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TANZANIA STRATEGIC CITIES PROJECT -  
ADDITIONAL FINANCING, 2015 – 2017  
(IDA CREDIT No. 54600-TZ)

# FINAL REPORT

## ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT(ESIA) FOR ROADS, DRAINAGE, STREET LIGHTS AND LANDFILL CELLS SUB-PROJECTS IN MBEYA CITY

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## LIST OF ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
BOD	Biochemical Oxygen Demand
BOQ	Bill of Quantities
CBO	Community-Based Organization
CDA	Capital Development Authority
CO <sub>2</sub>	Carbon Dioxide
COD	Chemical Oxygen Demand
DoE	Director of Environment
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMA	Environmental Management Act
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
HIV	Human Immunodeficiency Virus
ILO	International Labour Organization
NEMC	National Environment Management Council
NEP	National Environment Policy
NGO	Non-Governmental Organization
OSHA	Occupational Health and Safety Act
PAP	Project Affected Persons
PMO-RALG	Prime Minister's Office, Regional Administration and Local Government
PO-RALG	President's Office, Regional Administration and Local Government
RAP	Resettlement Action Plan
RoW	Right of Way
STDs	Sexually Transmitted Diseases
TAC	Technical Advisory Committee
TANESCO	Tanzania Energy Supply Company
ToR	Terms of Reference
TSCP	Tanzania Strategic Cities Project
TShs	Tanzania Shillings
WB	World Bank

## STUDY TEAM

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## **EXECUTIVE SUMMARY**

Mbeya City Council (MCC) is a sub-government entity under the PO-RALG and, is among the eight local authorities and the CDA implementing the Core Tanzania Strategic City Project (TSCP).

The Core TSCP ends in December 2015 and, some of the new infrastructure facilities will either not be well completed or the desired goals cannot be met. The proposed additional works for roads, storm drains and landfill structures are therefore desired to complement the Core TSCP subprojects.

The ESIA study is aimed to contribute to the environmental and social safeguards of the proposed additional subprojects in MCC which will have to be verified and approved by NEMC and the Vice President's Office (VPO) for legacy of implementation of the additional works. This ESIA has been prepared according to an Environmental and Social Management Framework (ESMF) for TSCP Additional Financing (AF). The ESMF provides guidance for environmental and social screening process and preparation of appropriate safeguards instruments for proposed investments under AF.

### **Project Description**

The project will involve the improvements of roads, drainage, passage structures and street light systems which were in Packages 1 and 2 under Core TSCP as well as improvement of the Uyole landfill by constructing two additional waste cells and improvement of an evaporation pond. Important works will include excavation works for roads and walkways are clearing, excavation and surfacing by asphalt concrete. Also, installation of furniture/crossing slabs, culverts, walkways and storm water / side drains. For storm drains will mainly involve excavation and lining by concrete slabs.

Key works in the landfill involve excavation works for waste cells, application of liners to intercept leachate, leachate storage and evaporation pond and construction of leachate collection system/ pipes. In addition, installation of gas collection system/ pipes and grading of surrounding areas to maximize run-off.

Other works are excavation for road-side drains and storm water canals, roads, vegetation clearance, fixing/ concreting and erection of 420 poles for street lights together with fixing of solar panels and bulbs for street lights mainly solar in various places including roads, open spaces, hospitals and the landfill.

### **Stakeholder Consultation and involvement in ESIA process**

A communication plan was prepared to guide in the stakeholders consultation process in which meetings and discussions were held with representatives of key stakeholders and the MCC. These meetings were aimed at collecting their concerns and opinions about implementing additional subprojects. Furthermore, the meetings were important to establish a common understanding about project setting and key issues.

The meetings were the basis for people's participation and involvement in project formulation process. The main stakeholders consulted were relevant officials from MCC, Ward, Mitaa, CBOs, NGOs and influential people who will benefit from the subprojects.



Field visits were also made to the subproject sites to understand and document about basic conditions on topography, location, drainage, human settlement and vegetation cover. The purpose was to get an insight about possible impacts to be caused by subprojects and feature them in the ESIA report.

## **Results of Public Consultations**

Stakeholders consultation meetings revealed presence of concerns on:

- Failure to implement mitigation measures
- Resettlement issues
- Prevention of HIV/AIDS
- Storm water effect
- Landscape protection
- City's management of solid waste
- Sufficient life span for landfill
- Dust pollution and,
- Occupational safety and health issues

## **Environmental and Social Impacts**

The study on ESIA for the additional subprojects shows that there are limited negative environmental implications associated with the proposed improvements for access structures, water drains and installation of street lights meaning that there will be high socio-economic returns to the residents of Mbeya City. The proposed subprojects may create negative impacts brought by noise and dust pollution, soil erosion and damage on landscape, interference to business and pedestrian movements, traffic accidents and management of solid waste. Some locals will lose their properties particularly due to acquiring land for the landfill buffer zone. Likewise, negative impacts may be attributed from non-adherence to regulations on occupational health and safety; and spread of communicable diseases. It was also noted that, there are topographical situations where rain water stagnation will create habitat for mosquitoes and cause prevalence of malaria.

However, the subprojects will create positive impacts such as employment and improved transport mobility and subsequently contribute to the development in social welfare of the City. There is no significant negative impact predicted for street lights. Installation of poles in particular excavation of foundations will be confined within the area reserved for public utilities and will fall inside the Road Right of Way (RoW). Even construction of storm water drains will safeguard road infrastructure and control flooding or water stagnation in the urban centre.

As regards to landfill improvement, associated negative impacts will be significantly reduced or eliminated through careful engineering design and best construction practices. Specific negative impacts predicted in this report are those linked human and social environment. These include underground water resource by leachate, air pollution by dust, traffic accidents along TANZAM Highway, nuisances of noise and odour.

Also, the fire outbreak at landfill during operation phase, solid waste and storm water or run-off effects and public health and safety. Others are risk on public utilities near the landfill such as power poles and any interference to Right of Way for highway which is managed by TANROADS.

The subprojects may also result into HIV/ AIDS risk while odour and public health around the Uyole landfill may arise due to poor landfill management in operational phase. Another challenge is importation or transportation of soil material for waste management at landfill as the site is dominated by rock material. In particular, soils should be excavated from nearby sources without harming the environment.

### **Mitigation Measures**

Some practical mitigation measures have been proposed for all significant impacts. Implementing these measures shall safeguard the environment and make the proposed sub-projects sustainable. The implementation of planned works will not require compensation or resettlement.

