resolution through Negotiation and Mediation

This grievance procedure is simple and administered at the local level to facilitate accessibility, flexibility, cost effectiveness, transparency to various proofs and timely settlement of the grievances. Under this system, the aggrieved PAPs can log their complaints by either reporting the matter directly to the "*Street"* offices *(usually verbally)* or to the subproject's grievance redress committee. If reported to the Street office, the chairperson will record the complaint in the grievance log book, and the matter is referred to the "*Street"* advisory committee for resolution. Depending on the matter, the "*Street"* chairperson will also notify Ward Office and/or Councilor.

Alternatively, if the aggrieved PAPs can log their complaints by reporting the matter directly to the subproject's grievance redress committee or at PIU office in Ilemela Municipal Council, he/she will fill special grievance forms. The subproject's grievance committee members will consist of the members from relevant District functional department (i.e., Land Office/Valuer in case of land disputes), Ward and "Street" offices, and a representative of the complainant and the perpetrator. The committee will consult the lower local government levels and other records to determine the validity of claims. If claims are valid, the committee will recommend appropriate remedial measures and or compensation. The GRC through "Street" office will notify the complainant on the recommended settlement.

10.2 Time Frame for Negotiation and Mediation

Under negotiation and mediation procedure, the time frame for grievance resolution will be as follows;

- Grievance committee will acknowledge receipt of a grievance in writings within five (5) business days from the day complaint was reported.
- Within ten (10) days of receipt of the grievance, grievance committee will conduct the investigation and provide a response to the complainant.

The resolution of the grievance through negotiation method shall be reached within twenty (20) days of receipt of the grievance.

10.3 Disputes Procedures under Existing Laws

If the PAP is not satisfied with decisions of the GRC, the aggrieved party is obliged to take the matter to the court as specified in the Tanzania Land Acquisition Act 1967. The matter will be filed to the local courts and/or the Land Tribunals whereby if not settled; the matter will be referred to the High Court for resolution. The High Court of Tanzania and Court of Appeal is the highest appellate "judge" in this system and its decision would be final.

The procedures for compensation dispute resolution prescribed by the Land Acts are cumbersome and costly, taking into account the fact that most of the PAPs have limited knowledge about legal issues and their rights with respect to the laws. Thus, all grievances should be amicably resolved before a decision to go to court is undertaken by the PAP.

11. RAP COST AND BUDGETING

This RAP budget is prepared in order to carefully assess and estimate costs to be incurred during implementation. In this RAP, quantities and unit costs per item are based on magnitudes of displacement-related impacts as well as on the eligibility considerations and entitlement matrix outlined in Chapter 6. Therefore, this budget has been prepared based on the valuation survey as of May, 2022.

The budget took into account the costs of compensation for loss of land, structures and crops; locations at the corridor of impacts of the proposed subprojects' sites; their associated allowances (accommodation, loss of profit, transport and disturbance allowances).

This RAP Budget is providing compensation costs and don't include programs for livelihood restorations, relocation of utilities, costs for consultancy services (hired service providers for implementing RAP activities); and monitoring and evaluation costs by internal implementing teams (PIU) and external monitors as they are not yet identified.

For the temporary relocation of traders in Kirumba market to Magomeni area, no compensation costs were incurred except for the coordination of the relocation process.

11.1 Funding Sources

Funding to be processed and effected through the project's financial processing arrangements. Funds for implementing inventory assessments and resettlement plans to be provided by the implementing agency (LGAs). The funds to be obtained from annual Council budgets approved through parliament; Local taxes and levies collected in the LGA and /or Loans from commercial Banks.

12. MONITORING AND EVALUATION

TACTIC Coordination Unit in Ilemela Municipal Council will be responsible for the M&E of implementation for the resettlement/compensation plans at Municipal level.

Once this RAPs have implemented, a final review is required in order to assure that the plans have been properly implemented- resettlement and compensation final report (RFR). The M&E objective will be to make a final evaluation to determine:

a) If PAPs have been compensated in full before implementation of subproject activities; and
b) If PAPs are now living at a higher standard than before subproject implementation, living at the same standard, or if they are poorer.

12.1 General Objectives of Monitoring and Evaluation

RAP implementation monitoring is critical to solve challenges in the areas of mobilization, compensation, relocation grievance redress etc. While process monitoring will enable the council to assess whether due process is being followed, performance monitoring will mainly relate to achievement in measurable terms against the set targets. Ilemela Municipal Council will monitor performance of this RAP which shall cover aspects such as staff involved RAP implementation, timeliness of implementation of proposed activities and various indicators and benchmarks. Internal monitoring of process and output indicators by TACTIC Coordination Unit in Ilemela Municipal Council and the TACTIC coordination Unit at PO-RALG. External monitoring by an independent monitoring agency or an independent consultant to check the extent to which resettlement and rehabilitation objectives have been met is also recommended.

12.2 Internal Monitoring

Internal monitoring should involve the concurrent checking of implementation activities to ascertain whether these activities are being implemented in accordance with the approved RAP and thereby enable the LGA to take appropriate action to address any gaps, deviations, etc. and ensure timely delivery of compensation and resolution of matter of concerns for PAPs and other stakeholders. The subproject's management unit and supervising consultant will be responsible for internal monitoring and share RAP implementation progress and periodic monitoring reports with PO-RALG TACTIC Coordination Unit and the World Bank. The census of PAPs and inventory

of losses will constitute a base line for monitoring of RAP progress and at subproject supervision level. Specific monitoring topics for the internal monitoring will be:

- Information on consultation with PAPs;
- Status of land acquisition and payments on land compensation;
- Compensation payment progress for affected structures and other assets;
- Payments for loss of income according to the details provided in the RAP;
- Income restoration activities
- Supplemental compensation for unforeseen losses
- Relocation of PAPs;
- Grievance management

12.3 Indicators for M&E

A number of socioeconomic indicators to be used to determine the status of affected people which includes: Comparison to pre-project, land being used, standard of house, and level of participation in project activities, how many children in school, health standards, and others. These indicators aim at achieving three major socioeconomic goals by which to evaluate subproject's success:

1. Affected individuals, households, and communities are able to maintain their subproject standard of living, and even improve on it;
2. Local communities remain supportive of the project; and
3. Absence or prevalence of conflicts.

The indicators in Table 5 below will be used to monitor and evaluate the implementation of resettlement and compensation plans.

Table 5: Indicators for internal monitoring

Parameters	Indicators	Timeline
Institutional set-up and strengthening	RAP implementation and monitoring institutional set-up is in place.	Monthly
	Budgeted RAP costs released and placed at disposal of land acquisition and resettlement implementation entities.	Monthly
	Number of trainings provided to the committees (GRCs)	Monthly and quarterly
	Grievance redress mechanism established and explained to the PAPs and affected communities	Monthly
Delivery of PAPs' Entitlements affected assets and livelihoods	Number of Affected assets compensated (based on category of losses set out in the entitlement matrix).	Quarterly, annually
	Number of replaced trees and structures	Quarterly, annually
	Number of restored livelihoods and income including transitional support provided	Quarterly, annually
	Social infrastructure and services restored as and where required.	
Financial (compensation/ establishment)	Amount of total compensation disbursed	End Term Evaluation
	Amount of compensation paid to PAPs by LGA, Location (sub-ward)	End Term Evaluation

Parameters	Indicators	Timeline
	Number of PAPs paid compensation (disaggregated by gender) in cash/cheque/bank account	End Term Evaluation
	Number of PAPs already having bank accounts and those yet to open	End Term Evaluation
	Number of PAPs who were not found and not paid	End Term Evaluation
Restoration of living standards and income	Number of residential structures reconstructed/ restored at relocation sites outside RoW limits.	Quarterly
	Number business structures (shops/stalls) constructed/relocated outside RoW limits and business/ income activity restored.	Quarterly
	Number of PAPs who shifted to other unaffected parcels by area	Quarterly
	Number of PAPs who continue to reside in the same areas as before	Quarterly
	Number and percentage of displaced peoples covered under livelihood restoration and rehabilitation programs (youths, women, and vulnerable groups).	
	Number of total PAPs enrolled into ongoing government programs (by type)	Quarterly
	Number of No of PAPs including vulnerable groups (youths and women) employed in construction works by type of services provided	Quarterly
	Number of emerging PAPs due to unforeseen construction impacts	Monthly
	Number of Encroachers existing within the compensated corridor	Monthly
	Number of Consultations meetings held with communities	Quarterly, Midterm and End Term
	Time taken for issuance of expropriation order and date of vacating the land	Quarterly, Midterm and End Term
	Time taken to identify alternate lands for PAPs	Quarterly, Midterm and End Term
	Number of displaced peoples who have successfully restored their income and livelihood patterns (youths, women, and vulnerable groups).	Quarterly, Midterm and End Term
Compensation usage	Number of men and women built new homes to replace the demolished/impacted ones	Midterm and End
	Number of men and women planted trees to replace the lost ones	Midterm and End
	Number of men and women built new homes to replace the demolished/impacted ones	Midterm and End

12.4 Reporting

Apart from periodical progress reports that will be submitted by the consultant on monthly and quarterly basis, there should be two essential monitoring reports to be produced by RAP implementers:

- A Resettlement and Compensation Monitoring Report (RMR) to be prepared by the M&E consultant at the end of the assignment.
- Resettlement and Compensation Final Report (RFR) to be prepared by the RAP implementation Agency and be approved by the client.

Appendix VII: 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 heart 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 hear 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 sunglass/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 cause 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 defends with proper training to use them.
- 85 dB (A) – Signposts shall be erected to inform all employees and public that usage of car 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 defence 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 Ilemela 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 vehicle 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 handing 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 earthling 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 form 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 ad 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 lifts of an independent tower scaffold.
- Adequate ladders shall be provided for the access to and egress form 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 on 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 750 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 if 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 breaks, 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.

2.0 Emergency Preparedness and Response

2.1 Procedure for Emergency Preparedness Response

The contractor will establish and maintain plans and procedures up to date to identify the potential for, and responses to, incidents and emergency situations, and for preventing and mitigating the likeliness and injury that may be associated with them. Possible Emergency situations will include but not limited to the following;

Incidents leading to serious injuries or ill health. In an event that incidents leading to serious injuries or ill health occur, the following procedure will be followed.

-Inform the first aider around to receive first aid treatment.

-Report to the nearest medical facility for further treatment

-The incident should be reported to your site operator or assistant project manager to be recorded in the Incident register by the Health and Safety Officer.

-Loss time of injury or ill health should be reported and recorded in the register.
-Fires and explosions,
-In an event of fire and explosion the company employee should follow the following

2.1.1 Fire Exist Plan

The preservation of life shall override all other considerations, such as saving property and extinguishing the fire. If a fire is discovered, the alarm shall be raised immediately however small the fire. All staffs are empowered to raise a fire alarm if they believe there is a fire; no authority should be sought from any other person. In the event of fire, the three most important actions are, in chronological order, to:
-Raise the alarm
-Dismiss the fire brigade
-Evacuate the building
-When firm is alarm sounds: All nonemergency committee personnel will go out the first available exit that is safe and then to the parking lot.

2.2 Fire Response Instructions

-Without endangering yourself, notify any employees, or guests in immediate danger zone of smoke, heat, or fire.
-Close all doors to prevent the spread of the fire.
-If possible, and if trained to do so, help extinguish the fire by using one of the public/department fire extinguishers.
-Never permit the fire and or smoke to come between you and your route of escape.
-Advice all employees, students/ guests of the nearest safe fire exit.
-Do not attempt to use the elevator under any circumstances.
-If you encounter smoke in a hallway, stairwell, anywhere, stop; go back to a safe area and look for another means of escape.
-Keep doors and windows in the area of the fire closed, to minimize further fire spreading.

Traffic accidents.
-Procedure for Traffic Accident shall be:
-Report to the nearest police station and obtain Police form to go to the hospital
-Report the incident to your line manager

2.3 Evacuation Plan

Evacuation of the building should be done quickly and calmly. Safety of staffs, students and guests should be the primary concern. Each department will appoint one of its staffs to oversee fellow staff members' and students' evacuation from the building. This employee will be responsible for needed supplies and the general safety of the department's staff members.

2.4 Emergency Equipment

The contractor shall at all-time keep possible emergency equipment that will be used during an emergency situation and employees will be trained in the use of those equipment.

Appendix VIII: Hydrology Study Report

1.0 Introduction

Kirumba market and its access roads fall within the ilemela district in kirumba ward. The project area consists of access roads with total length of 2.9 km. access roads under project includes; Furahisha road, Vuka, Mbugani, Msikitini, Sokono, KVC, Bismark and Zenze road as shown in figure 1 below. The section under project is of gravel roads as this section is forming an important connections of road network of the Mwanza city.

Figure 1: Kirumba Market anad its access roads

1.1 Terms of Reference

The Terms of Reference (ToR) require hydrological and hydraulics studies to be done along the road network with an aim of 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.

The rainfall-runoff relationships and catchment characteristics for each catchment are to be determined basing on the topographic maps/DEMs and field investigations and then used in the TRRL/ EAFM to estimate the design peak floods. However, to some of the catchments which will appear to be bigger than the upper limit of application of the TRRL EAFM, that is 200 km2, regionalization technique/Soil conservation method, which is free from this constraint, will be used/applied. On other hand the Rational method will have to be used for catchments with smaller sizes less than $1km^2$.

1.2 The Methodology

These Hydrological and Hydraulics (H&H) studies are along the following five exercises:

Exercise 1: Demarcation of the catchments to determine their coverage (km2) based on the available topographic maps and digital elevated models (DEM).

Exercise 2: Carrying out field investigations to determine the catchment characteristics including land use and cover and the hydraulic parameters like the value of Mannings

roughness coefficient, extent of flooding and flood marks on river/stream banks and channel stability.

Exercise 3: Estimation of peak flood discharges that cross roads sections for given frequencies.

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

Exercise 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.

2.0 Data Collection and Processing

The degree of accuracy of the flood estimates made depends on the quantity and quality of the available data.

The hydro-meteorological information available in the study area was collected mainly from the Tanzania Meteorological agency (TMA). These data were then compared from those of Satellite sources.

Site investigation along Kirumba Market and access roads plus its associated structures:

The site investigation was done in order to identify the hydraulic performance of all existing drainage structures under the study area. The assessment of existing drainage structures was done to ascertain the worthiness of existing structures in terms of capacity to the discharge flows, structural soundness and serviceability condition.

2.1 Climate

The area under study has a tropical type of climate with a slight bi-modal rainfall regime. The rainfall season starts in late October and ends in early May. A small trough is observed in February. June, July, August and September are the dry months. The following is the rainfall data (30 years) from Mwanza TMA.

MWANZA TMA MONTHLY TOTAL RAINFALL (mm)												
Year	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
1991	87.4	106.9	150.0	185.2	66.0	24.6	0.0	40.1	0.8	259.5	53.5	156.0
1992	36.7	95.4	102.4	97.0	61.2	35.7	0.4	0.3	6.8	64.2	110.9	181.6
1993	187.4	50.0	137.2	117.9	163.1	30.7	0.0	1.9	0.0	7.8	113.5	66.7
1994	181.0	56.4	152.8	180.2	94.9	16.3	1.5	69.4	0.2	97.5	344.2	65.2
1995	132.4	88.0	189.0	194.4	34.5	38.6	0.0	0.0	96.3	154.2	112.0	172.7
1996	149.2	137.4	119.9	116.4	33.0	9.3	48.9	40.9	30.0	26.9	112.2	46.4
1997	160.6	23.7	170.6	376.1	59.4	48.3	2.0	1.2	1.0	147.9	249.3	171.0
1998	153.7	121.7	85.4	234.3	100.9	80.2	1.2	0.0	16.3	45.4	133.0	27.6
1999	124.1	0.1	259.4	165.0	8.4	0.0	0.0	59.2	4.4	55.2	235.0	125.4
2000	143.0	42.0	51.3	68.3	13.7	5.9	0.0	0.6	0.0	51.8	157.5	136.9
2001	214.6	113.5	72.3	164.2	25.2	1.6	25.4	38.3	31.1	104.7	219.6	139.6
2002	140.4	68.0	240.5	206.1	122.6	0.0	0.0	0.0	1.1	61.1	143.0	299.2
2003	44.7	14.9	186.0	154.1	86.2	0.5	13.0	21.1	6.4	14.1	85.8	251.4
2004	121.0	82.3	266.6	106.7	32.4	0.0	0.0	77.0	29.5	151.8	189.3	210.1
2005	123.1	77.2	217.0	117.4	185.1	0.0	0.0	60.8	164.7	86.8	34.5	104.5
2006	79.0	156.9	212.4	70.0	131.0	6.1	1.6	38.2	37.4	80.7	276.0	337.3
2007	174.7	166.2	151.0	192.0	63.0	84.1	0.0	23.6	119.8	62.4	111.7	148.3
2008	80.4	60.1	153.2	68.4	37.5	8.1	3.5	1.0	78.1	206.5	129.9	53.8
2009	118.9	87.6	100.0	290.9	62.8	1.4	0.0	0.0	58.6	226.8	113.8	202.4
2010	125.5	216.8	239.4	108.8	78.1	51.7	0.6	1.4	11.8	156.9	76.4	74.2
2011	95.6	68.0	86.1	132.9	75.8	58.1	0.0	40.5	24.4	104.9	226.7	219.1
2012	2.1	36.8	37.0	322.6	158.2	60.2	0.0	10.7	65.6	336.4	105.8	172.1
2013	105.4	26.1	221.2	162.8	39.3	0.0	0.0	39.6	98.9	54.4	208.5	169.4
2014	137.7	74.1	90.0	95.7	17.3	0.6	11.6	38.7	64.5	167.8	153.1	120.3
2015	45.8	36.4	62.6	421.0	50.2	48.2	0.0	0.0	54.2	219.4	343.1	249.8
2016	207.1	88.6	183.2	152.3	66.7	62.7	8.6	4.7	43.1	55.5	118.4	48.4
2017	3.4	94.6	169.4	88.4	40.5	2.8	19.0	0.9	103.4	134.4	195.8	19.6
2018	71.8	55.6	175.6	281.7	110.1	21.2	0.0	37.5	1.4	142.1	125.5	130.5
2019	30.9	107.6	97.9	157.7	60.4	58.2	13.5	5.9	95.6	214.5	98.1	213.7
2020	132.9	108.4	256.4	161.9	30.9	16.8	0.0	56.2	22.8	125.7	170.7	65.5

Table 1: Total monthly rainfall (mm)

The average total rainfall was estimated from the above data and the following is the rainfall histogram.