The summary of recommended mitigation to minimize the potential impacts are:

- Proper design to prevent, storm water effects, soil erosion and landscape damage.
- Measures to safeguard local employment and influx of job seekers to the development sites.
- Compensation of affected properties as per the TSCP-AF RPF
- Proper design (size) of storm water drain, collection and discharge of storm water to safe ends.
- Measures against possible increase of social diseases like HIV/AIDS and STDs..
- Involve communities in the sustainable management of infrastructures.
- Liaison Utilities Authorities including water, TAROADS/ road authorities for any construction that may interfere with service utilities or road reserve.
- Proper design and liaison with relevant utilities Authorities to safeguard employment and influx of job seekers to the proposed development site.
- Mitigation measures on safety at subproject sites and pollution by noise and dust during construction and operational phases.
- Prevention of traffic accidents along Tanzania–Zambia Highway (TANZAM) in construction and operation phases.
- Measures to reduce odour and waste pollution at Uyole landfill during operational phase. Early sorting of refuse and proper waste management at landfill cells by compaction and soil mounding is important.
- Prevention of subsurface fire and smoke during operation phase by gas piping.
- Construction of storm water drains to control run-off in operation phase,
- Prevent leachate pollution of underground water by liner and leachate pond during operational phase.
- Installation of Test Pits at landfill to monitor water quality in operation phase.
- Fencing to prevent spread of solid waste, animals and scavengers.
- Monitor compliance to environmental, health and safety measures.
- Community involvement in management of landfill.
- Careful identification of soil sources without causing environmental impacts (soil erosion and landscape instability).

Specifically, the Uyole landfill site is dominated by shallow soils and rock exposure, thus the City Authority should further re-work on the measure to import soils for landfill operation without causing environmental degradation.

## ESMP

Effective implementation of the proposed mitigation measures as guided in the ESMF will significantly minimize the anticipated impacts. Therefore, implementation of mitigation measures should be adequate and timely. The ESMP has been prepared as shown in chapter 8.

The total estimated cost for the various environmental and social mitigation and monitoring measures including environmental and social follow-up, capacity building, sensitization campaigns against the spread of social diseases e.g. HIV/Aids, sexually transmitted diseases (STDs)etc. and ancillary works is TShs.24.0 Million for roads, TShs 8.0 Million for storm drains and TShs.18Million for the Uyole landfill. This cost structure will be further refined during the implementation stage. For example for the determination of training needs, MCC will have to identify the type and number of beneficiaries, type of the training needed and where this training will occur at what cost.

## Environmental and Social Monitoring Plan

The monitoring plan also assigns responsibilities for monitoring activities. MCC will assume an important role in the monitoring of activities such as disease spread, pollution and accidents, underground water quality which risk pollution by leachate. Monitoring of (ground)water quality will be undertaken by use of test pits constructed at landfill site. Environmental audit will also take place will in the long term involve National Environment Management Council (NEMC) as given in the ESIA regulations.

## Resettlement

Findings from ESIA reveals there are **no resettlement issues at the site designated for the construction of additional** roads. Works will be confined within legal boundaries of road Right of Way (RoW) or infrastructure reserve. The design team will avoid interference with private properties within and close to subproject sites especially along the proposed storm drain canal. MCC will collaborate with the contractors to resolve any unforeseen disputes or compensation guided by existing legislations.

For the establishment of a buffer zone for the landfill the ESIA reveals that there are resettlement issues; and therefore the MCC prepared an ARAP report. The resettlement will involve the impact of 1,846 assets that includes crops, land, structures and graves affecting 91 PAPs. The total compensation is 424,282,498 Million Tshs.

Any unforeseen grievances or complaints that will arise from loss of land and crop or land take during project implementation will be valuated and compensated as per the TSCP-AF RPF.

## Decommissioning

The anticipate life span for road and drains is more than 20 year and 15 years for the landfill. If applicable, decommissioning should aim at minimizing erosion problems, restoration of landscape scenery and replacement of vegetation to its near original state.

Activities of decommissioning that may affect the environment negatively are;

- Re-alignments road route
- Demolition works of bridges, road side drains and road furniture
- Removal of existing road surface
- Compaction, grading and resurfacing

The contractor shall demolish structures and clean up the project sites to a condition suitable for use by the community.

Therefore, the following mitigation measures are proposed as part of decommissioning;

- Safe removal / recycle of asphalt concrete layer
- Removal and safe disposal of concrete structures; culvers and drainage slabs
- Filling water pockets to eliminate risk of providing breeding sites for mosquitoes hence controlling malaria spread.
- Replanting of vegetation on the banks of the borrow pits to minimize the erosion

At the end of lifespan of the Uyole landfill when it will be filled, decommissioning will take place. This will be undertaken by competent engineers and solid management professionals. MCC will prepare a final closure plan which will be approved by NEMC before it is implemented.

The main components of the plan shall include the following:

- Stabilization of harsh slopes;
- Final cover by soil and green vegetation;
- Control of drainage systems;
- Safeguard to leachate and gas management systems;
- Fire control;
- Prevention of illegal dumping and;
- Resettlement action plan.

## **Conclusion**

MCC is committed to implement all proposed recommendations and further carry-out environmental auditing and monitoring schedules.

Effective implementation of the proposed improvement works subprojects will mitigate the predicted impacts to harmful or near to harmful levels. Their implementation should be adequate and timely. The ESMP has been prepared as shown in chapter 8. Overall, the anticipated positive impacts will outweigh the negative ones by far. Improved road infrastructure storm drains and land fill have significant impact on the social development and welfare for the community of MCC.

Ultimately, MCC is committed in implementing all the proposed recommendations and further carrying out environmental auditing and monitoring schedules.

It is equally committed to enhance the anticipated positive impacts particularly in the creation of local employment and ensuring social inclusion by gender.

# 1 INTRODUCTION

## 1.1 Project Background

The Government of Tanzania through PO-RALG received funds from the World Bank (IDA Credit) and a grant from the Government of the Kingdom of Denmark to implement the Core Tanzania Strategic Cities Project (TSCP). PO-RALG has been implementing the Core TSCP for 5 years (since 2010) with 7 participating urban Local Government Authorities (LGAs): 4 cities of Mwanza, Tanga, Mbeya and Arusha; and 3 Municipalities of Dodoma, Kigoma-Ujiji, Mtwara-Mikindani and Capital Development Authority (CDA). Later on, Ilemela Municipal Council was added to the list of implementing LGAs following the division of the Mwanza City Council to establish a new Municipal Council.

## 1.2 Objective and scope of ESIA study

The objective of this ESIA study is to supplement the earlier ESIA under the Core TSCP and to identify potential environmental and social impacts and key issues associated with TSCP – AF subprojects implementation. The ESIA further proposes appropriate mitigation measures to minimize negative impacts and enhance the positive impacts.

This ESIA has been prepared according to an Environmental and Social Management Framework (ESMF) for TSCP Additional Financing (AF). The ESMF provides guidance for environmental and social screening process and preparation of appropriate safeguards instruments for proposed investments under AF.

The scope of improvement of additional works for MCC under the TSCP AF comprise improvement of:

1. Two additional cells at the Uyole landfill.

2. Package 1 works of roads and storm water drains including access structures and street lights.
3. Package 2 works of roads and storm water drains including access structures and street lights.

## 1.3 Brief Description and Rationale for TSCP Additional Financing

The TSCP – AF is an extension of the Core TSCP prepared in a response to further request from the government to the International Development Association (IDA) or the World Bank.

The Development Objective of the proposed AF remains the same as the current project, to improve the quality of and access to the basic urban to basic urban services in seven selected Participating Local Government Authorities (LGAs). The Project will be implemented through three components: (i) Core Urban Infrastructure and Services (ii) Institutional strengthening and (iii) Implementation Support and Preparation of Future Urban Projects. Eligible investment projects must fall in at least one of the below categories: (i) Road and drainage infrastructure (ii) Urban transport infrastructure (iii) Solid and liquid waste management.