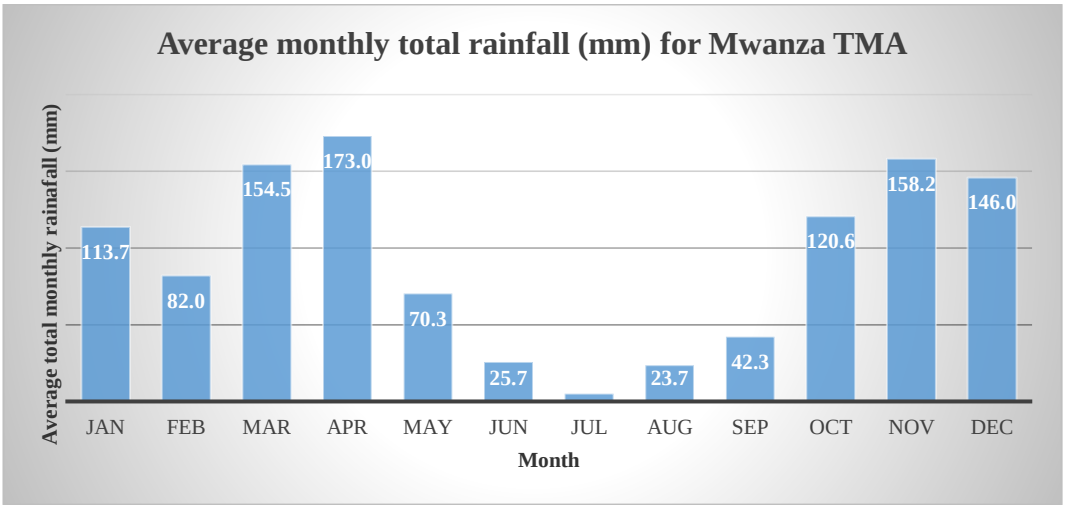
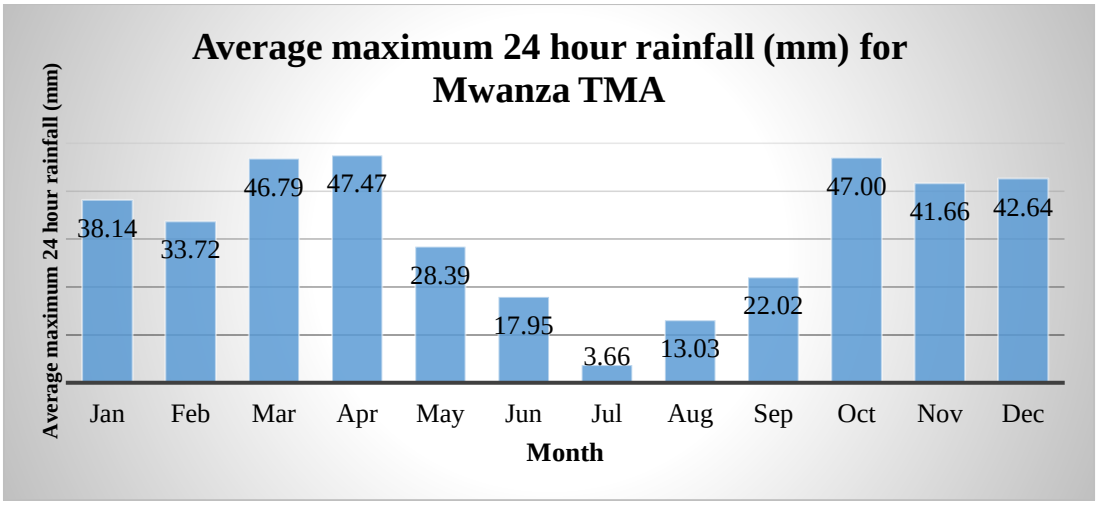


Figure 2: Histogram for average total monthly rainfall

MWANZA TMA MAXIMUM 24 HOURS RAINFALL (mm)												
Year	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
1991	23.2	61	59.8	58.1	12.2	18.7	0	36	0.6	70.9	15.4	39
1992	9.2	34.5	42.7	20.6	24.8	30.4	0.4	0.3	3.1	16.1	35.4	59.9
1993	52.4	26.8	57	25.6	60.5	22.3	0	1.2	0	3.5	50.8	17.8
1994	46.3	23.1	30.9	108.7	66.3	10.6	1.5	38	0.2	66	52.2	16.4
1995	57.5	32.6	78.1	40.1	12.7	19.1	0	0	52.1	60	28.5	51.4
1996	67.8	35.4	34.6	46.7	12.8	8	29.7	24.6	10.5	20.6	25.2	21.2
1997	35.5	13.1	95	87.1	21.3	45.4	2	0.8	1	46.1	79.9	25.8
1998	50.3	38.8	39.7	48.2	35.4	40.7	1.2	0	11.6	32.4	52.7	10.5
1999	40.2	0.1	81.4	39.5	6.8	0	0	26.6	1.6	25.4	48.9	19.1
2000	52.1	18	14.8	23.6	5	3	0	0.6	0	15.2	28.3	26.1
2001	50.5	45.3	19.8	37	11.5	0.8	13	17.4	10.9	23.4	40.3	45.2
2002	23.8	35.1	45.9	43.8	58.4	0	0	0	1.1	20.3	28.9	148
2003	24.5	5.6	43.5	52.6	18.6	0.5	13	11.2	4.4	7	16.4	86.5
2004	46.6	28	70.5	24	16	0	0	39.1	14.3	46.3	78.3	33.6
2005	38.3	53.3	70.5	57.2	73.6	0	0	42.5	116.6	26.4	26.2	53.9
2006	45.9	47	54.2	22.9	25.4	5	0.8	25.8	36.6	60.2	66.6	39.4
2007	81.3	50.1	45.8	70.3	27.6	53.3	0	8.6	47.6	35.2	28.6	36.3
2008	23.4	31	52.5	22.5	19.7	7.6	3	0.6	47.9	49.6	24.4	21.1
2009	38	49.1	28.5	63.8	37.7	1	0	0	19.1	134	28	68.9
2010	70.4	69.2	54.3	27.4	36.8	40.7	0.6	1.4	11.8	46.5	29	23.6
2011	21.8	38.1	22.1	42	20.4	27.5	0	11.9	7.3	47.3	62	59.1
2012	1	15.7	18.8	92.3	54.3	31	0	4	25.4	136.9	31.2	44.4
2013	26	9.2	49.6	29	33.6	0	0	28	37.9	33	50.7	39.2
2014	54.8	42.7	27.8	29.4	7.3	0.4	11.6	21.7	47.4	75.4	40.1	31
2015	11.1	20.2	21.2	65	22.8	20	0	0	24.6	52.1	82.9	92.1
2016	91.1	45.7	59.2	43.9	44.4	62.4	8.6	4.7	28	28.1	37.3	36.2
2017	2.8	20.6	54.8	14.6	13.7	0.9	11.2	0.9	40.8	73.5	53.8	9.2
2018	19.1	49.6	60.4	68.1	39.1	21.2	0	14	0.6	64.7	33.2	28
2019	15.6	50	28.8	92.6	17.4	53.2	13.3	5.9	51	40.2	30.2	72.1
2020	23.7	22.8	41.4	27.6	15.5	14.9	0	25	6.7	53.8	44.3	24.1

Table 2: Maximum 24 hour rainfall (mm)

The average maximum 24 hour rainfall was estimated from the above data and the following is the rainfall histogram.



The hottest period occurs between November and February and the coldest period occurs between May and August.

The Statistical analysis is made on maximum 24h rainfall to estimate the daily rainfall depth for several return periods using HEC-SSP and HEC DSS-Vue Software. The statistical analysis has been based on existing statistical distributions, such as Gumbel…and the probability distribution that best fits the data series has been considered. The maximization factor of 1.13 has been applied to the results of the statistical analysis to convert data provided by TMA from 24h rainfall to daily rainfall as described in WMO-No 168, 2009. The result of this analysis is indicated below. The value for 1.13 is applied to compensate climatic change scenarios under the study area.

RETURN PERIOD	PERCENTAGE OF EXCEEDENCE	DESIGN DAILY RAINFALL (mm)
200	0.5	189.31
100	1	175.49
50	2	161.54
20	5	142.67
10	10	127.77
5	20	111.78
2	50	86.57

Table 3: Design maximum daily rainfall

Intensity Duration frequency (mm)
The intensity Duration frequency for Mwanza station was obtained from TMA and used for analysis. The following is the Intensity duration frequency data;

	Rainfall intensity in mm/hr						
Duration (hr)	0.25	0.5	1	2	6	12	24
2yrs	85.07	62.57	44.38	26.97	10.52	5.48	2.91
5yrs	103.61	86.57	70.22	41.8	16.09	8.32	4.48
10yrs	115.88	102.47	87.34	51.63	19.77	10.2	5.52
25yrs	131.39	122.55	108.96	64.04	24.43	12.57	6.84
50yrs	142.89	137.45	125	73.25	27.88	14.34	7.81
100yrs	154.31	152.23	140.92	82.38	31.31	16.08	8.78

Table 3: Intensity Frequency data from Mwanza TMA

From these data, the curve was prepared at 100 year and the best fit eqaution was established as follows;

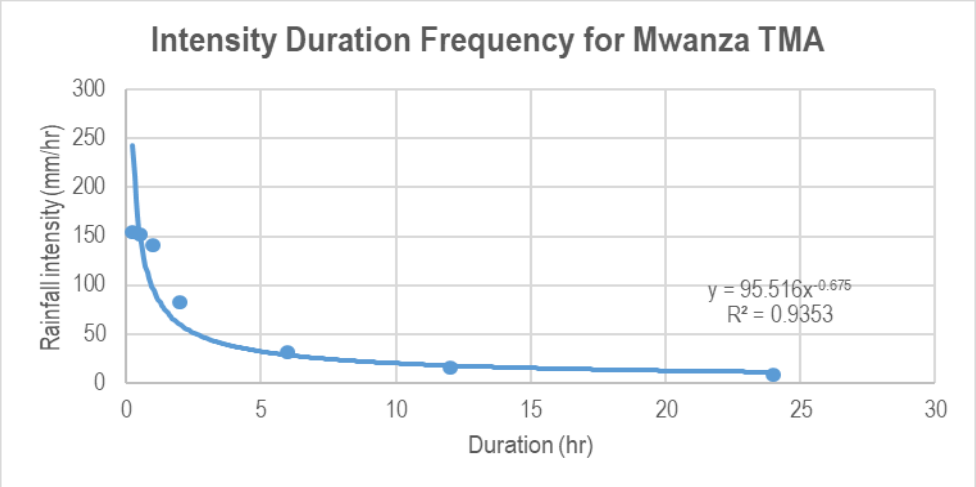


Figure 3: Intensity Frequency curve for Mwanza TMA

Temperature data analysis (mm)

The Mwanza TMA station which is located at Latitude -2.467 South and Longitude of 32.9167 East will be used in this project because it is near the project area and it has good temperature data distribution. The following is the temperature data (30 years) from Mwanza TMA.

MWANZA MONTHLY AVERAGE MINIMUM TEMPERATURE (°C)												
YEAR	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**
1985	18.5	18.2	18.4	18.3	18.1	16.5	16.1	16.4	18.1	19.0	18.6	18.7
1986	18.2	17.9	18.2	18.5	18.1	15.3	14.5	16.1	18.5	19.1	18.9	18.3
1987	18.3	18.3	18.9	18.8	18.3	16.5	15.7	16.3	18.3	18.7	18.0	18.0
1988	17.7	18.0	18.0	18.5	18.0	16.6	15.9	16.9	17.9	18.7	18.4	18.1
1989	17.5	17.7	18.0	18.1	17.6	16.1	15.4	16.3	17.7	18.5	18.6	17.8
1990	17.2	18.2	m	m	m	m	14.1	15.6	16.7	17.7	17.5	17.3
1991	17.2	17.2	17.6	17.2	17.4	15.6	14.1	15.0	16.5	16.5	16.9	16.5
1992	16.9	16.9	17.2	17.2	15.9	m	14.5	16.3	18.0	18.7	18.5	18.2
1993	18.2	18.4	18.2	18.7	18.5	17.4	14.9	16.7	16.9	18.5	19.1	19.0
1994	18.2	18.1	18.3	18.3	18.1	16.1	15.9	16.1	17.2	18.6	17.9	18.2
1995	17.7	17.5	16.7	17.8	16.8	15.5	14.8	14.6	16.1	17.2	17.4	16.5
1996	16.2	16.4	17.1	16.5	16.4	15.3	13.9	14.4	15.8	15.9	16.7	16.2
1997	15.9	15.6	16.5	15.8	14.9	14.2	13.1	14.3	15.1	16.2	16.0	15.5
1998	16.0	16.2	16.0	15.8	15.3	13.0	11.6	18.7	14.1	14.8	14.4	15.0
1999	14.2	14.0	14.0	17.1	18.0	15.9	15.2	16.7	16.9	17.5	18.5	18.6
2000	18.3	18.1	18.8	18.5	18.6	17.3	16.7	17.3	18.4	18.7	19.1	18.5
2001	18.0	18.4	18.1	18.4	18.1	16.4	16.1	16.5	18.1	18.9	18.8	18.9
2002	18.6	18.1	18.5	18.9	18.5	16.1	16.2	16.7	17.7	18.5	18.8	18.3
2003	18.2	17.8	18.7	19.0	18.3	17.3	15.7	17.1	18.0	m	19.0	18.8
2004	18.7	m	18.7	18.7	18.1	16.1	15.7	16.9	17.5	18.7	m	18.5
2005	18.4	18.5	18.8	18.7	18.2	17.0	m	16.5	17.7	17.7	m	18.8
2006	18.6	m	18.3	18.5	18.2	16.1	16.2	16.4	17.3	18.5	18.5	18.5
2007	18.6	18.3	18.6	18.8	18.7	16.6	16.2	16.7	17.7	18.2	18.9	18.0
2008	18.1	17.9	18.6	18.3	17.9	14.4	13.9	15.3	18.5	18.9	18.6	18.8
2009	18.9	18.5	19.3	19.1	18.9	17.7	16.3	17.3	18.7	18.8	18.9	m
2010	18.4	19.7	18.8	19.7	19.0	17.6	15.8	16.8	18.3	18.2	18.7	17.9
2011	m	17.8	18.3	18.4	23.7	16.9	16.0	17.2	18.2	19.0	18.7	18.8
2012	18.1	m	19.1	18.9	19.0	15.9	16.2	16.8	18.3	m	m	18.8
2013	19.1	18.5	19.0	19.2	m	15.9	15.0	16.3	m	18.3	18.7	19.1
2014	18.6	18.7	19.0	19.0	18.9	18.2	17.7	17.9	18.4	19.0	19.0	18.9
2015	18.5	19.5	m	18.3	19.3	18.0	17.1	17.7	18.9	19.6	19.2	18.9
2016	19.7	19.7	20.5	19.9	18.3	17.4	15.7	16.8	18.2	19.0	18.7	19.1
2017	19.2	19.4	19.1	19.5	18.8	18.6	17.6	18.8	19.4	20.0	19.0	19.3
2018	18.7	19.5	18.9	19.2	19.2	17.1	16.6	17.4	18.8	19.6	19.7	19.2
2019	18.4	19.2	19.0	19.7	19.4	18.3	16.9	17.6	18.7	18.7	19.2	19.3
2020	19.6	19.5	19.3	19.4	18.9	17.1	16.8	17.2	17.9	19.3	19.3	19.5

Table 4: Minimum average monthly temperature (mm)

MWANZA MONTHLY AVERAGE MAXIMUM TEMPERATURE (°C)												
YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1985	28.8	26.7	29.0	27.5	28.9	28.8	29.2	29.6	29.6	30.0	28.7	28.0
1986	28.0	27.7	28.1	27.4	27.8	28.1	28.1	29.8	29.9	28.6	28.0	26.7
1987	27.2	27.7	28.6	28.2	28.4	27.6	29.4	30.2	29.6	28.5	27.7	28.7
1988	26.8	28.7	27.8	28.0	28.4	29.3	27.6	27.6	28.3	28.2	27.2	28.3
1989	25.5	m	m	m	m	m	m	m	m	m	m	m
1990	m	m	m	m	m	m	m	m	m	m	m	m
1991	27.2	27.9	28.0	27.6	27.8	28.6	28.5	28.8	29.6	27.0	28.3	26.9
1992	28.3	27.1	27.5	m	m	m	m	m	m	m	m	m
1994	m	m	m	m	m	m	m	m	m	28.8	26.3	27.7
1995	27.8	27.4	28.1	28.8	27.8	28.6	28.3	30.7	29.5	28.4	28.3	28.0
1996	27.8	27.6	28.2	28.6	29.2	28.9	28.8	28.6	28.5	29.2	28.2	28.1
1997	27.8	29.0	30.6	27.6	27.4	29.2	28.7	29.9	32.1	29.6	26.7	25.9
1998	27.4	28.0	29.7	28.6	28.6	28.5	28.7	27.4	29.7	28.4	29.0	29.2
1999	27.8	30.6	27.1	27.6	28.8	29.2	28.9	29.5	28.8	28.1	27.3	26.9
2000	28.0	28.8	28.7	29.0	29.6	29.7	29.7	29.5	30.2	29.0	27.4	26.5
2001	26.1	28.4	29.0	28.5	28.9	28.9	28.4	28.5	27.9	28.5	27.4	27.9
2002	26.0	29.2	m	28.7	28.7	29.8	29.7	29.8	30.8	30.0	27.1	27.8
2003	28.1	30.2	29.8	28.9	27.5	28.9	28.9	28.9	29.8	m	29.2	27.8
2004	28.8	m	28.7	28.0	29.2	29.6	29.3	28.8	28.9	28.8	m	26.8
2005	27.7	30.3	28.5	29.3	27.6	28.7	m	28.7	27.9	28.8	m	29.5
2006	29.4	m	27.4	27.6	27.6	29.2	29.0	29.1	29.4	29.7	26.0	25.4
2007	27.0	27.6	29.0	28.6	28.5	27.7	28.2	28.8	27.7	29.0	28.4	27.2
2008	27.4	27.3	27.9	28.2	28.5	28.7	28.5	28.8	28.3	27.9	27.2	27.9
2009	27.6	28.0	29.0	27.6	28.1	29.5	29.1	29.9	29.4	28.8	27.5	m
2010	28.3	29.3	28.5	29.5	28.9	29.3	29.3	29.2	29.0	28.3	28.4	m
2011	m	m	m	m	28.8	28.7	28.6	27.8	28.3	29.4	26.9	27.0
2012	28.7	m	29.8	28.3	27.9	30.0	28.3	28.6	28.5	m	m	26.9
2013	28.8	28.9	28.6	27.6	m	30.0	29.5	29.0	m	28.6	27.9	26.8
2014	27.3	27.4	29.0	28.9	29.2	29.4	29.1	28.1	29.0	27.9	27.2	27.4
2015	27.5	28.9	29.8	26.3	28.4	27.8	28.9	29.9	29.4	27.7	26.3	26.2
2016	27.2	28.7	29.2	28.7	28.8	29.2	28.7	29.7	29.7	29.5	28.9	28.9
2017	30.0	28.8	28.4	29.6	29.5	29.1	28.5	19.2	29.4	28.8	28.0	28.6
2018	26.9	30.1	27.5	27.5	26.8	29.0	29.4	29.3	30.7	28.6	28.7	27.1
2019	28.9	30.6	29.6	29.7	29.6	28.6	29.8	30.4	30.3	29.1	27.8	25.9
2020	26.7	27.7	26.7	27.5	28.6	28.7	28.6	28.9	28.4	27.8	27.3	28.0

Table 5: Maximum average monthly temperature (mm)

From the above data, the following is the combined graph for Maximum and minimum monthly average temperature from Mwanza TMA.