Additional funding will further enhance socio-physical transformation of the designated urban areas and promote their economic growth and improvement in welfare of the entire nation. The urban areas are strategically important to mainland Tanzania based on their physical locations, connectivity for regional trade, demographic weight and contribution to the national economy.

### 1.3.1 Current Status

Activities under Core Urban Infrastructure and Services component have involved improvement or development of selected

infrastructure sub-projects at various locations within the city. Works has involved upgrading /rehabilitation of a number of artery roads and drainage and associated structures aimed to improve movement of people, goods and services in the urban areas. Priority is given to roads to enhance connectivity (linking principal residential areas, commercial centers and service centers i.e. markets, airports, bus terminal) to the main road networks, enhancement of traffic flow /alleviation of traffic congestion.

Completed subprojects also include a range of local infrastructure such as bus and lorry stands, and rehabilitation of solid waste collection centres and the development or improvement of disposal sites i.e. a landfill cell, existing road and storm drains. Most of the infrastructure on the list of the first batch of prioritized subprojects are complete and in use or ready for use.

### 1.3.2 Additional Financing

Some areas of the completed infrastructure have been identified where further improvements need to be made. In addition, a number of infrastructure facilities were prioritized during the Core TSCP design and preparation but could not be financed for implementation due to limitation of funds under the credit. Core TSCP is ending in December 2015 and, some of the additional infrastructure facilities were either not well completed under the Core project or were dropped because they were not funded.

Also, the City has also identified new sub-projects important for functionality of existing sub-projects. Thus, the government through PO-RALG has secured an additional credit from the World Bank that will specifically finance improvement of prioritized infrastructure investments in the City.

The additional improvement works for MCC especially **urban roads, storm drains and extra two cells at Uyole**

**landfill** are therefore desired to complement earlier works of Core TSCP.

Therefore, the proposed supplement ESIA study aims to contribute to the preparation of environmental and social safeguards parameters for the proposed subprojects.

## 1.4 ESIA APPROACH

The TSCP obtained EIS certificate for proposed works with conditions attached in the certificate after verification of the carried out the ESIA study between August and November 2009.

However, although the EIA regulations of 2005 GN No. 349 of 2005 allow for variation on issues certificate for any additional works where the developer is required to fill in Form No. 5 of the regulation, that will not apply to this case because the additional subprojects are part of the previously selected and designed subprojects approved by NEMC but could not be carried-out due to limitation of TSCP credit funds.

To this effect, steps adopted to prepare this ESIA study covers the following:

- Deskwork studies and analyses,
- Fieldworks and
- Stakeholders' consultations

The necessary activities involved in undertaking the study are as follows:

- To consult key stakeholders to gather their concerns about proposed improvement works and in particular how the surrounding communities will be affected by the project;
- To carry out additional information or data to supplement EIS - To establish an environmental conditions about in the proposed sites for proposed works;
- To assess the status of ecological and social receptors
- To describe the project characteristics and affected environment of the improvement works;
- To assess and evaluate the potential environmental impacts



resulting from the proposed and Storm Water Drain sub-projects, especially within the zones of project influence;

- To identify mitigation measures for serious impacts and,
- To develop an Environmental and Social Management Plan (ESMP) detailing actions and responsibilities for the mitigation of impacts and for monitoring them.

## 1.5 Report Structure

The ESIA Report is structured as follows:

An executive summary provides an overview of significant findings and recommended actions.

- Chapter 1 is about project introduction giving overview of the project conception and the necessity for carrying out an ESIA;
- Chapter 2 provides detailed baseline information on the proposed additional financing sub-projects, briefly describes the project area and conditions, the proposed project features with key trends and anticipated conditions that give justifications for the investment. It also includes the existing spatial, institutional and temporal boundaries;
- Chapter 3 summarises the policy, legal and administrative framework within which the ESIA was carried out, including the environmental and social impact assessment requirements;
- Chapter 4 presents stakeholders consultation and public involvement;
- Chapter 5 discusses the detailed information on the identification, prediction and analysis of actual impacts. In addition it covers alternatives considered in designing the project;
- Chapter 6 summarises measures that have been adopted to ensure that the mitigation measures are implemented and the impacts are in accordance with predictions;
- Chapter 7 provides an outline of the environmental and social management plan, cost and responsibilities during implementation; it also addresses measures for institutional capacity building, grievances and mechanisms/ procedures for their resolution.
- Chapter 8 provides the proposed monitoring plan. It outlines the mechanisms for checking environmental performance during the project implementation;
- Chapter 9 is about decommissioning activities at the end of sub-project life span.
- Chapter 10 provides a conclusion.
- Appendices: Provides a reference list, including

all literature and other sources of data used in preparation of the ESIA.



## 2 DESCRIPTION OF ADDITIONAL FINANCING SUB-PROJECTS

### 2.1 Overview

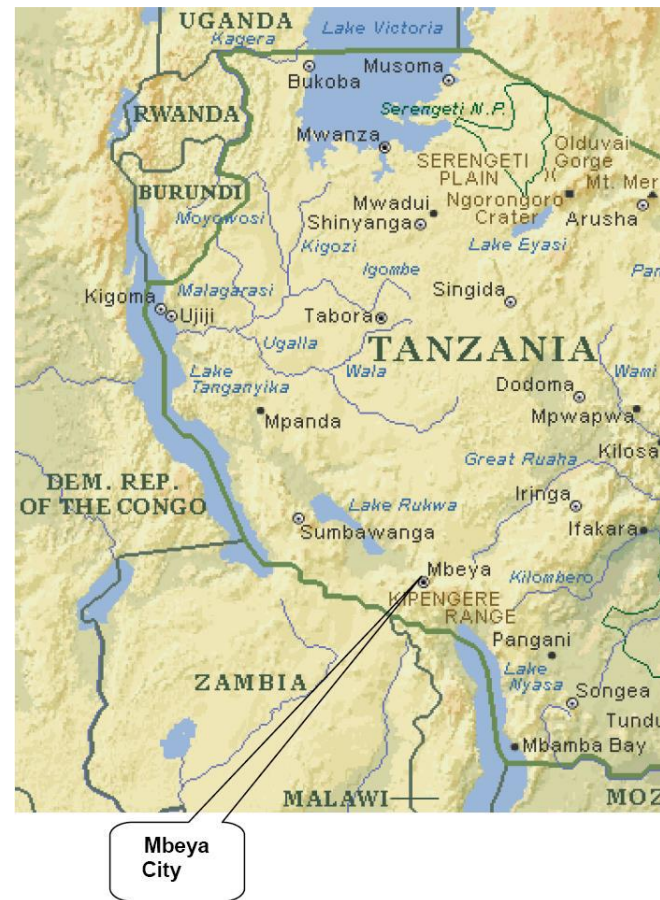
The improvement works of TSCP Additional Financing are infrastructural and for improvement of transportation, sanitation and social services in the City. These are side drains or storm water drains improvement to improve drainage along roads. In addition, installation of street lights to enhance night visibility and addition of more waste disposal cells at the new Uyole landfill. Some of these works were not completed in the Core project Packages 1 and 2.

The City has pockets of areas which are vulnerable to seasonal flooding because of its natural low-laying topography. Hence, roads passing in these areas especially the newly constructed roads require drains constructed and installation of street lights. Storm water drains and road-side drains will remove and empty run-off water into safe ends.

### 2.2 Project Location Map

The location of project area is shown in Figure 1.

Figure 1 - Location of Project area



### 2.3 Additional works for road, storm drains and landfill in Mbeya City

This subproject is designed to construct components for roads and Storm Water drains as described in section 1.2. The task will involve the following;

#### Road and Drainage Infrastructure

- 1) Roads and walkways
  - Upgrading of roads from gravel to asphalt concrete surface
  - gravelling, brick paving
- 2) Side drains:
  - Demolishing of side drains and laying of new ones
  - sand traps,
  - stone pitching,
  - gabions, concrete pipes
- 3) Storm drains for rain run-off
- 4) Pedestrian crossing slabs:

- pedestrian walkways,
  - speed humps,
  - rumble strips,
  - Road shoulders
- 5) Culverts
  - 6) Road furniture: street lights, signing
  - 7) Vegetation clearance to pave way for works.
  - 8) Construction of two cells at landfill for solid waste disposal including drainage structures and a boundary chain-link fence at the Uyole landfill.

Table below shows a list of sub projects combined for Package 1 & 2 which have been completed since 2013, but they are going for additional financing for provision of access roads, street lights improvement of drains and a landfill.

*Table 1: Sub project road list as proposed by the MCC(Package 1&2)*

Priority	Description of subproject	Current status (metres)	Scope of work
1	TANESCO – Sae Kisanji Road	3.86km Paved	Improvement to Access roads, street lights and Roadside drain
2	2 Air Port Jacaranda Sec School- Forest Sec School - Bhanji Road	3.8km Paved	Improvement to Access roads, street lights and Roadside drain
3	Commissioner Road	0.58km Paved	Improvement to Access roads,

Priority	Description of subproject	Current status (metres)	Scope of work
			street lights and Roadside drain
4	Kabwe Block T SIDO Road	2.4km Paved	Improvement to Access roads, street lights and Roadside drain
5	Pili Road	0.25km Paved	Improvement to Access roads, street lights and Roadside drain
6	Ilomba Machinjioni Road	2.16km	Paved Improvement to Access roads, street lights and Roadside drain
7	Ndio Regional Hospital Road	0.65km Paved	Improvement to Access roads, street lights and Roadside drain
8	New Forest road	2.16km Paved	Improvement to

Priority	Description of subproject	Current status (metres)	Scope of work
			Access roads, street
9	Igawilo Health Centre Road	0.41km Paved	Improvement to Access roads, street lights and Roadside drain
10	Ilemi/Iganzo Bridge	6m Paved	Improvement to Access roads, street lights and Roadside drain
13	Parking Area for Bus/trucks	30,000 M <sup>2</sup> Paved	Improvement to Access roads, street lights and Roadside drain
14	RTD SabaSaba Road	1.27km Paved	Improvement to Access roads, street lights and Roadside drain
15	Sae Ituha Dispensary Road	2.55km Paved	Improvement to Access roads, street lights and Roadside drain
16	Ilomba-Sokoni Rd	0.68km Paved	Improvement to Access roads, street lights and Roadside

Priority	Description of subproject	Current status (metres)	Scope of work
			drain
17	Ilomba-Isyesye Rd	2.4km Paved	Improvement to Access roads, street lights and Roadside drain
18	Uyole landfill	2 units	Construction of 2 landfill cells for solid waste disposal including drainage structures and boundary chain-link fence at new Uyole landfill site

## 2.4 Designing

### 2.4.1 Uyole landfill

The already built landfill cell has been partly built and risks the influence of heavy rains in Mbeya, therefore, raising the potential for leachate generation and, hence demands appropriate mitigation measures. Thus, the reason of additional works are to:

- build a facility that is effective, functional, compliant with environmental and other regulatory requirements, and is sustainable;
- achieve a filling capacity of approximately 15 years; and
- stay within the funding set aside for the landfill related works.

*Figure 2: Uyole landfill is located 15Km from Mbeya City and near TANZAM Highway*



### 2.4.2 Road subproject

The selected additional roads will be built confined within the existing road reserves of 30m for City roads. The upgraded road will follow the corridor of the existing roads managed by the City authority. Most of the access roads have been hindered to function due to existence of longitudinal ditches. Earlier roads were constructed to allow more to incorporate the size of culverts, fill vehicles to manoeuvre through the streets meeting design and safety requirements.

Walkways were provided as per existing design of 1-1.5m width on both and/or single side of the road with paving slabs laid to bring aesthetic view of the streets and safety and comfort to passers-by.

### 2.4.3 Storm Drains

This requires the new construction of drainage structures, including the construction of open drains and energy dissipation structures.

Storm water drains have been designed for consideration of holistic view of surface water movements in the City of Mbeya. The longitudinal road ditches exist in the additional roads and direct run-off to the lowest points along the roads and, from the lower points to external locations far from the roads whose levels are lower than the lowest points on the roads.

### 2.4.4 Structures

Structures to be constructed include access slabs to houses for vehicles, pedestrian crossings and foot bridges crossing the storm water drains were considered as additional facilities. The major structures for the storm water drains are open trapezoidal lined ditches of varying sizes running throughout the drains considering climate change factors.

### 2.4.5 Pavement

The pavement for the additional access roads and the access to landfill will be done with 150mm of G15 improved; 200mm Sub-base, 150mm base and 40mm of asphalt concrete (AC) surface layers.

### 2.4.6 Street lighting

Streetlights with solar power (Photovoltaic module) sources will be provided to the already built access roads, installed at 6.0 M height and at distant pole intervals of 50m centre to centre in the appropriate road side within the RoW capable of providing a luminous bright light at night or during low visibility. The city is set to install 420 street lights mainly solar type.

## 2.5 Project requirements

### 2.5.1 Borrow materials and quarries

Construction materials particularly gravel and sand will be obtained from approved borrow areas. Crushed rock aggregates may be obtained from existing quarries within and outside City boundaries used during Core TSCP.

Safety measures during transportation of the materials will be adhered to and all access roads to be used for the transportation of materials shall be properly maintained.



The contractor shall prepare and subsequently implement rehabilitation plans for borrow pits and quarries during the decommissioning stage. The plans shall include demolition of temporary structure, and blending and filling of cuts to minimise risks for mosquito breeding and human or animal accidents, especially to children.

### **2.5.2 Construction camps, workshops, offices and camps**

Mostly, additional works will be undertaken from existing workshops, offices and accommodation for staff, storage of construction materials because these premises/ facilities are liable to be transferred to forthcoming contractors.

## **2.6 Project activities/Operations**

### **2.6.1 Mobilisation**

With the experience from the Core TSCP, mobilisation as necessary should be made of equipment, recruitment of manpower, construction of offices and campsites (if required), including the associated waste products management systems, identification of borrow areas and quarry sites and acquisition of various permits as required by the law. If applicable, the locations for offices and campsites will be agreed between the contractor and the supervisor and subsequently approved by the City authority. Project works will be implemented close to households or public areas and may affect public utilities and water supply and so necessary precautions must be taken with the guidance of the supervision consultant.