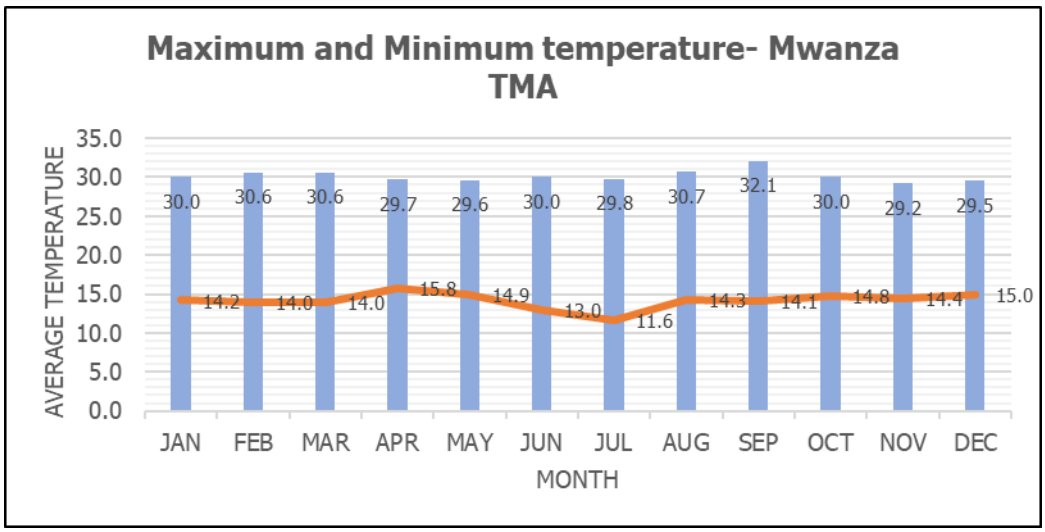


Figure 3: Maximum and minimum temperature for mwanza TMA

It was found that, there is minimum temperature from June to July and maximum temperature is in September. These data are also the basis for understanding the hydrological responses within the sub basins.

2.2 Catchments

There are about 10 main catchments along the project road. Their areas range from 1.0 km^2 to 5.6 km^2.The details of catchments information can be clearly presented in appendix 2&3.

2.3 The Catchment Characteristics

2.3.1 Drainage

The study area falls basically under Lake Victoria drainage basin. All available streams and rivers run and empty their water in the Lake Victoria which locates about 1.5km from the study area.

The soil is well drained in most areas and in some fewer areas it has slightly impeded drainage. However, throughout the project road network, the soil has been assumed to have a mixture of well and slightly impeded drainage.

2. 3.2 Land Use/Land cover

The land use under project area is basically dominated with settlements/ urban area. All streams, catchments drain its water via settlements, paved areas and in some few places with bare land (For open spaces).

2.3.3 Terrain

The land under project area lies between an altitude of 1133m to 1313 m above sea level (asl). The terrain changes from hilly, rolling, undulating to relatively flat all along the project area.

There are occasional hills on either side of the project road network. The highest point in the project area is 1313m asl whereby streams run from the hilly towards their footings and finally drain water to the lowest point (Lake Victoria).

3. Design Standards:

3.1 Background

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

The design flow is 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 or a limited amount of flooding to be exceeded on the average once during the design return period.

The very first step the consultant has undertaken regarding the hydrological investigation and its hydraulic analysis was to obtain the approved alignment for the all-access roads and the market location from the Ilemela Town Council. The second step was to procure DEM/DTM of the project area and topographic maps with the study area in it. These set of data were instrument for the analysis of the hydrology and hydraulic of the area as discussed in the following sub sections.

3.2 Extracting Data for Hydrological Analysis

The data (Digital Elevation Model-DEM/Digital Terrain Model-DTM) was obtained from the International Centre for Tropical Agriculture (CIAT). CIAT have derived/ processed the data from the USGS/NASA SRTM data (Shuttle Radar Topography Mission) to provide seamless continuous topography surfaces.

Delineation: Delineation is used to define boundaries of the drainage basins, and/or to divide the drainage basins into sub-catchments. Delineation is a part of the process known as

watershed segmentation, i.e., dividing the watershed into discrete land and channel segments to analyze watershed behavior (Figure 4).

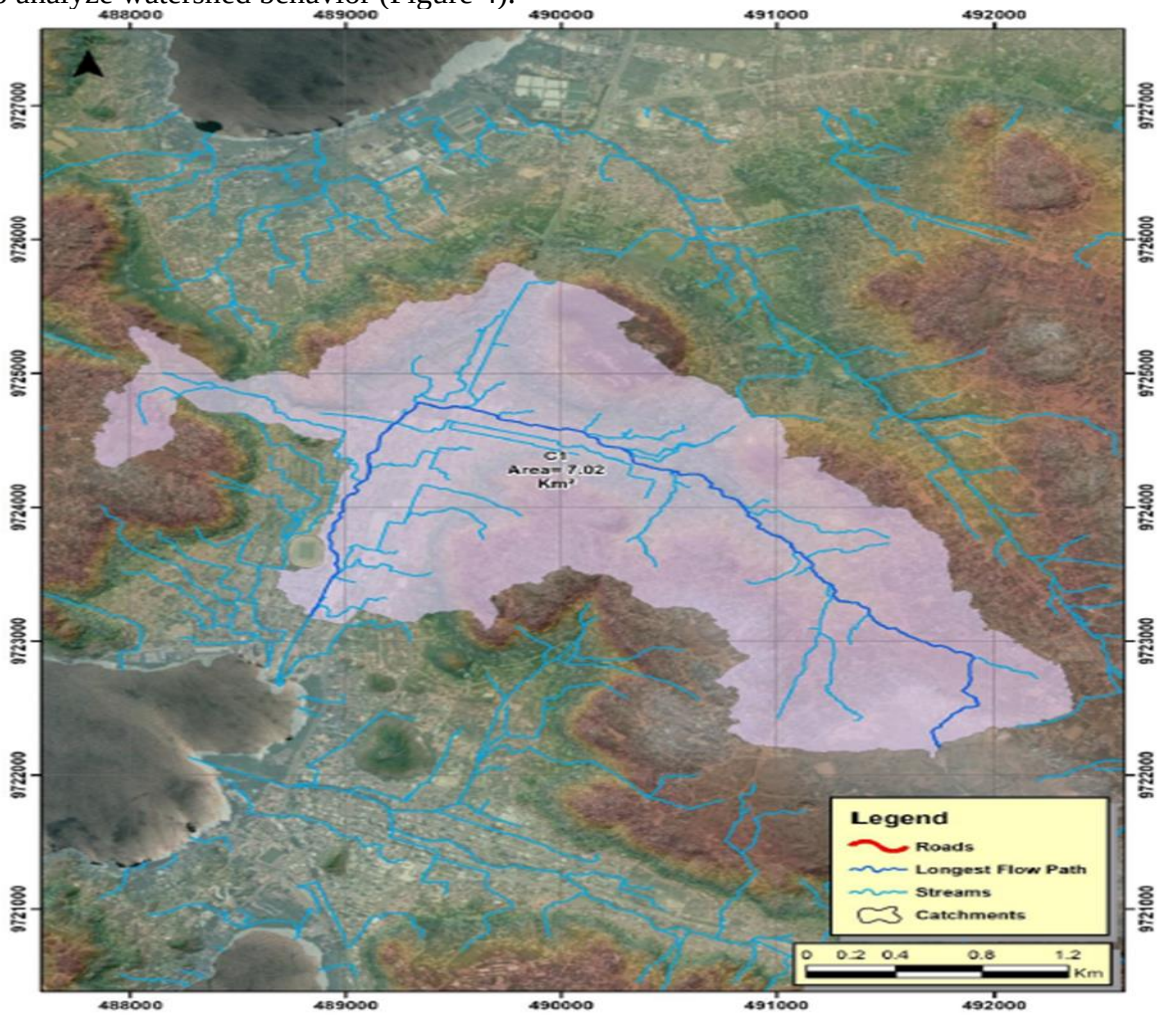


Figure 04: Delineated catchments draining the study area

After determining catchment sizes of streams draining the study area, it will be easier to decide which method can be applied to estimate discharges across the study area.

The areas as measured by ArcGIS indicated that some of the catchment's size of the streams crossing the road were less than $1km^2$ while others were above $1km^2$.

Such variations of catchment sizes suggested that more than one hydrological model have to be used in determining the design discharges of rivers/stream crossings. In response to the different sizes of catchment areas measured, two methods were applied to determine the design discharges of rivers/stream crossing: (i) Rational Method (RM) applicable for catchments with areas which are less than or equal to $1km^2$, (ii) The East African Flood Model (EAFM) which is applicable for catchments with areas of above $1km^2$ but not for catchment with areas beyond $200km^2$.

3.2 The Models

There are a number of models which can be used to analyses both discharge from un-gauged channels and the flood flow frequencies from gauged channels. However, there are several factors which outweigh applicability of these models in different environments.

Based on this reason, the models which were applied in this study were carefully selected to meet the condition of both the study area and geographical location. With respect to the results

of catchment sizes from the study area and Tanzania standards of drainage design, it was apparently revealed that the Rational model and the East African Flood Model has to be applied to estimate the design discharges in the study area.

There are several hydrological methods for estimating peak floods, however under this study only two methods were applied basing on catchment sizes examined.
The rational method is a suitable method for small catchment areas. Thus, all the catchments with areas less than $1km^2$ in the study area have been analyzed using this method. This method has been one of the most widely used methods for predicting peak discharges on un-gauged catchments. All criteria in the use of this method have been considered and addressed accordingly. Some of the major criteria which was highly considered in the use of this methods are:

a) Catchment areas are less that $1km^2$;
b) The runoff coefficient was carefully chosen for each of the catchment.

Rational Method:

- The Rational Method used for small catchments with sizes of around 1.0 km^2 where rainfall distribution becomes fairly uniform or where drainage flow distance is less than 1.0 km.

The Area Reduction Factor (ARF) reduces the point rainfall to a value that is uniform over the entire catchment. It is given by

$$ARF=1-0.044A^{0.275}$$

The effective point rainfall duration Tc (hours) that gives the rainfall concentration time and therefore the required rainfall intensity is given by

$$Tc= (0.519*L)/ (A^{0.1}*S^{0.2}).$$

Discharge Q (m^3/s) is computed from

$$Q=ARF*c*I*A/3.6$$

where A is the catchment area (km^2),
L is the channel length (km),
S is the channel slope,
c is the runoff coefficient and
I is the rainfall intensity (mm/hr)

- The **Transport and Road Research Laboratory East Africa Flood Model (TRRL EAFM)** used for catchments with areas greater than 1km2 but not exceeding $200km^2$. The point rainfall is reduced to a catchment representative value by ARF given by

$$ARF=1=0.04T^{-1/3}A^{1/2}$$

where T is the zone dependent rainfall duration in hours and the other acronyms are as shown above

The TRRL EAFM is used here on catchments with coverage not exceeding 200km^2 while RFFA is used on those catchments having sizes greater than 200 km^2.

4.0 Calculations of Design Peak Floods

The Transport and Road Research Laboratory-East African Flood Model (TRRL EAFM) has been used here together with the Rational method to estimate the peak floods for catchments with outlets at the roads network.

4.1 The TRRL EAFM

4.1.1 Background

The TRRL EAFM is a simple conceptual catchment model developed to predict the 10-year peak flood for catchments with areas not exceeding 200km^2.
The peak floods for higher return periods are estimated basing on the 10-year peak flood.
The model assumes that the catchment can be modeled as a linear reservoir the input into which is rainfall and the output is the catchment runoff.

The outflow Q of such a reservoir is related to the reservoir storage S by linear relationship

$$Q = \frac{1}{K} S$$

where K is the reservoir lag time whose value is dependent on the characteristics of the catchment, particularly land cover.
The hydrograph assumed here has a peak factor

F = 2.3 for lag time K>1 hour and
F = 2.8 for lag time K< 0.5 hour
This peak flow factor is defined as the ratio of peak flow Q_p and average flow Q_{avg} during the base time T_B, that is,

$$F = \frac{Q_p}{Q_{avg}}$$

4.1.2 Runoff Volume

The total volume of runoff R_O is given by

$$R_O = (P-Y)*C_A*A*10^3$$

Where: P is the total storm rainfall (mm) during time period equal to the base time T_B.
Y is the initial retention (mm)
C_A is the contribution area coefficient and
A is the catchment area (km^2)

Average Flow

For the hydrograph time base T_B, storm rainfall P and a total volume of runoff R_O, the average flow Q_{avg} is calculated as

$$Q_{avg} = \frac{0.93* R_O}{3600* T_B} \quad m^3/s$$

The base time is estimated as

$$T_B = T_P + 2.3K + T_A$$

Where: T_P is rainfall time (hours), the time when rainfall intensity remains at a high level
K is the catchment lag time (hours) and
T_A is the additional time for flood wave attenuation (hours).

The 10-year Storm Rainfall

The 10-year storm rainfall P can be determined for a given catchment area A and a given rainfall base time T_B as

$$P = R_{TB} * ARF$$

Where: R_{TB} is the 10-year point rainfall during the base time T_B and
ARF is an area reduction factor which indexes the rainfall variability in space. It considers the reduction of the rainfall with increasing catchment area.
For Tanzania, ARF can be determined using the equation

$$ARF = 1.0 - 0.04T^{-1/3} A^{1/2}$$

The 10-year rainfall R_{TB} during the base time T_B is calculated from the expression

$$R_{TB} = RR_{TB} * R_{10/24}.$$

where: RR_{TB} is the rainfall ratio that indexes the rainfall variability in time and is given by

$$RR_{TB} = T_B/24*(24+b)/(TB+b))^n$$

b and n are empirical zone dependent indices for rainfall given in the TRRL EAFM Report as b=0.33 and n=0.96 for the zone on which the project road lies.
$R_{10/24}$ is the 10-year daily (24-hours) rainfall that is estimated from the regional maps of the 2-year daily rainfall $R_{2/24}$ and the empirical zone specific 10:2 years ratio $r_{10:2}$ provided in the report.

$$R_{10/24} = r_{10:2} * R_{2/24}.$$

Rainfall

The TRRL EAFM Report 706 gives the values

$r_{10:2}$ = 1.49 and
$R_{2:24}$ = 70 to 80; average is 75 mm so that
$R_{10:24}$ = 111.75 mm over the study area.

These rainfall values are the average values for the inland areas of Tanzania. They are used in the absence of data close by.

Annual maximum 24-hour rainfall data on the study area, which provide the actual rainfall statistics for the study area, are available at Mwanza airport weather station.
These are presented in section 2 above with their distributions at the attachments.
In this study, therefore, the individual station values have been used with their areas of influence but basically the area under study is well influenced with the Mwanza airport weather station.

Initial Retention Y

Initial retention is the rainfall entering the reservoir without creating outflow. It is calculated from the balance of evapo-transpiration and rainfall since the last storm having given significant runoff.
In dry and wet zones in Tanzania the probability that the soils are at field capacity is quite high and therefore initial retention is assumed here to be

$$Y = 0.$$

Contributing Area Coefficient C_A

In a catchment not all the surface contributes to the formation of runoff, depending on different factors like terrain, slope, soil, land use, vegetation, soil moisture etc.
The effective contributing area coefficient is given by

$$C_A = C_S * C_W * C_L$$

where CS is the standard value of the contributing area coefficient
C_W is the catchment wetness factor and
C_L is the land use factor
The coefficient and the factors were selected from tables below.

TABLE 06: THE STANDARD CONTRIBUTING AREA COEFFICIENTS, Cs

Catchment Slope	Soil Type		
	Well Drained	Slightly Impeded Drainage	Impeded Drainage
Very Flat < 1.0%		0.15	0.30
Moderate 1-4%	0.09	0.38	0.40
Rolling 4-10%	0.10	0.45	0.50
Hilly 10-20%	0.11	0.50	
Mountainous > 20%	0.12		

TABLE 07: THE CATCHMENT WETNESS FACTORS, Cw

Rainfall Zone	Catchment Factors (Cw)	
	Perennial Streams	Ephemeral Streams
Wet Zone	1.0	1.0
Semi-arid Zone	1.0	1.0
Dry Zones	0.75	0.5

TABLE 08: THE LAND USE FACTORS, C_L

Largely Bare Soil	1.50
Intense Cultivation (particularly in valleys)	1.50
Grass Cover	1.00
Dense Vegetation (particularly in valleys)	0.50

Ephemeral Stream, Sand Filled Valley	0.50
Swamp Filled Valley	0.33
Forest	0.33

4.1.3 Base Time T_B.

The base time T_B is the sum of

- the rainfall time TP, the time during which the rainfall intensity remains at high level. It is a zone dependent factor and is provided in the TRRL EAFM maps
- the recession time T_R for the surface flow estimated as $T_R = 2.3K$ where K is the lag time.

- the attenuation time of the flood wave T_A in the stream system estimated from the equation

$$T_A = 0.028 * L/ (Q_{Avg}{}^{¼} * S_C{}^{½})$$

where L is the stream length,
Q_{Avg} is the estimated average discharge and
S_C is the stream slope.

The rainfall time T_P and the lag time K were selected respectively from Tables 9 and 10 below.

TABLE 09: RAINFLL TIME (T_P) FOR EAST AFRICA 10-YEAR STORMS

Zone	Index "n"	Rainfall Time (T_P)
Inland zone	0.96	0.75
Coastal zone	0.76	4.0
Kenya-Aberdare Uluguru zone	0.85	2.0

TABLE 10: THE CATCHMENT LAG TIMES K

Catchment Type	Lag Time K (hr)
Arid	0.1
Very Steep Small Catchments (slope >20%)	0.1
Semi-arid Scrub (largely bare soil patches)	0.3
Poor Pasture	0.5
Good Pasture	1.5
Cultivated land (down to river bank)	3.0
Forest, Overgrown Valley Bottom	8.0
Papyrus Swamp in Valley Bottom	20.0

The details and results of the hydrological calculations, including the various parameters that characterize **each of the study catchments**, are shown in **Table 13** of this report and detail in appendix 1&2.

Table 15 is a self-contained table where all the catchment variables are conveniently lumped and used to compute the design discharges, iteratively, for return periods 10, 25, 50 and 100 years.

5.1 Drainage Design

5.2 Hydraulic Design

5.1.1 Existing drainage structures

During the field investigations, the drainage structures crossing the project road network were recorded. These were

-Concrete pipe culverts of sizes 0.6m, 0.9m and 1.2m.

-Concrete box culverts and open drains with various sizes.

Pipe culverts are hereby categorized as minor structures and box culvert as major structures.

5.1.2 Erosion

Erosion at culvert inlets has generally not been a major problem, except where a confined approach channel is not aligned with the drainage structure. Erosion at culvert outlets has, however, been a common condition due to high exit velocities.

The stream / Open drains bed and banks there consist mostly of soil/earth materials that are vulnerable to erosion by flowing water.

5.1.3 Channel Stability

Channel stability varies from channel to channel depending on the bed slopes, vegetative cover and type of soil material. There is only one noticeable big stream in the project area which finally runs and drain its water to the Lake Victoria.

Major stream bed, has sandy soil material with some foreign materials composed of sand and small stones.

The other channels are small and are in their middle stages of development. Stability, both at the banks and beds, are fair due to presence of some few vegetative cover.

5.2 Hydraulic Design Standards

A considerably large part of the total cost of a road works project is attributable to construction of drainage structures and the associated works like scour protection and improvement of river bottom and bank stability. In this respect, the factors associated with drainage design must therefore receive careful and detailed attention.

5.2.1 The Specifications

The following are the general specifications:

-all the structures to be constructed of reinforced concrete

-the pipe culverts should have a minimum diameter of 0.9m

-structure to occupy the full span and natural depths of the channels they cross in order to avoid future morphological changes as a result of significant changes in flow velocities

-Major structures/bridges with span > 6m should be designed for peak flows with clearance between the maximum water level and the bridge soffit, known also as the freeboard specified in **Table 11.**

TABLE 11: SPECIFICATIONS ON FREEBOARD

Discharge Range (m^3/s)	Clearance (or Freeboard) (m)
50 – 100	0.3
100 – 200	0.6
200 – 400	0.8
400 – 1000	1.0
>1000	0.8*log(Q) – 1.3

5.2.2 Risks and Uncertainty in the Selection of Design Floods

The probability that the design flood will be equaled or exceeded during the N-year design life of a hydraulic structure is called the hydrological risk.

The risk of failure R of a hydraulic structure is given by

$$R=1-(1-1/T)^{N}$$

Where T is the return period and

N is the design life time of the structure (years).

Table 12 below presents the risk of the various design lives and return periods.

TABLE 12: RISKS FOR THE VARIOUS DESIGN LIVES

Recurrence Interval T-Years	**Risk of Failure**			
	N=10	**N=25**	**N=50**	**N=100**
2	99.90	100	100	100
5	89.25	99.62	100	100
10	65.13	92.82	99.48	100
20	40.13	72.26	92.31	99.41
25	33.52	63.96	87.01	98.31
50	18.29	39.65	63.58	86.74
75	12.56	28.51	48.89	73.88
100	9.56	22.22	39.50	63.40
500	1.98	4.88	9.63	18.14
1000	1.00	2.47	4.88	9.52

The relationship shows that the probability that a structure designed for 100-year flood during its estimated design life of N=50 years will be overtopped is R=39.5%.

If we need to lower the risk to R=4.88%, the structure has to be designed for T=1000 years flood. That is to say, for a given design life N, increasing the design frequency Twill lower R. This offers a good criterion for making objective decision on the design floods for the hydraulic structures.

5.2.3 The Design Return Period

The adopted design return periods are 25 years for pipe and box culverts and 50 years for bridges while its 2 years for other structures.

5.3 The Hydraulics of Drainage Structures

The complexity of the culvert hydraulics rests on the short length of the conduit and the existence of several flow control types which may also change with changes in discharge.

Several standard hydraulic calculation procedures to determine the hydraulic capacities of the drainage structures, under the mentioned hydraulic complexity, have been put into monographs and equations to help in the designs.

5.3.1 Culverts

Energy is required to force flow through a culvert. This energy takes the form of increased water surface elevation on the upstream side of the culvert.

This depth of upstream water surface measured from the invert at the culvert entrance is the headwater depth, H_w.

Calculations of discharge capacities of culverts have been based on an allowable ration of headwater depth H_w /height (h) of culvert opening, $H_w/h \geq 1.2$. Maximum value of this ratio is 1.5.
Models are available that can be used to determining the dimensions of the hydraulic structures required to pass the design peak floods across a road embankment.
South African Drainage Manual (Rooseboom et al., 1993) presents such a model. Based on this ratio the model takes the form shown below for the inlet control situation.

Concrete Box Culverts (CBC)

$$Q=C*B*D*(2g(H-CD))^{0.5}$$

where Q=discharge (m^3/s)
C=energy loss coefficient
B=culvert width(m)
D=culvert height(m)
H=upstream water head
g=gravitational acceleration (m/s^2)

Concrete Pipe Culverts (CPC)

$$Q=(2gHCA)^{0.5}$$

where Q=discharge (m^3/s)
A=water flow area (m^2)
C=energy loss coefficient
H=upstream water head
g=gravitational acceleration (m/s^2)

5.3.2 Manning's formular

There are a limited number of methods for determining sizes of structures in open channels. The most popular method is the Manning equation and is discussed and applied in this study.
The key consideration in using the Manning equation was the selection of the roughness coefficients. Due to the low variability in channel sizes, the roughness coefficient ranged from 0.025 – 0.03 for normal size stream channels and large size stream channels.
Manning relationship has been used to size various hydraulic structures. This relationship is given as

$$Q= (1/n)*A*R^{2/3}*S^{1/2}$$

where A is the channel cross-section area
R is the hydraulic radius and
S is the channel slope.

6.0 Conclusion and Recommendations

The Transport and Road Research Laboratory East Africa Flood Model (TRRL EAFM) and the method technique have been used to estimate the design peak flood discharges, incorporating the information collected from the field together with the catchment characteristics extracted from the topographic maps covering the area and justified during the field reconnaissance survey.
The estimated peak flood discharges so computed are considered to be reasonable for the design of the appropriate drainage structures.

Based on the estimated design flood discharges, various drainage structures have been proposed.
The sizes of the drainage structures proposed are the minimum sizes required to pass the peak floods across the project road.
It is recommended that regular cleaning of the openings of the structures, once constructed, be done to ensure their sustainable hydraulic performance.
Table 13 on the next page presents a general summary of the proposed structures.

TABLE 13:List and Location of all structures at Kirumba Market Access Roads 2.9km

ID	Location				Existing Structure			Proposed Structure			Remarks
Major/Min or Structures	Chainage (Km+m)	UTM Easting	UTM Northing	UTM Zone	Type	BRG = Span x Depth; CBC = Span x Depth; CPC= Diameter; Units (m)	No. of Cells	Type	BRG = Span x Depth; BC = Span x Depth; CP = Diameter; Units (m)	No. of Cells	
Start (Furahisha Road)	0+00	489018	9723433	36s				CPC	0.9	1	New Proposed due to Discharge
1	0+100	488988	9723359	36S				CPC	0.9	2	New Proposed due to Discharge
2	0+200	488947	9723263	36S				CPC	0.9	1	Access to Annex Hotel
3	0+240	488929	9723226	36S				CPC	0.9	1	Access to Garage
4	0+300	488898	9723166	36S	CPC	0.6	1	CPC	0.9		Replace due to Discharge
End (Furahisha Road)											
Start (Vuka Road)											
5	0+00	488929	9723473	36S				CPC			Start Vuka RD& SD
6	0+50	488910	9723438	36S				CPC	0.9	1	Access to RIKS hotel
7	0+75	488911	9723417	36S	BC	1.2X1.2		BC (Skew)	1.5X1.5	1	Replace due to discharge
8	0+130	488896	9723394	36S				CPC	0.9	1	Access to RHS
9	0+155	488880	9723332	36S				CPC	0.9	1	Access to RHS
10	0+220	488851	9723262	36S	BC	1.2X1.2		CPC		1	Moved to CH - 0+230

11	0+230	488847	9723252	36S				BC	2.0x2.0	1	Proposed new Box Culvert
12	0+301	488828	9723192	36S	CPC	0.9		CPC	0.9	1	End Vuka RD (Provided New CP)
End (Vuka Road)											
Start (Mbugani Road)											
13	0+00	488865	9723497	36S				CPC	0.9	1	New Proposed due to Discharge
14	0+35	488852	9723471	36S				CPC	0.9	1	Access CP RHS
15	0+100	488833	9723416	36S				CPC	0.9	1	Access CP RHS
16	0+225	488789	9723291	36S	CPC	0.6	1	CPC	0.9	1	New proposed due to discharge
End (Mbugani Road)											
Start (Sokoni-1 Road)											
19	0+00	488808	9723351	36S	CPC	0.6	1	CPC	0.9	1	Replace due to discharge
20	0+98	488718	9723378	36S				CPC	0.9	1	New Proposed due to Discharge
End (Sokoni-1 Road)											
Start (Sokoni-2)	0+00	488829	9723412	36S	CPC	0.6	1	CPC	0.9	1	Replace due to discharge
21	0+110	488728	9723442	36S				CPC	0.9	1	New Proposed due to Discharge
End (Sokoni-2 RD)											
Start (Sokoni Road)											
22	0+00	488734	9723529	36S				CPC			
23	0+200	488698	9723316	36S				CPC	0.9	1	Access rd RHS
24	0+275	488680	9723244	36S				CPC	0.9	1	New Proposed due to Discharge
25	0+00	488709	9723316	36S				CPC	0.9	1	New Proposed due to Discharge

26	0+167	488795	9723282	36S				CPC	0.9	1	Access RHS
27	0+225	488844	9723266	36S				CPC	0.9	1	New Proposed due to Discharge
End (Sokoni Road)											
Start (Msikitini Road)											
28	0+00	488669	9723542	36S				CPC	0.9	1	New Proposed due to Discharge
29	0+275	488623	9723261	36S				CPC	0.9	1	New Proposed due to Discharge
End (Msikitini Road)											
Start (KVC Road)											
30	0+00	488525	9723287	36S	CPC	0.9	1	CPC	0.9	2	Start KVC, Existing CP-0.9-SD
31	0+150	488481	9723154	36S				CPC	0.9	1	Access KVC
32	0+175	488483	9723122	36S	BC	2.0 X 1.5	1	BC	2.0X2.0	1	Replace due to Discharge
33	0+245	488486	9723064	36S				CPC	0.9	1	New Proposed due to Discharge
34	0+312	488488	9722991	36S	BC	1.0x1.0		CPC	0.9	2	Replace due to Discharge
End (KVC Road)											
Start (Bismark Road)											
35	0+00	488768	9723203	36S				CPC			
36	0+148	488725	9723060	36S				CPC	0.9	1	ACCESS TO RHS
37	0+199	488714	9723013	36S				CPC	0.9	1	Access to Petro station
38	0+218	488707	9722996	36S	CPC	0.6	1	CPC	0.9	1	Replace due to Discharge
End (Bismark Road)											
Start (Zenze Road)											
39	0+00	488876	9723159	36S				CPC			
40	0+075	488859	9723098	36S				CPC	0.9	1	Access LHS

41	0+124	488842	9723056	36S				CPC	0.9	1	Access LHS
42	0+239	488812	9722936	36S	CPC	0.9	1	CPC	0.9	2	End Zenze
End (Zenze Road)											

	Key		BRG =	Bridge		
			CBC =	Concrete Box Culvert		
			CPC =	Concrete Pipe Culvert		

Appendix IX: Geotechnical Study Report

1 GEOTECHNICAL

1.1 Introduction

The President's Office, Regional Administration and Local Government (PO-RALG) has received a fund from the World Bank under the umbrella of the World Bank-financed Tanzania Cities Transforming Infrastructure and Competitiveness Project (TACTIC), implemented through the PORALG to support of urban management performance and deliver improved basic infrastructure and services in participating urban local government authorities. The President's Office, Regional Administration and Local Government (PO-RALG) (the Client), Tanzania, invited the Specialized Consultants to submit their proposals to undertake the Consultancy Services for the Feasibility Study, Urban Design, Detailed Engineering Design, Environmental and Social Due Diligence, Preparation of Cost Estimates and Bidding Documents for Urban Infrastructure Investments in Mwanza, Ilemela, Geita and Kahama Cities/Municipalities/Towns (Tactic Zone 2). As such, Dar as one of the main Consultants working in Tanzania with vast experience in urban design and infrastructure projects submitted comprehensive technical and financial offers that got the highest evaluation and accordingly, the project has been awarded to Dar.

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 **Ilemela 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 as shown in Figure 1.

Geita 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 Geita Region.

Kahama is a town in north-western Tanzania. The town serves as the headquarters of Kahama Urban District. Kahama is located in the Kahama District of the Shinyanga Region. The town is approximately 536 kilometres by road, north-west of Dodoma, the capital of Tanzania.

Mwanza City comprises of Nyamagana and Ilemela Districts. In 2000, Nyamagana District attained the City status and since then it is referred as Mwanza City which is ruled by the City Council.

Mwanza city is located on the southern shores of Lake Victoria in Northwestern Tanzania.

Ilemela District is largely rural, and it is ruled by Municipal Council. The city has 37 wards of which

18 wards are in Nyamagana district and 19 wards in Ilemela district. In addition to that, the city has smaller administrative units classified into sub-wards (Mitaas), villages and sub-villages (vitongoji).

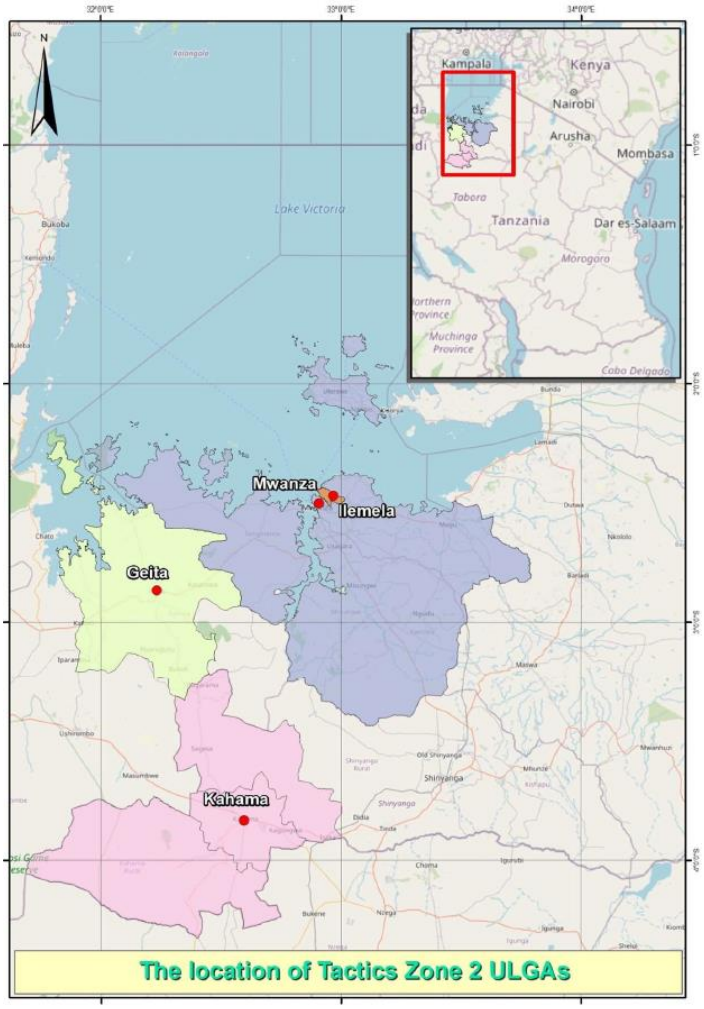


Figure 1: Location of tactic zone 2

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).