### **2.6.2 Construction**

The major works and materials for roads, drains and road and storm drains during the construction phase will be as follows:

#### **a) Road and drainage canals:**

The project comprises primarily civil engineering works consisting of;

- i) Clearing of areas in advance of construction works;
- ii) Filling and reshaping the road section to sub-grade level;
- iii) Earthworks necessary to construct the road ways and drains;
- iv) Excavation at proposed sites for roads
- v) Shaping of gravel from borrow pits for sub-base and base-course;
- vi) Supply of bitumen and stone chippings/aggregates;
- vii) Laying a bitumen prime Mbeya and bituminous surface treatment;
- viii) Construction of concrete slabs and strips;

#### **b) Storm Water drains**

This will require construction of new drainage structures, including open drains and energy dissipation structures.

#### **c) Uyole landfill**

- i) Removal of overburden material;
- ii) Earthworks necessary to construct the landfill cells and office building;
- iii) Construction of leachate collection pond / storage structures;
- iv) Construction of leachate treatment facilities;
- v) Construction of gas ventilation and collection system;
- vi) Construction of test pits for ground water and other pollution monitoring;
- vii) Excavation for the construction of the storm water canal;
- viii) Installation of polysynthetic lining material; and
- ix) Construction of office building, weighbridge, fence and access ways;

### **2.6.3 Waste Management**

The proposed road-side and storm water drains, street lights and landfill works are not expected to generate harmful waste materials. The major wastes generated by the subprojects are spoil soils resulting from earthworks including creation of borrow pits. Topsoil shall be stock piled along near construction sites and later on used to re-instate the sites at the end of the project implementation phase. In particular, the topsoil will be used for environmental rehabilitation such as capping of waste cells, re-vegetation and stabilisation of road, drain and landfill cell embankments.

Waste may be generated in the campsites if the contractor chooses to establish new sites or use the existing sites. This will include liquid wastes, general refuse and hydrocarbons. Sanitation facility to be used in the landfill site/camp will include ventilated improved pit latrines (VIP latrines), septic tanks and soak ways.

However, the contractor will make contingency plans to handle accidental oil spillages and general waste management during the preparation of ESMP for the subprojects.

#### **2.6.4 Power and Water Supply**

The contractor will obtain power supply from own standby generators or national power grid or served by TANESCO as well as water supply from the Mbeya Urban Water Supply and Sanitation Authority. Power and water supply are essential services for office, camps and workshops and for the operation of some equipment as well as the environmental hygiene of at the compounds.

#### **2.6.5 Demobilisation**

As soon as possible and to as great an extent as possible, after construction all areas not covered by permanent works shall be reinstated to their original condition.

The activities during demobilisation will include the following:

- Handing over of the permanent works in a serviceable condition to the City authority;
- Removal of temporary works and associated installations;
- General cleanliness of the areas affected by the contractor's activities;
- The disposal of all wastes to designated disposal sites;
- Restoration of borrow pits, quarry areas, water ponds to natural and usable conditions; and
- Termination of recruited workers in accordance with their contracts and labour laws and regulations.

### **2.7 Operation and Maintenance**

During the operation phase, the major activity will be the transport of various goods and passengers to neighbouring districts, towns and regions. Maintenance of the landfill, roads and drainage facilities will be necessary to ensure continued ease of use and to prevent deterioration of the assets. That will include the following:

#### **a) Landfill**

- Piling and management of waste by compaction and soil capping inside cells,
- Clearing and cleaning/ unblocking of drainage systems and collection pipes,
- Management of leachate pond,
- Repairs to damaged and replacement of vandalized poly material (liner),
- Re-establishment of sign boards,
- Operation, repair and servicing of weighing bridge,
- Importation of soil material for waste management and final capping ,
- Allow vegetation growth on cell mounds or capping from outside the site as these soils will not be available at site,

- Continuation of safety awareness programme for the people close to the landfill site, and
- Environmental monitoring for dust, noise, leachate, inflammable gas, and groundwater quality.

#### **b) Roads, drainage and street lights**

- Repairs to damaged road sections, including potholes;
- Removal of debris from the road;
- Maintenance of drainage including the removal of blockages, cutting and removal of vegetation, the removal of silt from culverts and the inverts of drains, repairs to damaged sections etc.:
- Replacement of road signs;
- Re-establishment of road markings;
- Proper storage and deployment of maintenance materials and equipment; and
- Continuation of safety awareness programme for the people using the road.

### **2.7.1 Workforce and Equipment**

In the same manner as was during the Core TSCP, the construction of additional works will require a team of technical personnel namely project managers, engineers, surveyors, sociologists, valuers, supervisors and technicians as well as semi-skilled and unskilled labourers. Unskilled and semi-skilled labour will be employed from local areas as need may be. The exact number of employees required by the subprojects will be known when each prepares and avails the methodology on how they will deploy the labour force..

There will be a need for heavy equipment for earthworks, construction of pavements and drainage structures, and transportation of construction materials and the labour force. These shall include bulldozers, graders, wheel loaders,

excavators, water bowsers, fuel tankers, bitumen distributors, vehicles, pumps, generators, cranes, rollers and compactors.

It is anticipated that labour based methods will be used for the construction of drainage and part of landfill cell structures especially in concrete works.

### **2.7.2 Street lights**

Solar lights will be installed in the streets. They absorb energy from the sun and turn it into light illuminating in subproject areas, hence, ensuring safety and security in the then dark streets Technically, a solar light has a photo-voltaic module integrated with a micro controller and a lithium battery which combines with high output LEDs and a human infrared sensor to get a multiple feature of low power consumption with high luminance.

The lights are designed to deliver in a long lifespan with minimal maintenance and provides a complete solution for the off-grid or remote inner streets applications. The lights endure against harsh weather as they are kept free from corrosion and premature failure.

## **2.8 Organisation of Works and Construction Duration**

MCC will award works to different contractors in separate lots for each subproject (roads, and drains). The detailed schedule and methodology for works will be known at a later stage when the contractor(s) is/are engaged.

## **2.9 Land requirement, resettlement and compensation issues**

### *Drainage structures:*

Land for the proposed works is available inside the existing RoW for municipal roads.

### *Storm Water drains:*

The planned drainage canal is not expected to take land from surrounding people.

Design works have been detailed in the design and feasibility report prepared under the Core TSCP, but, will be updated by the supervision consultant prior to commencement of works. When engaged, the contractor will liaise with municipal engineers to propose sites for workshops borrow pits and quarry sites. A number of existing borrow pits have been identified and are suitable for use in the subprojects.

Compensation for any unforeseen land or properties take or damage will have to comply the World Bank OP 4.01 and the national land and land-related legislations. Thus, as the project will cause zero displacement of people and loss of land or properties Resettlement Action Plan (RAP) has not been prepared.

#### **Establishment of Buffer zone for the Uyole landfill**

For the establishment of a buffer zone for the land fill the ESIA reveals that there are resettlement issues; and therefore the MCC prepared an ARAP report. The resettlement will involve the impact of 1,846 assets that includes crops, land, structures and graves affecting 91 PAPs. The total compensation is 424,282,498 Million Tshs.