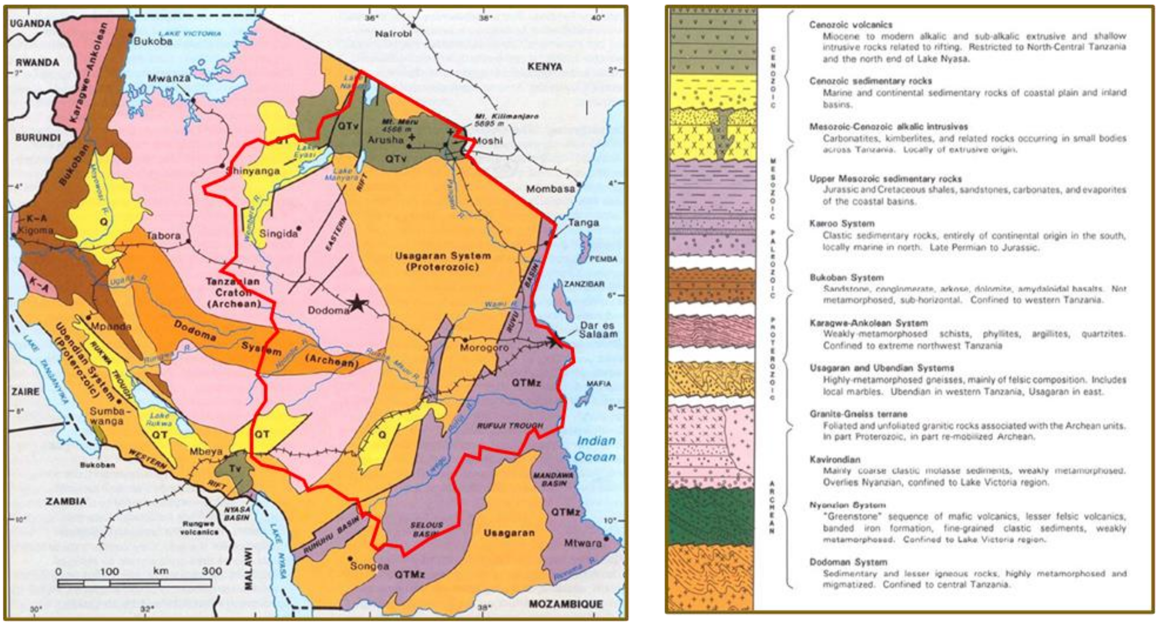


Figure 2: Google Earth satellite Images showing the site history of the project area.

1.3.1 General Geological Setting of Mwanza

Ilemela Municipality is located in the north western part of Tanzania to the south of Lake Victoria. The City of Ilemela is located in the north-western part of Tanzania to the south of Lake Victoria. Ilemela is characterized by flat to undulating topography with isolated hills of different elevations that are dissected by subparallel northwest-oriented valleys/wadis. The rock units of the Ilemela. Area forms a part of the Tanzanian Craton which is composed mainly of; Crystalline basement rocks (Granitic rocks) of Precambrian age and quartzite metamorphic rocks outcropped at places. These rocks are partially covered by Tertiary to Quaternary soil layers. Joints and foliation are the most common discontinuities in the project area and the rocks are affected by two sets of faults oriented in NW and NE directions.

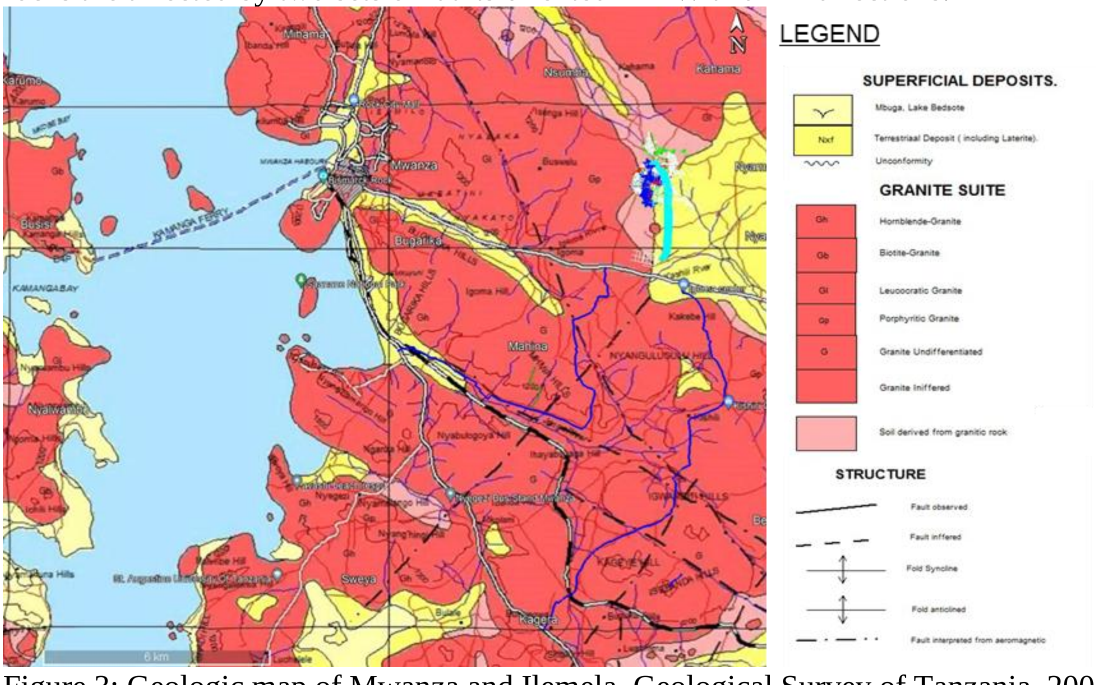


Figure 3: Geologic map of Mwanza and Ilemela, Geological Survey of Tanzania, 2002. (Scale 1:100,000)

1.3.2 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. Soil aggressiveness
- Ilemela is located close to the Lake Victoria. Hence, the potential corrosiveness of the soils throughout the project areas should be investigated in detail to define the soil properties.

iii. 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 Subsurface Investigation

To the date of this geotechnical report, the provided investigations cover the logs in-situ and laboratory test results of samples taken in 4 borehole and 40 trial pits in the study area.

- Boreholes were drilled to 10m depth, logged, sampled and in-situ SPT measurements taken at about 1.0m interval wherever possible, till refusal conditions with N values >50.
- Photographs of the cored samples were taken to correlate with the written logs.
- Samples of soil, broken rock and ground water were taken for classification, strength, and chemical analysis to confirm the site observations and measurements.
- Trial pits were excavated to 3m depth wherever possible and logged and photographed. Samples were taken for classification and CBR strength tests.
- Permeability tests performed in selected boreholes
- Piezometers was provided in selected boreholes for further monitoring.

Test pits are usually excavated to a depth of 3.0m. However, the excavation of the trial pit shall be stopped in case of some restrictions such as ground water, hard rock, or concrete.

1.4.1 Ilemela

Performed Site investigation

Eleven (11) test pits of 1.5m to 2.3m depth in Ilemela - Kirumba - central market (Area G). The below table and figure show the coordinates and location of the site investigation for Ilemela area.

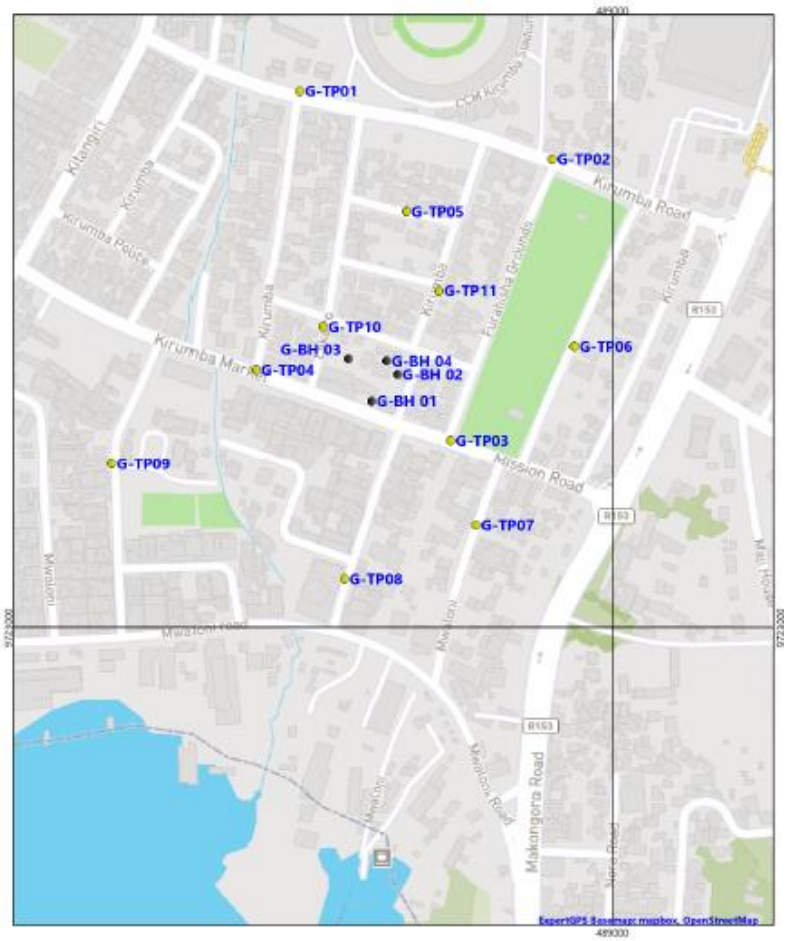


Figure 4: Layout and coordinates of the Site investigation program in Mwanza area

ID	Easting	Northing	Depth	Area	
G-BH-01	488,748.43	9,723,234.76	10	Ilemela	Kirumba - Central Market
G-BH-02	488,775.33	9,723,262.29	10.5	Ilemela	Kirumba - Central Market
G-BH-03	488,723.96	9,723,278.53	10.5	Ilemela	Kirumba - Central Market
G-BH-04	488,763.99	9,723,276.32	10.5	Ilemela	Kirumba - Central Market
G-TP01	488,673.33	9,723,556.48	1.9	Ilemela	Kirumba - Central Market
G-TP02	488,936.06	9,723,485.97	2.1	Ilemela	Kirumba - Central Market
G-TP03	488,830.58	9,723,193.68	2.3	Ilemela	Kirumba - Central Market
G-TP04	488,627.97	9,723,266.80	1.7	Ilemela	Kirumba - Central Market
G-TP05	488,784.08	9,723,431.32	1.9	Ilemela	Kirumba - Central Market
G-TP06	488,959.29	9,723,291.22	1.5	Ilemela	Kirumba - Central Market
G-TP07	488,856.92	9,723,106.24	1.5	Ilemela	Kirumba - Central Market
G-TP08	488,719.83	9,723,050.18	1.8	Ilemela	Kirumba - Central Market
G-TP09	488,479.73	9,723,168.02	2.2	Ilemela	Kirumba - Central Market
G-TP10	488,697.84	9,723,311.91	1.8	Ilemela	Kirumba - Central Market
G-TP11	488,818.23	9,723,349.28	1.8	Ilemela	Kirumba - Central Market

Trial pits less than 2.7m had restrictions such as groundwater, hard rock or concretes detailed on the logs

Soil Stratigraphy

The soil in the provided boreholes in ILEMELA consists mainly of:
Kirumba - central market

- Very loose to medium dense silty/clayey Sand up to (4.0m to 5.0m) depth in Ilemela – Kirumba area.
- Sandy CLAY form (4.0m to 5.0m) to the end of BH.
  SPTs are shown in the figure below.

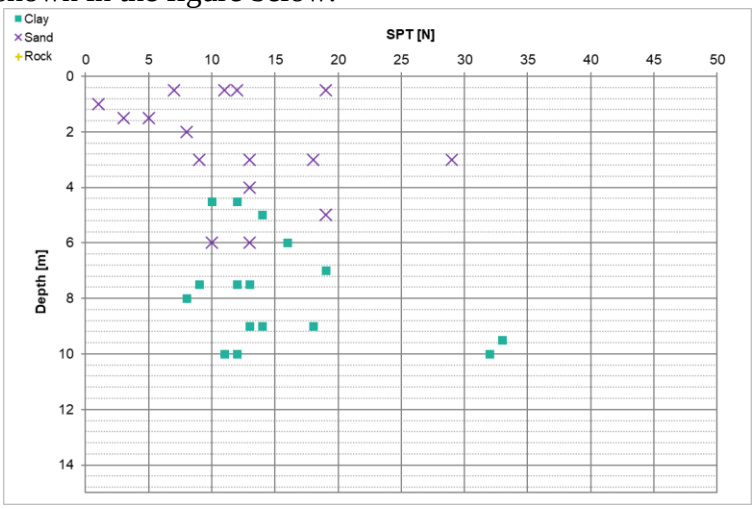


Figure 16 SPT distribution along the depth for Central market

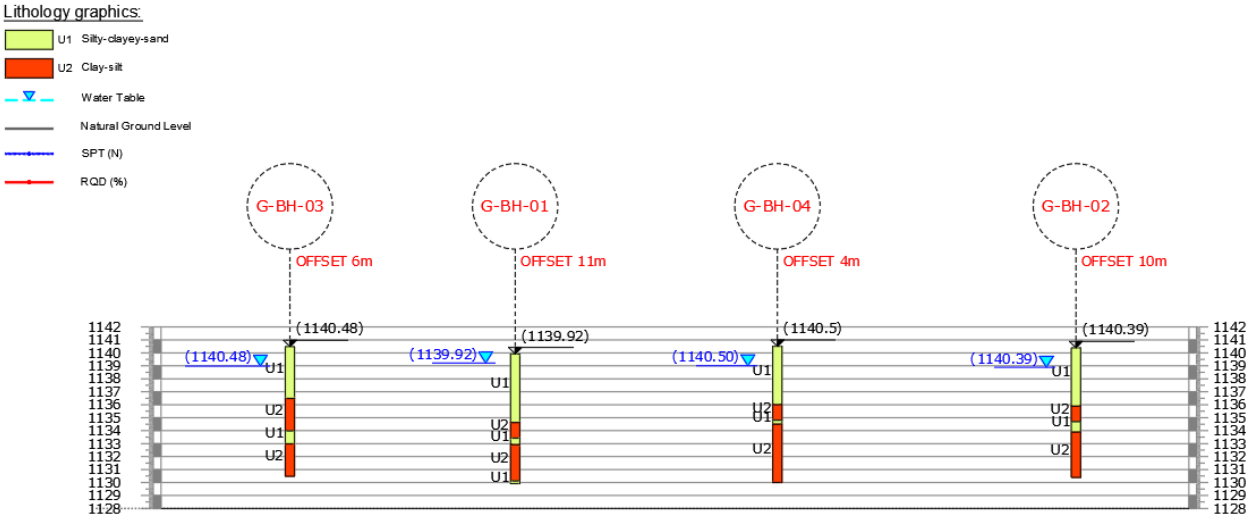


Figure 17 Geological profile for Central market

For the test pits excavated in the site G-TP-01 to G-TP-11, the CBR at 95% is shown below with depth, all values are below 10. The soil classification on the trial pit samples as per PMDM 1999 classification is shown below. It can be seen that 90% of the soil is classified G7, and 10% as G3 only in G-TP-06.

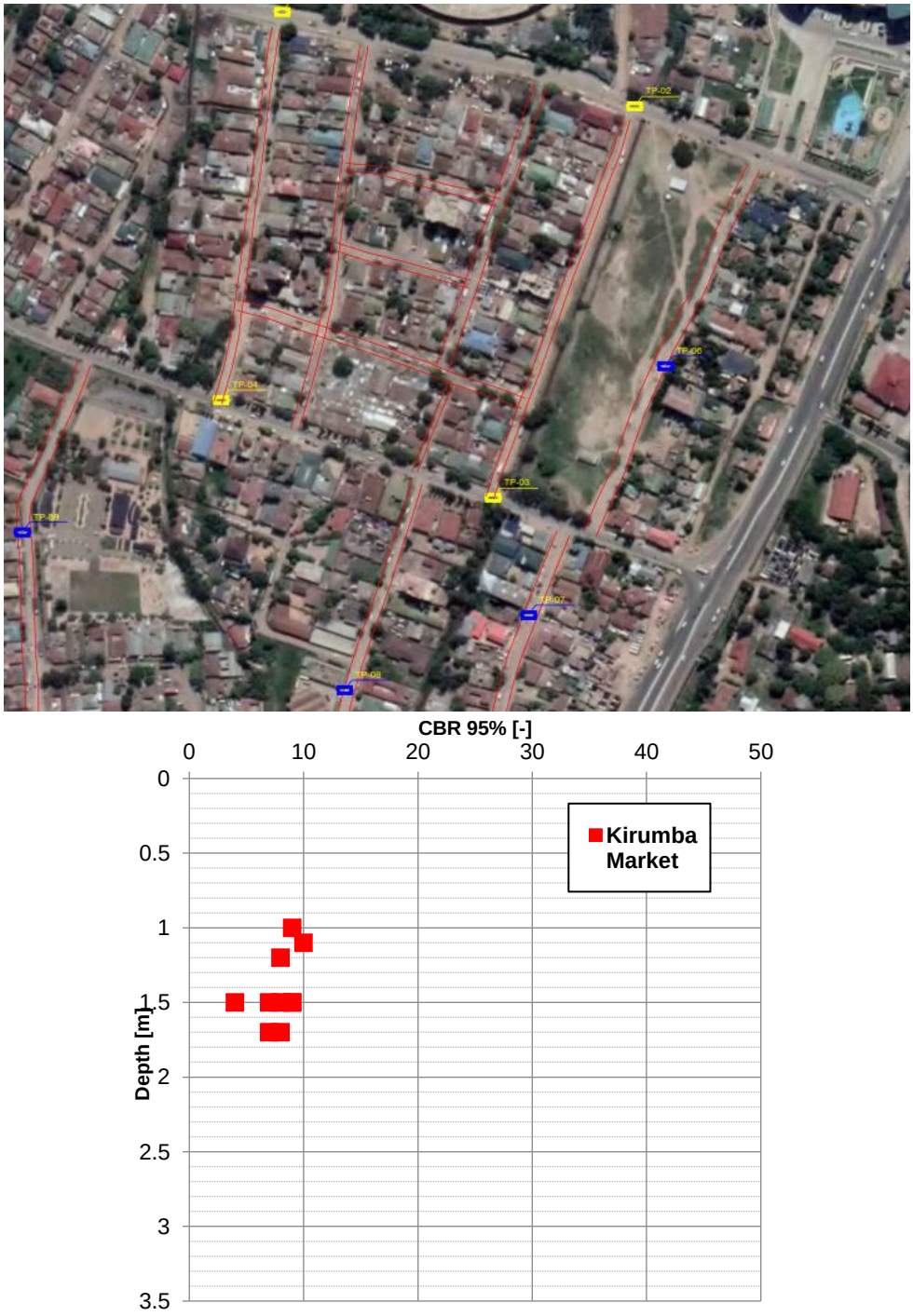
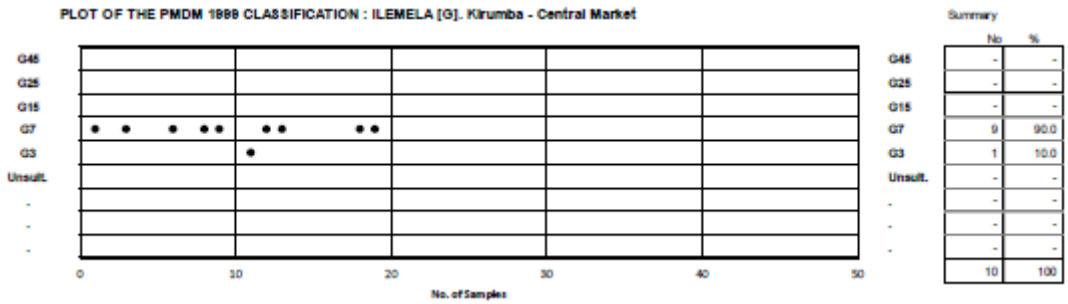


Figure 18 CBR distribution along the depth for Central market



Atterberg Limits

Atterberg limits (liquid limit LL and plastic limit PL) tests were performed on soil samples collected from G-BH-01 to G-BH-04 at different depths. The obtained results show that the majority of clay samples are low to high plastic above the A-line

Tri-axial test

Three (3) UU tests were performed on the clay at different depths.

The values of the phi were ranging from 0 to 22.5 ^{o} and Cu value from 66.76 to 212.6 kPa.

Chemical test results

Chemical Tests were carried out on selected samples of soil and ground water including the water pH,

sulphate (SO_4^{2-}) content and chloride (Cl-) content. The tests were performed according to ASTM D1293 Method B [pH of water by electrometric method], EPA Method 9038 [Determination of Sulphate content by turbidimetric method], D512 [Determination of Chloride Content by Silver Nitrate or Mohrs method] respectively.

- Groundwater samples in Ilemela area, pH varies from 7.05 to 7.61, CL- content varies from 27.5mg/L to 72.2mg/L, and sulphate content varies from 10.3mg/L to 45.3mg/L.
- Soil samples in Ilemela area, pH varies from 7.17 to 7.26, CL- content varies from 597.2mg/L to 702.5mg/L, and sulphate content varies from 1201.5mg/L to 1539mg/L.

The analyses of Exposure/Environmental Conditions and Durability Requirements for Concrete are provided in item 1.6 and 1.7.2.

Groundwater Table

With reference to the received factual data, the groundwater depth was investigated In Ilemela-Kirumba, the groundwater is found at depth 0.7m at G-BH-01, and at 1.5m at other BHs.

1.4.2 Hydrogeological Conditions

This section presents the hydrogeologic conditions at the project site, including the available subsurface data, and measured groundwater levels from piezometers, boreholes, and test pits. Furthermore, the section provides the calculated Maximum Design Groundwater Level (MDGWL) for the project site.

Based on the results of the recently carried out subsurface investigation, a gravelly SAND layer with a thickness varying between 4.0 to 5.0 m is found on the surface, followed by a layer of stiff sandy CLAY. The groundwater table is encountered at shallow depths as shown in Figure 1, while Table 1 shows the summary of the measured depth to water and permeability values within the area of Ilemela.

1.4.3 Kirumba Central Market

Regarding the Kirumba central market and access road, the groundwater table was encountered at shallow depths varying between 1.1 down to 2.3 m corresponding to an approximate elevation of 1138.9. Moreover, the permeability of the surficial layer is varying between 0.15 to 1.21 m/day, which allows water to infiltrate smoothly within the soil layer with no risk of a perched groundwater aquifer.

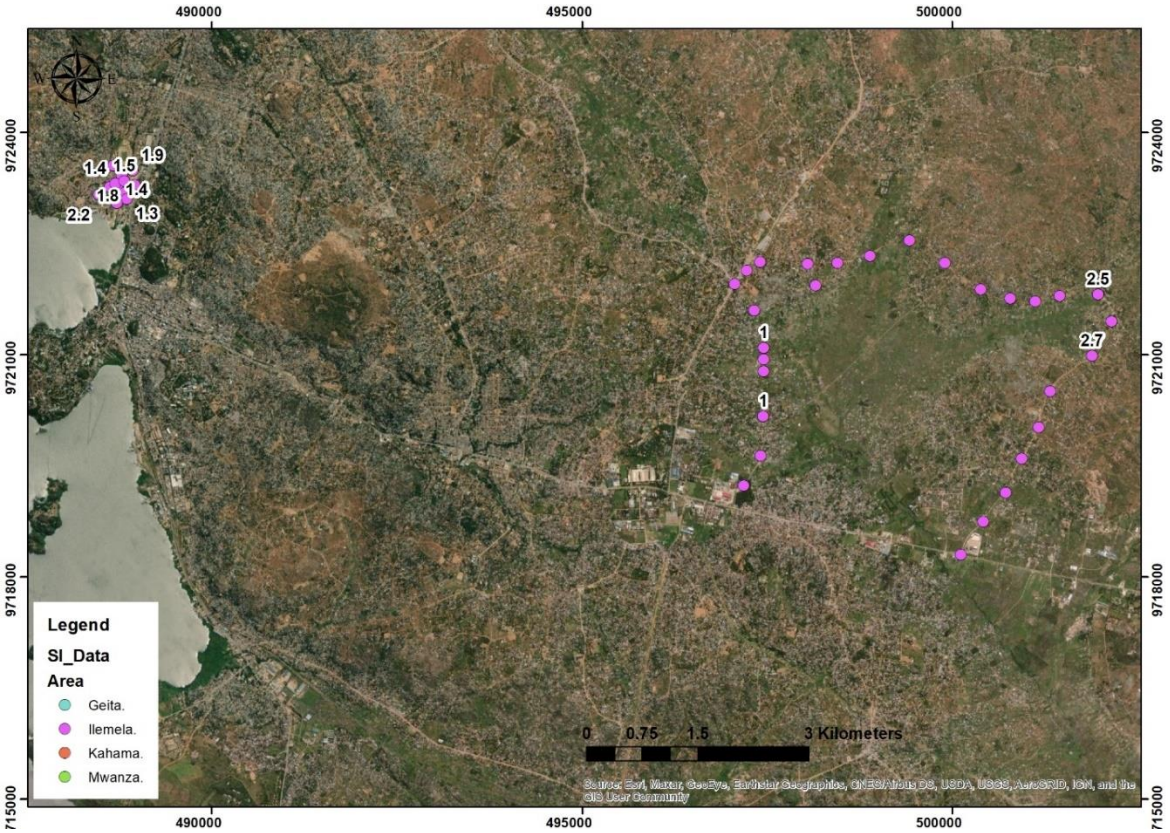


Figure 7: site investigation data carried out in Ilemela with the encountered depth to groundwater

Summary of the measured depth to groundwater and permeability in Ilemela

	Characteristic	Value
Depth to groundwater (m)	Average	1.64
	Min	1.00
	Max	2.70
Permeability (m/day)	Average	0.67
	Min	0.15
	Max	1.21

1.4.4 In-Situ and Laboratory Tests

The laboratory tests were performed on samples retrieved from site according to the relevant local standards, ASTM, and British standards. The in-situ as well as laboratory tests were performed in order to determine the characteristics of the encountered subsurface strata.

The laboratory tests included the following tests:

- Classification tests such as grain size analysis, selected sedimentation tests, specific gravity, Atterberg limits (BS 1377 Part 2),
- Selected chemical testing on groundwater samples pH and Chloride (ASTM D 512 MOHR'S METHOD), and for sulphate content (ASTM D 516 -07 / BS 1377 Part 3:1990) to assess their possible aggressiveness on concrete and reinforcement.
- Selected chemical testing on soil samples for pH and Chloride (ASTM D 512 MOHR'S METHOD), and for sulphate content (ASTM D 516 -07 / BS 1377 Part 3:1990) to assess their possible aggressiveness on concrete and reinforcement.
- CBR tests and swell after 4-days soaking for each typical soil type identified (BS 1377 PART 4: 1990)

- Direct shear tests on soil samples (BS 1377: Part 7: 1990)
- Bulk density and moisture content (CML 1.6 ref BS 1377 Part 2)
- Uniaxial compression tests when RQD allows selecting sample and Point Load tests on the rock samples.
- Falling head tests (BS EN ISO 22282-2) and constant head tests (BS EN ISO 22282-2) to determine the permeability of soils.

1.5 Basis for the Design

The selection of foundation type is based on the soil/rock conditions encountered at the Site and magnitude of structural stresses applied to the ground. Shallow foundations are proposed for the planned structures. The following section presents the design basis for shallow foundations.

Shallow Foundations shall satisfy the following criteria:

Stability Considerations: A minimum safety factor of 3 shall be considered to safeguard against the occurrence of a bearing capacity failure of the foundation soil under the imposed loads.

Serviceability Considerations: The settlement induced by the structural service loads should not impair the functionality of the structure. The total and differential settlements of shallow foundations shall be controlled within permissible limits. Using the calculated allowable bearing pressure value, the total settlement (short term + long term) for isolated/strip footing and raft foundation shall follow the ECP recommendations. However, BS EN 1997-1:2004+A1:2013 also stated that larger settlements may be acceptable provided the relative rotations remain within acceptable limits and that the total settlement does not cause problems with the services entering the structure. The allowable angular distortion as per BS EN 1997-1:2004+A1:2013 is 1: 500.

Due to the weak soil of the subsurface materials, relatively high fines content and very soft soils /loose and liquefiable sands, and for the structural safety and to avoid any excessive differential movement between the footings, the foundation soil is needed to be improved with a probable method to be defined in detailed stages. The improvement may include a soil replacement layer below the foundations or an improvement technique such as stone columns, or other relevant methods depending on the actual soil conditions and the applied stresses form the buildings.

Generally, shallow foundations are commonly used in the applications where ground conditions are suitable to withstand the average loads of typical low-rise buildings. The below figure shows some types of shallow foundations.

The use ops shallow foundation allow for limited excavation works and no requirements for specialist contractor but can be limited by the ground conditions to relatively low bearing capacities not suitable for high-rise buildings and long span structures.

The use of Deep foundations is limited to either weak soil condition or special applications such as deep basements, high uplift loads, high overturning moments, and high applied loading in high rise buildings.

Generally, the type of foundations is determined by the structural applied loads to design the most probable type and hence, the needed improvement system under the foundations.

1.6 Basis for the Design

This section presents the design basis for the foundations of various proposed structures, retaining walls, pavements, site class, and subsurface concrete.

Design Basis for Foundations

The selection of foundation type is based on the soil/rock conditions encountered at the Site and magnitude of structural stresses applied to the ground. Shallow and deep foundations are proposed for the planned structures. The following sections presents the design basis for shallow and deep foundations.

1.6.1 Shallow Foundation

Shallow Foundations shall satisfy the following criteria:

Stability Considerations: A minimum safety factor of 3 shall be considered to safeguard against the occurrence of a bearing capacity failure of the foundation soil under the imposed loads.

Serviceability Considerations: The settlement induced by the structural service loads should not impair the functionality of the structure. The total and differential settlements of shallow foundations shall be controlled within permissible limits. Using the calculated allowable bearing pressure value, the total settlement (short term + long term) for isolated/strip footing and raft foundation shall be within 25mm & 50mm respectively. However, BS EN 1997-1:2004+A1:2013 also stated that larger settlements may be acceptable provided the relative rotations remain within acceptable limits and that the total settlement does not cause problems with the services entering the structure. The allowable angular distortion as per BS EN 1997-1:2004+A1:2013 is 1: 500. However, for machinery sensitive foundations, the angular distortion could be reached 1: 750.

Foundation depth: The foundation shall be embedded not less than 1m under the ground surface and rested on a replacement layer of 0.5m to 1.0m thickness consists of gravel or crushed stone.

Bearing Capacity Calculation for Shallow Foundation on Soil

Bearing capacity failures are rarely observed in foundation design. This is mainly due to the following main factors:

settlement mainly governs the foundation design, the limitation of the settlement to limit tolerable limits and/or allowable angular distortions in the superstructure;

the Factor of Safety of 3 that is relatively high and thus allowing for sufficient margin of safety;

the minimum footing sizes also enhance the stability of the foundation

The ultimate bearing capacity of the foundation soils under the structure's shallow foundations can be estimated using Meyerhof (1963) equation:

$$q_{ult} = cN_c s_c d_c + \bar{q} N_q s_q d_q + 0.5\gamma B N_\gamma s_\gamma d_\gamma$$

The allowable bearing capacity = $\frac{qult}{FS}$ with (FS = 3.0)

Where:

c: undrained shear strength

$\bar{q}$: the effective overburden (γD)

B: the width of foundation

D: the embedment depth

γ: the Effective unit weight (submerged unit wt. if below water table) of soil

N_c, N_q, N_γ: the Bearing Capacity factors

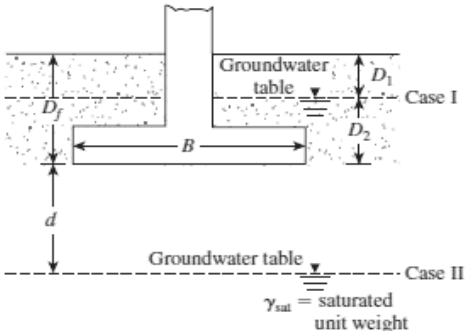
d_c, d_q, d_γ: the Depth factors

s_c, s_q, s_γ: the shape factors.

The first term accounts for the cohesive shear friction of the soil located below the footing.

The second term accounts for the soil located above the bottom of the footing. The term Ɣ x D represents a surcharge pressure that helps to increase the bearing capacity of the footing.

The third term accounts for the frictional shear strength of the soil located below the footing.



The embedment depth D is computed considering the water level with respect to the foundation's bottom level. As show in Figure 4.1 below, two cases can be considered:

i. Case I- If the water table is located at a depth D1 so that $0 \leq D1 \leq Df$, the factor γD in the bearing capacity equations take the form

$$\gamma D = \gamma D_1 + (\gamma_{sat} - \gamma_w) D_2$$

Where:
γ_{sat}: the saturated unit weight of soil
γ_w: the unit weight of water
D_2 is equal to D_f-D_1

ii. Case II- If the water table is located at a depth d below the foundation level so that$0 \leq d \leq B$, the term γD will take the form:

$$\gamma D = \gamma D_f$$

Settlement Calculation of Shallow Foundations

The total and differential settlements of shallow foundations shall be controlled within permissible limits given in the standards. As per BS EN 1997-1:2004+A1:2013, settlements is acceptable provided the relative rotations remain within acceptable limits and that the total settlement does not cause problems with the services entering the structure.

A maximum relative rotation (angular distortion) of 1/500 is acceptable for the structures under service loads.

For foundations rested on one layer (infinite depth)

$$\Delta = \frac{q.B'.(1-\mu^2).I}{E_s}$$

Where:
q: net allowable bearing capacity
B': equivalent diameter of the foundation width
□: poisson ration = 0.3
I: shape & stiffness factor (I =1.12 for square flexible footing)
E_s: Deformation modulus

For foundations rested on multilayers, the settlement is:

$$\Delta = \sum \frac{\sigma}{E_s}.h_z$$

Where:
□: applied stresses at mid depth of the layer
h_z: depth of layer

For Settlement due to consolidation in cohesive material

$$\Delta H = \frac{c_c}{1+e_o}.H.\log\frac{\sigma'_{vo}+\Delta\sigma_v}{\sigma'_{vo}}$$

Where:
c_c: compression index, $c_c = 0.007(W_L - 10)$ for overconsolidated clay and $c_c = 0.009(W_L - 10)$ for normal consolidated clay
e_o: initial void ratio
σ'_{vo}: overburden pressure at the mid clay layer
$\Delta\sigma_v$: additional applied stresses at the mid clay layer

Iterative process of the Detailed Settlement Analysis

In order to evaluate the foundation behaviour under the anticipated structural loads, an iterative process is carried out by the structural and geotechnical engineers. The detailed settlement analysis is conducted in 4 steps:

Step 1: the Structural Engineer conducts a finite element computer analysis of the foundation using the Geotechnical Engineer's best estimate of the modulus of subgrade reaction "K". In the first analysis a uniform value of "K" is used over the entire foundation footprint.

Step 2: using the structural load distributions from Step 1, the Geotechnical Engineer calculates the soil settlement at each node of the foundations. A new modulus of subgrade reaction is computed at each node.

Step 3: using the geotechnical modulus of subgrade reaction computed for each node in Step 2, the Structural Engineer conducts a new analysis, and a new pressure distribution is obtained.

Step 4: the Geotechnical Engineer computes new settlements at each node using the pressure distributions from Step 3, and the "K" values are refined accordingly.

Allowable settlement and angular distortion values

The total and differential settlements of shallow foundations shall be controlled within permissible limits given in the standards. As per BS EN 1997-1:2004, the allowable settlement is 25mm for isolated footings and 50mm for rafts. However, BS EN 1997-1:2004+A1:2013 also stated that larger settlements may be acceptable provided the relative rotations remain within acceptable limits and that the total settlement does not cause problems with the services entering the structure foundation design for buildings.

1.6.2 Kirumba Central Market

Due to the soil conditions of the site, the foundation depth shall be provided at 1.5m depth of the existing ground level. The foundation soil is represented by Sand to depth 4m with N = 9, $\varphi = 30^o$, γ at foundation level = 18kN/m^3.

Q_{ult} = 463kPa; Q_{all} = 463/3 = 154kPa; $Q_{net\ all.}$ =154- (18*1.5) = 127kPa.

As per Ciria 1995, E'/N = 0.7 for silty clayey Sand, E' = 0.7* 9 = 6300kPa.

Settlement on loose Sand soil due to 127kPa, Δ = 46.7mm for 2.0m foundation width (not allowable)

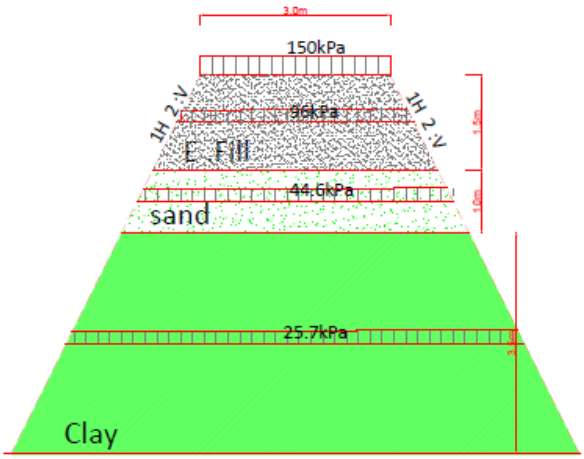
A soil replacement layer consists of engineered fill of thickness 1.5m (and protrusion 1.5m out of foundation edges) is to be adopted below the foundation level to decrease the anticipated settlement, to ensure a regular distribution of the stresses along the foundation, and to decrease the expected differential settlement along the foundations.