## **2.10 Status of proposed sites for additional works**

### *Road subprojects*

The present characteristic for the sites for roads subproject proposed improvement works as observed during are presented in Table 2.

*Table 2: Environmental characteristics of the proposed sites for Improvement works*

PRO JEC T	NAME OF SUB-PROJ ECT	TARGET ED INTERV ENTION S	PHYSICAL, SOCIAL ENVIRONM ENTAL CHARACTE RISTICS
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PRO JEC T	NAME OF SUB-PROJ ECT	TARGET ED INTERV ENTION S	PHYSICAL, SOCIAL ENVIRONM ENTAL CHARACTE RISTICS
1	Road subproject	TheofloKisanji – Kabwe Block (0.9 Km)	<ul style="list-style-type: none"> <li>– Unpaved road</li> <li>– The project passes in residential and business premises.</li> <li>– Make shift Kiosks</li> <li>– Serves The oflo Kisanji University</li> </ul>
2		TAZAM Madaraka – Kabwe T Sido (1.2 Km)	<ul style="list-style-type: none"> <li>– Telephone Tower</li> <li>– Church buildings or premises</li> <li>– The road is narrow on the TAZAM end</li> <li>– Con</li> </ul>



PRO JEC T	NAME OF SUB-PROJ ECT	TARGET ED INTERV ENTION S	PHYSICAL, SOCIAL ENVIRONM ENTAL CHARACTE RISTICS
			<ul style="list-style-type: none"> <li>- crete fence</li> <li>- Live fence</li> <li>- Mobile phone tower</li> </ul>
3	Ilomba – Isyese and connecting to Parking area (0.5KM )	Access roads and street lightsto tarmac	<ul style="list-style-type: none"> <li>- Works will affect and</li> <li>- Business premises and</li> <li>- Residential houses</li> <li>- Works will affect planted trees / fence</li> <li>- Concrete fence</li> <li>- Will serve NaneNane Bus Stand.</li> </ul>

PRO JEC T	NAME OF SUB-PROJ ECT	TARGET ED INTERV ENTION S	PHYSICAL, SOCIAL ENVIRONM ENTAL CHARACTE RISTICS
4	Sae - TANE SCO – TAZA M road connecting to Theofl oKisanji Road (1.5Km ) km	Access roads and street lights	<ul style="list-style-type: none"> <li>- Serv es Resi denti al pre mise s</li> <li>- Busi ness kios ks and shop s</li> <li>- Mot or gara ges and work shop s</li> <li>- Chur ch</li> <li>- Mobi le pho ne towe rs</li> <li>- Herb al Clini cs</li> <li>- Plan ted tree s</li> <li>- Serv es or conn ect to TAN ESC O sub-stati on</li> <li>- Utiliti es of wate</li> </ul>

PRO JEC T	NAME OF SUB-PROJ ECT	TARGET ED INTERV ENTION S	PHYSICAL, SOCIAL ENVIRONM ENTAL CHARACTE RISTICS	PRO JEC T	NAME OF SUB-PROJ ECT	TARGET ED INTERV ENTION S	PHYSICAL, SOCIAL ENVIRONM ENTAL CHARACTE RISTICS
			<ul style="list-style-type: none"> <li>- Live and concrete fence.</li> </ul>				campus and unplanned settlements in Mwakibete area ; and roads.
6	Drainage Canals	To facilitate drainage water drainage in newly constructed roads. To serve flood prone areas	<ul style="list-style-type: none"> <li>- Proposed for phase I roads</li> <li>- Passes in residential and business areas</li> <li>- Traverses poorly drained areas</li> <li>- Will improve drainage in roads, The oflo Kisanji University</li> </ul>				<ul style="list-style-type: none"> <li>- Drains – Kabwe Block T SIDO road</li> <li>- Proposed works will affect residential community.</li> <li>- Noise from works will affect university students at TEC</li> </ul>

PROJECT	NAME OF SUB-PROJECT	TARGETED INTERVENTIONS	PHYSICAL, SOCIAL ENVIRONMENTAL CHARACTERISTICS
			<ul style="list-style-type: none"> <li>- U To drain into Nzo wa River.</li> <li>- Construction works will improve sanitation in the area .</li> <li>- Construct crossing pads / slabs for pedestrians across drains.</li> <li>- Drain will improve drainage in areas with high water table (Mw</li> </ul>

PROJECT	NAME OF SUB-PROJECT	TARGETED INTERVENTIONS	PHYSICAL, SOCIAL ENVIRONMENTAL CHARACTERISTICS
			akibete)

Most roads have utilities of water and power which requires protection. See Figure 3

Figure 3

#### Storm Water Drains

The present environmental conditions show some of the construction sites could be vulnerable to soil erosion. For example, in Mwakibete area on the bank of Nzowariver as shown in the Figure 4. In addition, there are power and water utilities which should be identified and relocated or avoided.

The drainage structures following phase I construction of roads in Mbeya city are have limited capacity to drain water from city roads especially during rainy season hence the need for improvement Figure 5.

Some of important features of the proposed sites for improvement works such as ongoing business, under capacity drains, water utilities and vegetation at road and storm drains are presented in the photos below:

*Figure 3 Power lines, residential and bussines properties long Madaraka – Kabwe - TANZAM Road*



Figure 4 Soil erosion and water utilities along and human path in the proposed Drain in Mwakibete area.

Figure 5 Inadequate drainage structures for storm water outside the fence of TECU in Mwakibete area



#### Uyole landfill

- a) Newly constructed 1 large cell covered by poll-lining material
- b) Office and weighing bridge location.
- c) Fence is lacking at landfill
- d) Completed leachate pond
- e) Ongoing dumping of waste at nearby old dump.
- f) Smoke from burning of solid waste.
- g) Ongoing rock crashing and excavation activities (crasher plant).
- h) TANESCO power line
- i) Operational asphalt plant at site.
- j) Storm water drain around landfill cell.

Some of important features of the proposed sites for improvement works such as ongoing business, under capacity drains, water utilities and vegetation at landfill are presented in photos below:

Figure 6: Smoke from burning waste, crashed rocks and leachate pond downstream of constructed cell at landfill site.



## **3 POLICY, ADMINISTRATIVE AND LEGAL POLICY**

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### **3.1 NATIONAL POLICIES**

#### **3.1.1 Overview of national policy and administrative framework**

- a) The ESIA study has been guided by the NEMC's EIA Guidelines (March 2002) and that of other relevant sectors and the World Bank's Environmental and Social Safeguard Policies

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. 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.

National policies on environment, land, transport, wildlife, forests, water, occupational health, mining and local government relevant to this project have been considered, as also various international treaties and conventions on natural resources that Tanzania has ratified. The main legal instruments applicable to environmental management with respect to this particular road and storm drains subproject are:

#### **3.1.2 The National Environmental Policy (NEP, 1997)**

This is the major policy document which outlines environmental problems and gives guidance to environmental management and projection in Tanzania. The policy seeks to promote the economy and livelihoods of people while promoting sustainable utilization of natural resources in the country. The policy provides the framework for the formulation of plans, programs and guidelines for the achievement of sustainable development. Key objectives of this policy with regards the road rehabilitation and upgrading projects are to:

- Ensure sustainability, security and equity in the use of resources;
- Prevent and control degradation of life supporting land, water, vegetation and air;
- Conserve and enhance natural and man-made heritage;

The policy promotes the use of EIA's as a planning tool that integrates environmental issues into the planning process. The policy also stipulates the use of numerous approaches in environmental management in Tanzania.

#### **3.1.3 Transport Policy, 2002**

The main Policy objective in the transport sector is to enhance transport and promote environmental protection. Environmental problems created by the transport sector are pollution and safety. Emission into the environment from vehicles is beginning to take its toll in Tanzania. The majority of fuel is leaded and a lot of the vehicles are in poor condition.

Furthermore, improper disposal of oils, fuels, and other pollutants from garages and petrol stations may contaminate soils and water sources.

The implementation of this ESIA process will take aboard all these issues as appropriate.

### **3.1.4 National Mining Policy, 1997**

The Mineral Policy covers all activities regarding extraction from the ground. This includes minerals and material such as that for construction. The policy however, promotes private sector led mineral development relegating the role of the government to regulation, promotion and facilitation.

The responsibilities of the government include monitoring of mining activities, collection and maintenance of geo-technical data for promotional purposes and administration and inspection of mining activities, and environmental management with regards to mining. The project sourcing for materials shall be guided under this policy as extraction of sand, gravel and stone are considered as mining.

### **3.1.5 National Water Policy, 2002**

Three components from the National Water Policy have a bearing on the solid waste project. These address proper use, conservation and protection for human consumption and the environment.

(i) Socio-Economic and Water Allocation: Water is a basic need and its use is to be determined by and have consistence in the legislation, the allocation system should distinguish and separate water use permit from land titles and a sufficient supply of water and an adequate means of sanitation are prioritised.

(ii) Protection and Conservation of Water Resources: The "polluter pays principle" shall apply and water conservation for all aspects of water use are to be enforced. "Demand management" is to be used in conjunction with water supply provision.

(iii) Water and the Environment: Water related activities should aim to enhance or to cause least detrimental effect on the natural environment. Furthermore the allocation and consumption of water for environmental purposes shall be recognized and given appropriate considerations, water for the environment shall be determined based on scientific information available considering both the temporal and spatial water requirements to maintain the health and viability of riverine and estuary eco-systems.

The design and implementation of this ESIA process will take into consideration the provisions of water policy especially those related to pollution of surface and underground water resources.

## **3.2 RELEVANT REGULATIONS AND GUIDELINES**

### **3.2.1 Environmental Management Act of 2004**

The Act provides a legal and institutional framework for the sustainable management of the environment. It outlines the principles for management, impact and risk assessments, the prevention and control of pollution, waste management, environmental quality standards, public participation, compliance and enforcement. It provides the basis for the implementation of international instruments on the environment and the National Environmental Policy. All project activities must be planned in order to comply with the provisions of Part VI (EIA) Studies, Part VIII (Pollution Prevention and Control), Part IX (Waste Management), Part X (Environmental Quality Standards) and Part XI. Specifically, section 81(1) EMA 2004 states that each developer has to carry out an Environmental Impact Assessment (EIA). The implementation of sub-project investments and this ESIA process will be in full compliance with the Act.

### **3.2.2 Occupational Health and Safety Act No. 5 of 2003**

This Act make provisions for safety, health and welfare for persons at work in factories and other places of work; to provide for the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with activities of persons at work. Proposed project operations will entail the employment of both skilled and unskilled labourers, and as such will comply with this Act.

Occupational health and safety are key aspects in the operations. First aid and appropriate personal protective equipment will be provided to employees and maintained by the contractor during the period of construction.

### **3.2.3 Local Government Act (District and Urban Authorities) of 1982**

This Act provides for detailed responsibility for urban and district councils in the administration of their day-to-day activities. ESIA and waste management is pointed out as one of the activities to be managed by both district and urban authorities. Accordingly, the proposed investment sub-project activities including this ESIA process will seek to liaise closely with Mbeya City Council and other sector authorities in the region.

### **3.2.4 Land Act No. 4 and Village Land Act No. 5 of 1999**

The Land Act seeks to control land use and clarify issues pertaining to ownership of land and land-based resources, transactions on land and land administration. This act identifies three categories of land; village, public and general, and distinguishes protected or restricted land (e.g. national parks, forest reserves, etc.), and ensures that tenure and rights of legitimate land users are considered and respected. Land sensitivity and potential environment impacts of the proposed road and drains subproject shall be considered in order to ensure that the land is not polluted and to allow for natural and rapid restoration of cleared vegetation or disturbed land.

The Village Land Act provides for legal framework for the management and administration of land in villages. The Act empowers the Village institution or Council to manage all village land. It is important therefore that there should be close consultations and consideration of views of local authorities over any matter, e.g. compensation of damaged properties, as a result of the implementation of investment sub-project.

The design and implementation of this ESIA process is consistent with both legislations.

### **3.2.5 Environmental Impact Assessment and Audit Regulations (2005)**

It is an offence for MCC to commence, finance, permit or license a project without ESIA authorization. The city – specific ESIA process described in this ESMF (chapter 4 below) including application, screening, assessment, review and approval are in line with EIA Regulations. The EIA and Audit Regulations Part IX, Regulation 42, Sub-regulation (1); (2)(b); and (4), require that in such situations where an ESIA Certificate is still valid, and a Proponent wishes to make changes to the development, extra work should be done to supplement the existing Environmental Impact Statement. The nature of additional information required to supplement the EIS should be provided by the National Environment Management Council (NEMC).

The EIS supplement is undertaken by the Proponent. At the completion of the assessment, the supplement report is reviewed and approved by NEMC. The Proponent is issued with a Variation Certificate in accordance with Part VII, Regulation 35, Sub-regulations (1) – (3)) of



the EIA and Audit Regulations, 2005. This ESMF environmental and social assessment and management process specific for TSCP additional works aims to fulfil this requirement.

### **3.2.6 Environmental (Registration of Environmental Experts) Regulations (2005)**

Sub-project ESIA, where required, will be conducted by person or firm of experts registered and certified by the Registrar at NEMC. PO-RALG will commission Consulting firms certified to undertake ESIA. MCC will strive to assign qualified their staff to prepare sub-project ESMP; or support and supervise external experts where screening determines a need to follow national procedures and obtaining ESIA certificate issued by Minister responsible for environment. MCC will ensure through capacity building outlined under this ESMF (B6) that its relevant Staff attain qualifications required under this regulations to conduct Environmental Impact Assessment and Audit or related studies and are registered / certified by Registrar (NEMC).

### **3.2.7 Environmental Management (Air Quality Standards) Regulations, (2007)**

This regulation prohibits emissions/release of hazardous substance into the environment. The sub-project ESMP for managing wastes will adhere to permissible emission limits and quantities of emissions of SOX, CO, black smoke and suspended particulate matters, NOX, O3, hydrocarbon, dust, lead, and substances in exhaust of motor vehicles prescribed by the regulations. If need be, MCC will seek air pollutant emission permit issued by NEMC.