Settlement of foundation (150kPa) rested on 1.5m engineered fill (E = 50MPa), above the loose sand layer:

Considering that the soil at this location is below groundwater level, the settlement of the clay layer shall be analysed for two alternative cases: drained behaviour of the clay using drained deformation modulus (E'), and consolidation settlement of the clay layer using the compression index (C_C). The greater settlement value is considered.

Settlement considering drained behaviour of the clay using drained deformation modulus (E')

Depth to calculate the settlement is 2B below foundation (isolated footing), i.e., 6.0m (1.5m replacement + 1.0m sand N =9 + 3.5m Clay, N= 14, E' = 8.4MPa).



Settlement on engineered fill + sand and clay soil due to 150kPa, Δ = 20.7mm for 3.0m width < allowable.

Settlement considering consolidation settlement of the clay layer using the compression index (CC)

Depth to calculate the settlement is increased to longer depth (10m), the clay is considered as normal consolidated with W_L = 13.1% (as per lab results at depth 7.0m of the clay), e_o is considered as 0.6.

The results concluded as per program SETTLE 3, shown below,

Settlement due to **150**kPa, Δ = 22.4mm for **2.0m width foundation** < allowable (25.0mm).

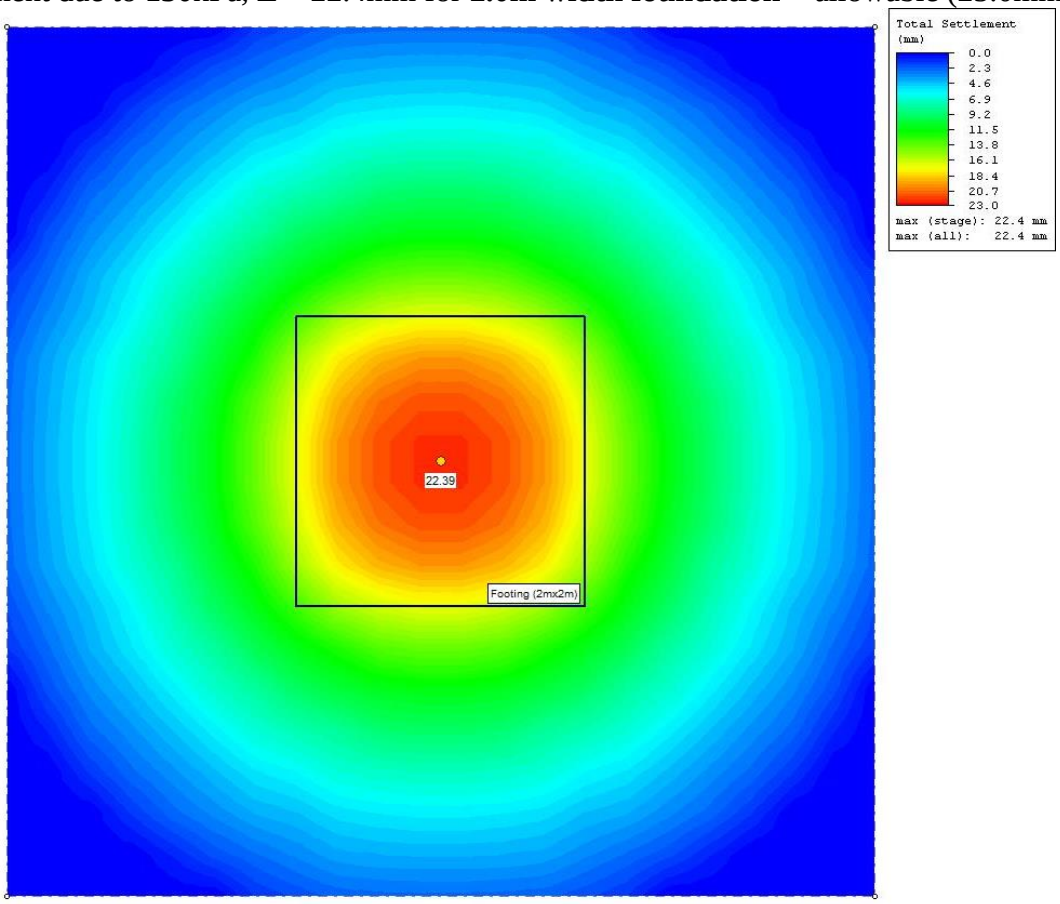


Figure 8 Settlement analysis for Kirumba market

1.7 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.

Ilemela 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 SO4), (mg/l)	pH	Chloride (as Cl), (mg/l)	Sulphate (as SO4), (mg/l)	pH
Min.	597.2	1201.5	7.17	27.5	10.5	7.05
Max.	702.5	1539	7.26	72.2	45	7.61
Average	632.3	1370.23	7.22	55.32	27.51	7.37
Adopted in Analysis*	702.5	1,539	7.26	72.2	45	7.61
Count	3	3	3	10	10	10

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 1.8.2 below.

1.8 Geotechnical Recommendations

Based on the mentioned in the above section, the following recommendations shall be followed.

1.8.1 Foundation Recommendations

- Shallow Isolated Footing connected with ground beams and/or continues 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.

1.8.2 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/m^3.
- 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.

1.8.3 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

2.4 Material Source

A list of the coordinates of the material sources and estimated quantities is tabulated here below:

Gravel Sources

- Mwanza-Ilemela – Ilalila: The estimated quantity is 35000 not active.

The test results on some samples show that the gravel is clayey Gravel with sand (62% Gravbel, 9% Sand, 29% fines and PMDM class is G15.

Sand Sources

- Mwanza-Ilemela Sand – Kiesa: The estimated quantity is 11000 active, pit sand.
- Mwanza-Ilemela Sand – Bujingwafela: The estimated quantity is 5500 not active, river sand.

The test results on some samples show that the sand sources had a high fines content and had too many organic impurities. They are not suitable for use in concrete work. Other sources need to be explored.

Rock sources

- Mwanza-Ilemela Quarry – Bukandwe: The estimated quantity is 285000 active quarry.

Existing Granite quarries were found at Bukandwe in Mwanza. The results of SSS on the aggregate from Bukandwe Quarry MWANZA are non-compliant for asphalt. Confirmatory testing may be carried out to verify otherwise an alternative source is to be sought.

Water source

- Mwanza-Ilemela - Lake Victoria.

The test results on some samples show that: pH value is 7.58, Chloride content 130.6 mg/l, and Sulphate content 27.8 mg/l. The source is suitable for construction works. Care should be taken not to contaminate or deplete adjacent public water sources. The below figure and table shows the location and coordinates of the material sources in Mwanza and Ilemela area.

- 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.

Area	Easting	Northing	Estimated Quantity
GRAVEL SOURCES			
MWANZA ILEMELA Gravel - Ilalila	503,311.20	9,734,309.50	35000 - not Active
SAND SOURCES			
MWANZA ILEMELA Sand - Kisesa	510,635.00	9,720,040.90	11000 - Active Pit Sand
MWANZA ILEMELA Sand – Bujingwafela	505,649.60	9,710,604.70	5500 – not Active River Sand
QUARRY / Rock Sources			
MWANZA ILEMELA Quarry – Bukandwe	516,050.20	9,716,745.10	285000 Active quarries
WATER SOURCES			
MWANZA ILEMELA – Lake Victoria	489,777.00	9,717,659.10	Lake

Figure 9 Sources of materials for Mwanza and Ilemela

Appendix X: Grievance Receipt and Resolution Form for Project Affected Persons (PAPs)

Grievance/Complaint Registration Number: ……. Date: ……

A. COMPLAINANT

1. Important information of the Complainant

First Name .....Middle Name .....Last Name: .....
Occupation:.....Tittle.....
Address:.....
Mob. Phone..... E-mail:…….....

2. Who is complaining

i. Project Affected Persons (PAPs)..... ☐
Specific PAPs are:
- City staff..... ☐
- Labourer ..... ☐
- Representative of complainant. ☐
- Others ..... ☐

ii. Technicians/Local Fundis ..... ☐

B. EXPLANATION OF THE GRIEVANCES

1. Source of Grievance/ Complaint.....
2. Brief explanation of the Grievance/Complaint emanating from the project implementation.....
.....
.....
.....
3. Event/person being complained about .....
.....
4. Place where the event occurred .....
5. Date of the event .....
6. Have you ever filed the same grievance before? .....**Yes**..... ☐ .....**No**..... ☐

C: LODGING THE GRIEVANCE/COMPLAINT

1. Method used to lodge the grievance/complaint

☐ Letter ☐ hone Fa☐ face E-mail ☐ thers ☐
(Mention).....

2. Name of Person registered and Filed the complaint
Name……Position……Date…….
3. Agreed time frame for feedback on the processed grievance/complaint:
(a) Immediately ☐ (b) Three days ☐ (c) One week ☐ (d) Two weeks …… ☐

GRIEVANCE/COMPLAINTS RESOLUTION

1. Date of conciliation session.....
2. Was the complainant present? **Yes** ☐ **No** ☐
3. Was field verification of complaint conducted? **Yes** ☐ **No** ☐
4. Findings of field investigation…
   ……
   …….....
   .....
5. Summary of Conciliation Session……
   .....
   .....
   .....
6. Was agreement reached on the issues? **Yes** ☐ **No** ☐
7. If agreement was reached, give the details of the agreement
   ……
   …….
8. If agreement was not reached, specify the points of disagreement and promise given to the client
   .....
   .....

Signed (Arbitrator/ Complaints handling Officer-GHO): ……Date.....
Signed (Complainant).....Date.....
Signed (Independent Observer) .....Date.....

Appendix XI: Architectural Drawings

1. SITE LAYOUT PLAN

SCHEDULE OF AREA

Plot Area.....6,698.38 SQM
MAIN MARKET
G.Floor Area.....3,364 SQM
F.Floor area.....3,591 SQM
External Facilitites area..918.02 SQM
Total Built up area.....**4,282.02** SQM
Total floor area..... **7,873.02** SQM
Plot coverage.....64%
Plot ratio.....1.18

SCHEDULE OF AREA PHASE I.

Plot Area.....6,698.38 SQM
MAIN MARKET
G.Floor Area.....3,364 SQM
F.Floor area.....3,591 SQM
Plot coverage.....50.2%
Plot ratio.....1.04

SCHEDULE OF AREA PHASE II.

External Facilitites area..918.02 SQM
Plot coverage.....13.7%
Plot ratio.....0.137

SCHEDULE OF FACILITIES

Facility	Site level	G.Floor	F.Floor	Total
Shops	49	4	78	131
Tables		400		400
Machingas			270	270
Chicken cages		30		30
TOTAL CAPACITY				831

SITE PLAN

PRESIDENT'S OFFICE, REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT TANZANIA (PO-RALG)

dar

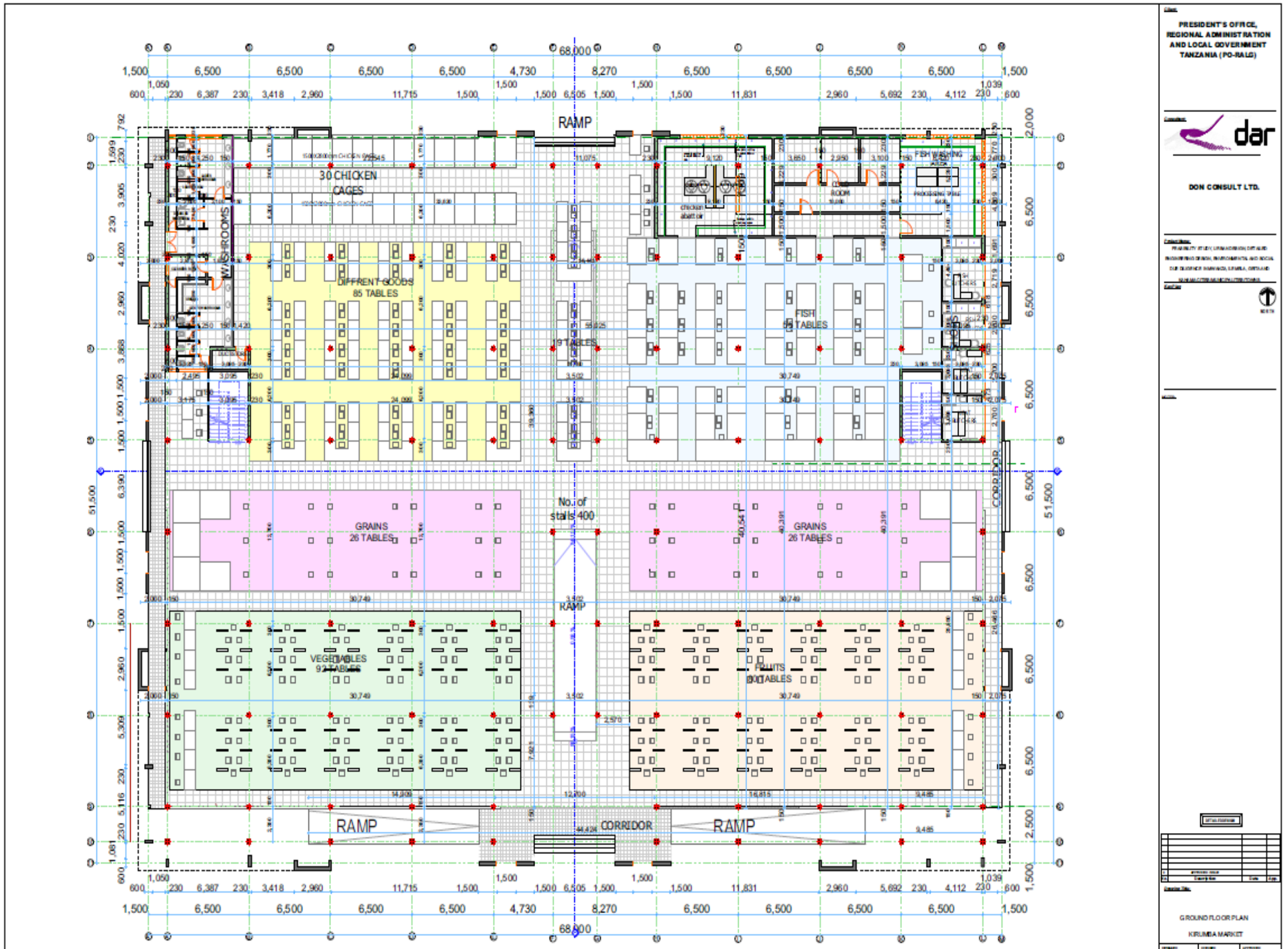
DON CONSULT LTD.

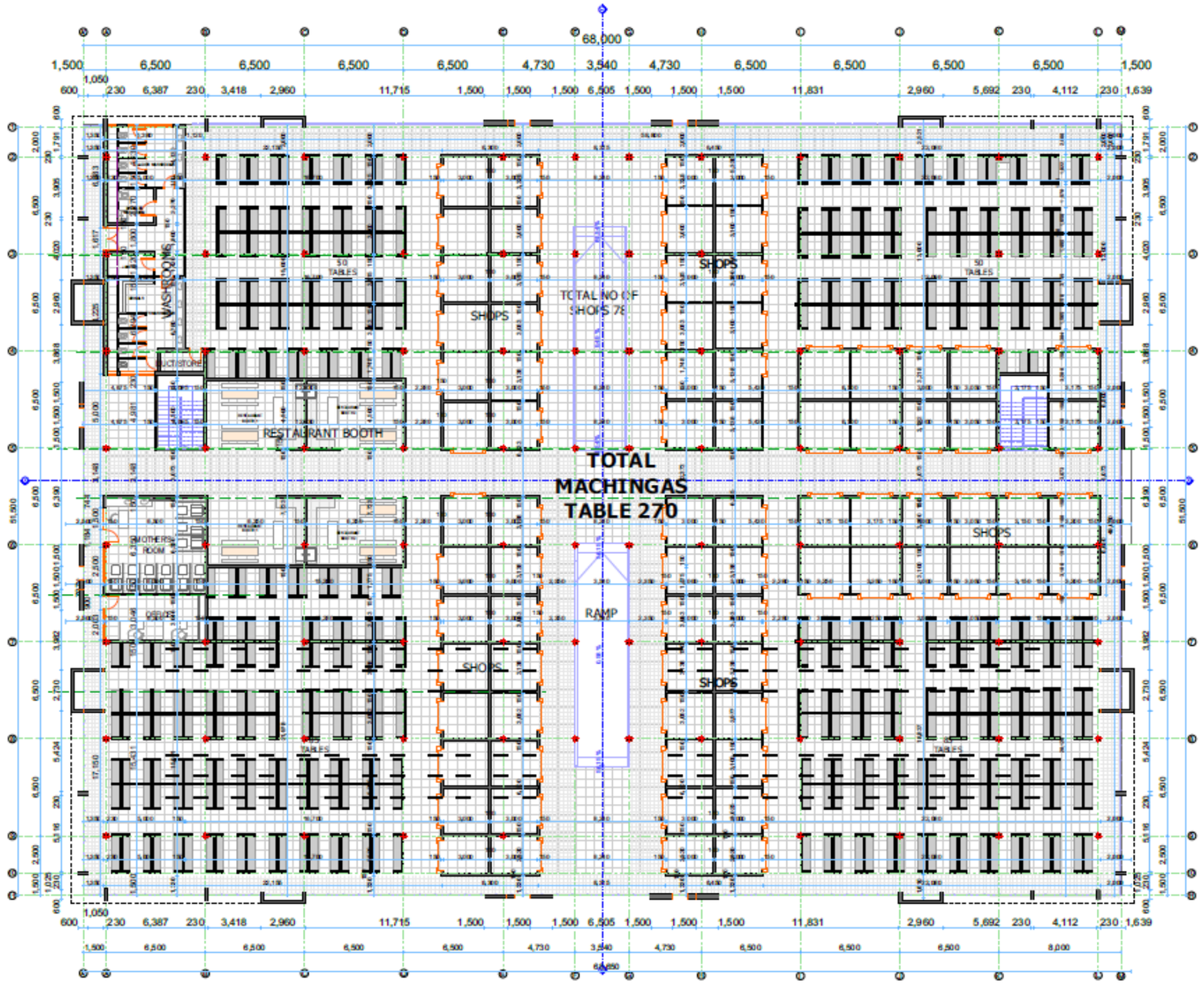
SITE PLAN
KIRUMBA MARKET

2. 3D VIEW OF THE PROPOSED KIRUMBA MARKET


KIRUMBA MORDEN MARKET
GATE No 01

3. FLOOR PLAN FOR PROPOSED KIRUMBA MARKET





PRESIDENT'S OFFICE, REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT TANZANIA (PO-RALG)

DON CONSULT LTD.

FIRST FLOOR PLAN
KIRUMBA MARKET

TA21265-01(00)-FD-AR-KRM-03

FIRST FLOOR PLAN

ENGLISH-SWAHILI VERSION OF NON-TECHNICAL EXECUTIVE SUMMARY FOR THE PROPOSED UPGRADING OF KIRUMBA MARKET AND ITS ACCESS ROADS (2.9 KM) AT KIRUMBA KATI MTAAs IN KIRUMBA WARD, ILEMELA MUNICIPALITY, IN MWANZA REGION

PROPONENT:
ILEMELA MUNICIPAL COUNCIL
P.O.B OX 735
MWANZA
Tel: + 255 736 200 910
Email: md@ilemelamc.go.tz Web: www.ilemelamc.go.tz

SUBMITTED TO:
The National Environment Management Council (NEMC)
Regent Estate, Plot No. 29/30
P.O. Box 63154, Dar es salaam, Tanzania
Tel: +255 22 2774889 or +255 22 2774852
Fax: +255 22 2774901
E-mail: dg@nemc.or.tz

CONSULTANT:
ROSEMARY C. NYIRENDA
Mobile: +255 713 030 865/ +255 753 880 424
Email: rosemary.nyirenda35@gmail.com

SUBMISSION DATE: 28TH MAY, 2023

NON-TECHNICAL EXECUTIVE SUMMARY

1. Title and location of the project/undertaking

Environmental and Social Impact Assessment for the Proposed Upgrading of Kirumba Market and its access roads (2.9km) at Kirumba Kati Mtaa in Kirumba ward, Ilemela Muncipality, Mwanza Region.

2. Name of the proponent and contacts

Ilemela Municipal Council,
P. O. Box 735,
Mwanza, Tanzania.
Tel: +255 736 200 810
Email: md@ilemelamc.go.tz Web. www.ilemelamc.go.tz

3. Names and address of Firm of Experts conducted the EIA

ROSEMARY C. NYIRENDA
Mobile: +255 713 030 865/ +255 753 880 424
Email: rosemary.nyirenda35@gmail.com

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 construction of Kirumba market and its access roads in Ilemela Municipality as part of the Tanzania Cities Transforming Infrastructure and Competitiveness (TACTIC) project financed by the World Bank (WB). The former Kirumba market was old and not designed or organized to accommodate a large number of traders and customers old and not sufficient to meet the growing demand and its access roads are rough. The quality of service delivered offered was very poor. Also due to rapid increase in population of Ilemela and Mwanza Region at large hence there is a need to have a modern Kirumba market and with its access roads upgraded. The proposed Kirumba Market shall consist of all necessary services in order for it to function including but not limited to retail shops around the market, Market Structure, Restaurant, Mini Supermarkets, Fish and Meat Shop, Administrative block, Manager's Office, Toilets, Garbage collection point (with a volume capacity of 5 m^3), Ramps, Parking, washrooms with safe menstrual room, generator shed, and all the access roads improved to the asphalt level.

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

The proposed site for the construction of Kirumba market and its access roads (2.9km) are located in Kirumba Ward, Ilemela Municipality. The proposed Kirumba market shall be constructed on a survey land with Plot No. 19858 and the land size of 6,698. 38 m^2 with a tenure of 99 year. According to the Ilemela Municipality, the market is owned by the Council and traders have no claim over market structure as all belongs to the council. This was also confirmed by market administration as well as traders and other market users. The market is easily accessible. It is connected with newly constructed tarmac roads which are Pasiansi - Buzuruga road, Sabasaba- Kiseke - Buswelu, Makongoro junction - Mwaloni Kirumba roads. The road corridor is an existing one hence there will be no relocation thus no compensation. The proposed market and its access roads will create conducive environment small scale traders and different business owners as well as the customers due to an improved market and increased accessibility. The proposed project is predicted to be effective and efficient to deliver more quality services while accommodating the projected growth of the economy with increasing number of traders, other business owners and customers.

The Ilemela Municipal Council has experienced a rapid population increase in recent years hence the Kirumba market and its access roads being community services is projected benefit a lot of people including those from the host Municipality, Mwanza Region and the neighbouring areas. the proponent intends to develop a modern market building at Kirumba market area in Kirumba Ward to absorb the current congestion and provision of accessible and conducive business environment to Kirumba market vendors. The proposed Kirumba Market project and its access roads involves the construction of a modern Market building with all necessary facilities such shops, fruit and grain vending spaces, beef and fish butchers, cold rooms for fish storage, administrative block, restaurants, washrooms, parking area. All the access roads will also be improved to asphalt level with all the necessary facilities such as drains, curb stones and lights. Ilemela Municipal Council, Ministry of Finance, PO-RALG and

trade sector and works department are the main actor in organizing and management of fund before and during construction phase. The proposed project will serve Ilemela Municipality inhabitants, traders and other 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, Construction Industry Policy (2003), National Land Policy (1995), National Gender Policy (2002), National Transport Policy (2003), 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), 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 stakeholders' 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 The President's Office – Regional Administration and Local Government (Project Coordination Unit), Ilemela Municipal Council, Mwanza Urban Water Supply and Sanitation Authority (MWAUWASA), Tanzania Elictric Supply Company Ltd (TANESCO), Tanzania Forest Services Agency (TFS), Beach Management Unit (BMU), Association of People with Disabilities (PwDs), Ward and Mtaa Leaders as well as neighbours

Major issues of concern raised were:

- Increased pressure on social services and utilities
- Employment opportunities
- Design of the Kirumba market and its access roads to consider the changing weather and the area's topography
- Dust and noise pollution
- Waste management problems during both construction and operation phase
- Labour issues during construction, locals to be given priority

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 the construction of Kirumba market and its access roads
  ii. Benefits to the government resulting from revenue and tax
  iii. Benefits to businessmen due to improved transportation

- Negative Social Impacts
  i. HIV/ AIDS among workers and nearby communities
  ii. Community safety caused by the influx of workers
  iii. Unwanted pregnancies

- 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. Availability of conducive business space
  iii. Increased security of the area
  iv. Improved social services
  v. Increased revenue to Ilemela Municipality and country as whole

- Negative Social Impacts

i. HIV/ AIDS among workers and nearby communities
ii. Community safety caused by the influx of workers
iii. Unwanted pregnancies

- Positive Environmental Benefits
  i. Improved environment which consists of standard drainage system
  ii. 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
  iv. Safety and health risks due to fire hazards

(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 fenced 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 Kirumba market and its access roads shall strictly adhere to the Fire Safety Standards.
- **Poor maintenance of the Kirumba market and its access roads during operation**: A private cleanliness firm with adequate number of staff shall be commissioned to clean the Kirumba market and its access roads, its facilities and the surrounding daily.

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 construction of Kirumba market and its access roads). Adopting this option would mean avoiding most of the negative effects associated with the presence of the Kirumba market and its access roads and missing all the positive benefits such as benefits to communities resulting from employment during construction and availability of conducive and adequate business spaces.

(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 Ilemela 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 Ilemela 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

Ilemela Municipal Council has set aside a total of over four and half (4.5) billion Tanzania shillings as initial cost for the development and construction of Kirumba market and its access roads. All these funds will cover costs of civil and building works; electrical and 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 are 99,000,000.00 and 50,000,000.00 TZS 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 Kirumba market and its access roads located at Kirumba Kati in Kirumba ward in Ilemela Municipal Council, Mwanza region. The project has large socio-economic benefits to both the Ilemela Municipal Council and the nation at large. The project 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 KWA MAPENDEKEZO YA UBORESHAJI WA SOKO LA KIRUMBA NA BARABARA ZAKE (KM 2.9) KATIKA MTAA WA KIRUMBA KATI, KATA YA KIRUMBA, MANISPAA YA MWANZA, MKOA WA MWANZA

MUENDELEZAJI (MTEJA)
Halmashauri ya Manispaa ya Ilemela
S. L. P. 735,
Mwanza, Tanzania
Simu: Tel: +255 28 250 1375/ +255 768 520 195
Barua pepe: md@ilemelamc.go.tz Tovuti. www.ilemelamc.go.tz

IMEWASILISHWA KWA:

Baraza la Taifa la Hifadhi na Usimamizi wa Mazingira (NEMC)
35 Regent Street
S. L. P. 63154, Dar es salaam, Tanzania
Simu: +255 22 2774889/ +255 22 2774852/+255 713 608938
Barua Pepe : dg@nemc.or.tz
Tovuti: www.nemc.or.tz

MTAALAMU MUELEKEZI:

ROSEMARY C. NYIRENDA
Simu: +255 713 030 865/ +255 753 880 424
Barua pepe: rosemary.nyirenda35@gmail.com

TAREHE YA KUWASILISHA: 28 MEI 2023

MUHTASARI USIO WA KIUFUNDI

1. Kichwa na eneo la mradi/shughuli

Tathmini ya Athari za Kimazingira na Kijamii kwa mapendekezo ya uboreshaji wa Soko la Kirumba na barabara zake (km 2.9) katika Mtaa wa Kirumba Kati, Kata ya Kirumba, Manispaa ya Ilemela, Mkoa wa Mwanza.

2. Jina la Mwekezaji na anwani

Halmashauri ya Manispaa ya Ilemela,
S. L.P. 735,
Mwanza, Tanzania
Simu: Tel: +255 28 250 1375/ +255 768 520 195
Barua pepe: md@ilemelamc.go.tz Tovuti. www.ilemelamc.go.tz

3. Majina na anuani za Kampuni ya Wataalamu iliyofanya TAM

ROSEMARY C. NYIRENDA
Simu: +255 713 030 865/ +255 753 880 424
Barua pepe: rosemary.nyirenda35@gmail.com

4. 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 ujenzi wa Soko la Kirumba na barabara linazolizunguka katika Manispaa ya Ilemela ikiwa ni sehemu ya mradi wa maboresho ya miundombinu na ushindani wa Miji Tanzania (TACTIC) unaofadhiliwa na Benki ya Dunia (WB). Soko la Kirumba la zamani na halikuwa kwenye mpangilio mzuri wala hajasanifiwa ili kutosheleza idadi ya wafanyabiashara na wateja hivyo hayaendani na ongezeko la uhitaji na barabara zake ni hazina ubora. Ubora wa huduma za soko hilo zilikuwa ni duni sana. Pia kutokana na kasi ya ongezeko la watu katika Manispaa ya Ilemela kuna haja ya kuwa na soko la kisasa ambalo litakuwa na huduma zote muhimu zinazotakiwa kuwepo katika soko ikiwa ni pamoja na maduka ya rejareja, jengo la uongozi na utawala wa soko, masoko madogo ya kisasa, mabucha ya samaki na nyama, ofisi ya msimamizi wa soko, vyoo na chumba cha wanawake kujistiri kipindi cha hedhi, eneo la kukusanyia taka ngumu, jenereta za dizeli na barabara zinazozunguka soko zitawekwa lami.

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 ilivyorekebishwa 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

Mradi wa Soko la Kirumba na barabara zinazolizunguka ziko katika Kata ya Kirumba, Manispaa ya Ilemela, mkoani Mwanza. Soko la Kirumba litajengwa kwenye eneo lililopipwa lenye hati miliki Na. 19858 na ukubwa wa meta za mraba 6,698.38. Soko hilo linamilikiwa na Halmashauri ya Manispaa ya Ilemela, hivyo wafanyabiashara hawawezi kudai umiliki wa soko hilo. Hii ilithibitishwa na uogozi wa soko, wafanyabiashara na watumiaji wengine. Soko linafikika kirahisi. Soko limeungana na barabara ambazo zitaboreshwa pamoja nalo, nazo ni barabara za Pasiansi – Buzuruga, Sabasaba – Kiske – Buswelu, njiapanda ya Makongoro – Mwaloni – Kirumba. Upana wa barabara hizo unatosheleza kuboreshwa kwa kiwango cha lami, hivyo hakuna fidia. Soko na Kirumba na barabara zinazolizunguka zitatengeneza mazingira mazuri kwa wafanyabiashara ndogondogo za aina mbalimbali na wateja sababu ya maboresho na kufikika kirahisi. Mradi pendekezwa unatarajiwa kuwa wenye ufanisi mkubwa katika kutoa huduma bora zaidi na kwa kuzingatia ukuaji wa uchumi na uhitaji sababu ya ongezeko la wafanyabiashara pamoja na wateja.

Manispaa ya Ilemela ina ongezeko kubwa la idadi ya watu kwa miaka ya karibuni hivyo Soko la Kirumba na barabara zinazolizunguka ni huduma za jamii ambazo zitawafaidisha watu hao na wakazi wa maeneo mengine ya mkoa wa Mwanza na Jirani. Soko la Kirumba linalopendekezwa litajumuisha na maduka ya rejareja, jengo la uongozi na utawala wa soko, masoko madogo ya kisasa, mabucha ya samaki na nyama, ofisi ya msimamizi wa soko, vyoo na chumba cha wanawake kujistiri kipindi cha hedhi, eneo la kukusanyia taka ngumu, sehemu ya genereta, maeneo ya kuuzia mbogamboga, matunda na nafaka, sehemu za mama lishe na maegesho. Barabara zinazozunguka soko zitaboreshwa kwa kiwango cha lami na kuwekwa miundombinu kama mifereji, taa na mawe ya vizuizi. Halmashauri ya Manispaa ya Ilemela, Wizara ya Fedha, TAMISEMI na Sekta za Biashara na 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 Ilemela na wadau wote wa sekta ya biashara na uchukuzi kwa takribani zaidi ya miaka 30 baada ya kukamilika.

5. 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 Sekta ya Ujenzi (2003), Sera ya Taifa ya Ardhi (1995), Sera ya Taifa ya Jinsia (2002), Sera ya Taifa ya Uchukuzi (2003) na Sheria ya Usimamizi wa Mazingira (Sura ya 191), 2004, na Kanuni za Tathmini na Ukaguzi wa Athari kwa Mazingira (2005) kama ilivyorekebishwa 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 kusaidia 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.

6. 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 mjadala wa kitaalamu ulikuwa muhimu hasa wakati wa kuchunguza na kutathmini masuala ya kiufundi. Wadau hao waliobainika ni pamoja na Ofisi ya Rais Tawala za Mikoa na Serikali za Mitaa (Kitengo cha Uratibu wa Miradi), Halmashauri ya Manispaa ya Ilemela, Mamlaka ya Majisafi na Usafi wa Mazingira Mwanza (MWAUWASA), Wakala wa Huduma za Misitu (TFS), Shirika la usambazaji umeme Tanzania (TANESCO), Kikundi cha usimamizi wa ufuko wa Ziwa Victoria (BMU), Jumuiya ya Watu Wenye Ulemavu, Viongozi wa Kata na Mtaa pamoja na majirani.

Masuala makuu na maangalizo yaliyotolewa yalikuwa:

- Kuzidiwa kwa huduma za kijamii kutokana na ongezeko la watu;
- Fursa za ajira;
- Usanifu wa majengo na miundombinu ya soko kuzingatia mabadiliko ya hali ya hewa;
- Uchafuzi wa vumbi na kelele;
- Changamoto ya udhibiti wa taka wakati wa awamu ya ujenzi na uendeshaji; na
- Kutoa kipaumbele kwa wenyeji kwenye masuala ya kazi na ajira hasa wakati wa ujenzi.

7. 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 zinazorekebishika.

(a) Awamu ya Uhamasishaji na Ujenzi

• Faida Chanya za Kijamii

i. Manufaa kwa jamii yanayotokana na ajira kipindi cha ujenzi wa Soko la Kirumba na barabara zake.
ii. Faida kwa serikali kutokana na mapato na kodi.
iii. Faida kwa wafanyabiashara kutokana na shughuli za ujenzi.

• 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 Ilemela 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 yaliyoboreshwaji wa Soko la Kirumba na barabara ikiwemo mifumo ya mifereji ya uondoshaji wa 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
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 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. Shuguli 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 ya Ilemela. 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 yatapewa kipaumbele cha juu.
- **Ajali na matukio ya moto**: Muundo wa Soko la Kirumba utazingatia kikamilifu Viwango vya Usalama wa Moto.

- **Matengenezo duni ya Soko la Kirumba wakati wa operesheni**: Kampuni ya kibinafsi ya usafi yenye idadi ya kutosha ya wafanyakazi itaajiriwa kusafisha Soko la Kirumba, vifaa vyake na mazingira yanayozunguka kila siku.

8. 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 ujenzi wa Soko la Kirumba na barabara zake). Kupitisha chaguo hili kunaweza kumaanisha kuepuka athari nyingi mbaya zinazohusiana na uwepo wa Soko la Kirumba na barabara zake na kukosa manufaa yote chanya kama vile manufaa kwa jamii yanayotokana na ajira wakati wa ujenzi na upatikanaji wa maeneo ya biashara yanayofaa na ya kutosha.

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 Ilemela (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.

9. 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 wafanyakazi 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 Ilemela itafanya ukaguzi wa kawaida na kuwasilisha taarifa ya ukaguzi kwa uongozi wa juu ili kuhakikisha uendelevu wa mfumo wa usimamizi wa mazingira.

10. Tathmini ya rasilimali

Halmashauri ya Manispaa ya Ilemela imetenga jumla ya zaidi ya shilingi bilioni mbili za Tanzania kama gharama za awali za uendelezaji na ujenzi wa Soko la Kirumba. 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 Tanzania shilingi. 99,000,000.00 na 50,000,000.00 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.

11. 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.

12. Muhtasari na Hitimisho

Soko la Kirumba na barabara zinazolizunguka zipo katika Kata ya Kirumba, Manispaa ya Ilemela, Mkoa wa Mwanza. Mradi huo una manufaa makubwa ya kijamii na kiuchumi kwa halmashauri ya Manispaa ya Ilemela na taifa kwa ujumla. Mradi kama huo, unahusisha athari ndogo mbaya 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.