### **3.2.8 Environmental Management (Water Quality Standards) Regulations (2007)**

The sub-project ESMP will ensure safe distances of water supply systems from pollution sources for any infrastructure activity near water sources. The inclusion of EMOs in project teams and approval of subproject ESMP will ensure no discharge of water polluting substances will go uncontrolled.

### **3.2.9 Environmental Management (Soil Quality Standards) Regulations (2007)**

The sub-project ESMP will ensure main polluting activity and discharge effluent are prevented from contaminating soils or subsoil.

### **3.2.10 Environmental Management Act (EMA), Cap 191 (Sections 114 – 118).**

By developing waste management infrastructure, MCC has fulfilled their responsibility required by EMA which empower them to devise means for minimization of solid wastes and method of collection, transportation, treatment and disposal; as well as availing appropriate equipment and routes for collection; and designate transfer station / collection centres. The subproject ESMP will ensure proper functioning of the infrastructure and facilities.

### **3.2.11 Public Health Act, Cap 336 (2009)**

By developing waste management infrastructure, MCC also has fulfilled PHA requirement that vest duty to it to set aside and manage areas in respect of solid (and liquid) wastes;



collect, transport and dispose wastes from all sources; cleanse all receptacles; clean, maintain, and keep streets and public places, dumping sites and control scavengers at all waste sites. The subproject ESMP and specific Waste Management Plans will ensure that the MCC infrastructure and facilities operate as per these requirements.

### **3.2.12 Quality Standards for Control of Noise and Vibration Pollution) Regulations (2011)**

The sub-project ESMP will incorporate measures for control of noise and vibration pollution emanating from construction site, vehicles, workshop, and quarries that annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and of the environment.

### **3.2.13 Water Acts of 1974 and 1981**

The Water Act no. 42 of 1974 and Act no. 10 of 1981, principally seek to ensure that water is utilized without sectoral conflicts and without causing pollution. They were enacted to control and protect water resources, and place a regime of water rights to govern access to water use. Pollution control norms and standards are embodied in the water rights.

Apart from incorporating pollution control and having prevention conditionality in the water rights, the Act goes a step further by putting in place a regime in consent with discharge of effluent. Under Section 15 A (1) of the Act, no person may discharge effluent from any commercial, industrial or other trade waste systems into receiving waters without a consent duly granted by a Water Officer. The Act also contains two schedules, which set standards for receiving waters and effluent. The ESIA process will see to it that all relevant adverse impacts from the proposed additional works for landfill, road, drainage and street lights facilities are properly mitigated to avoid any potential pollution problem in the project area.

### **3.2.14 Mining Act, No. 17 of 1980, as amended**

The Act sets out government policy on all forms of mining and is supported by various regulations covering claims, prospecting rights, mining rights and royalties. Mining license applicants are required to submit plans for environmental protection. Each industry is required to establish realistic resource recovery standards and to adhere to them. Mining plans are required to be presented before operations begin.

The implementation of investment sub-projects will take on board all the relevant provisions of the mining act especially as regard to borrow pits, crushers and quarry material.

### **3.2.15 Roads Act 2007**

The Road Act 2007 serves as a guideline to the use of the road reserve. Clause 29 (2) gives provisions for the request and terms of approval for use of the road reserve by other people, utilities or institutions. The Ministry of Infrastructure Development is the authority for this regulation.

## **3.3 International Regulations**

The most appropriate international legal frameworks include:

### **3.3.1 United Nations Convention on Biological Diversity**

This Convention, which calls for the sustainable use of biological diversity, was ratified by Tanzania in 1996. Mbeya City, where the sub-projects will be implemented has a very low

diversity of both flora and fauna. However, best practices of flora and fauna protection will be observed by contactors.

### 3.2.2. 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.

### 3.2.3. **World Bank's Safeguard Policies**

The World Bank Safeguard Policies are Operational Policies (OP) and Bank Procedures (BP) approved by the Board for addressing environmental and social issues within the Banks supported development projects. The core TSCP and the Additional Financing have been rated Environmental Risk Assessment Category B and trigger three environmental and social safeguard policies, which are: Environmental Assessment (OP/BP 4.01); Involuntary Resettlement (OP/BP 4.12); and Physical Cultural Resources (OP/BP 4.11). The same policies will apply to the Sub-Project activities under the proposed Additional Financing.

The safeguard policies considered applicable to the TSCP in general and Additional Financing specifically are:

#### **3.1.3.1 Environmental Assessment (OP/BP4.01)**

This policy requires environmental assessment (EA) of projects/programs to help ensure that they are environmentally sound and sustainable. The EA is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of the sub projects under the core urban infrastructure (Mbeya) component.

The environmental and social impacts are anticipated to come from the implementation of sub projects activities by the contractor. The EA process will lead in the preparation of an Environmental and Social Management Plan (ESMP) for Mbeya City. The ESMP will set out mitigation, monitoring and institutional measures to be taken during operations of these activities, to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels.

OP 4.01 further requires that the ESIA report must be disclosed by the Government of Tanzania and the World Bank InfoShop before commencement of the project activities

#### **3.1.3.2 Physical Cultural Resources (OP/BP 4.11)**

Culturally, Tanzania is an extremely rich and diverse country and is home to ancient civilizations: 300-year-old Arab settlements; 100-year-old European buildings; graveyards; sacred areas; mosques; churches; etc. To mitigate potential for adverse impacts on cultural property, training of LGA project teams and local leaders and management committees and the subproject planning checklist as well as other tools, will ensure that cultural property resources are identified during subproject planning, and appropriate measures are taken to avoid damaging them. Chance find procedures have been included into civil works contracts; Designs and buffer zones will be created to avoid damage to cultural resources, such as "sacred" forests and graveyards. According to approved designs, the proposed infrastructures are such that they do not affect cultural resources, but procedures in case of "chance finds" will be observed.

### **3.1.3.3 Involuntary Resettlement (OP/BP 4.12)**

WB Involuntary Resettlement Policy OP 4.12 requires that all projects with land acquisition implications are guided by a Resettlement Policy Framework (RPF), which outlines processes and procedures to be followed for preparation of site specific RAPs during project implementation. However, in Tanzania, there are no explicit requirements for a RPF or RAP. As regards compensation the Tanzania laws requires that only the rightful land or property owner (statutory or customary rights of occupancy) should be compensated, while the WB OP 4.12 require that any person (whether is rightful owner or not) who lose or is denied or restricted access to economic resources – including tenants, encroachers, squatters - should either be compensated for use of the land or assisted to move. TSCP project will apply both WB requirements and Tanzania government's guidelines regarding compensation and resettlement of Project Affected People (PAP, and where there are gaps between these two, the World Bank's safeguard policy will prevail.

Significant efforts are made in the design and screening stages of sub-projects to avoid impacts on people, land, property, including people's access to natural and other economic resources, as far as possible. The works sub projects are not expected to cause any involuntary resettlement as the infrastructure of roads is confined within the legally owned road reserve. Therefore no human activities and settlement inside Right of Way (RoW) for roads. However, for the establishment of a buffer zone for the landfill, resettlement is involved; and therefore the MCC prepared an ARAP report. The resettlement will impact 1,846 assets that includes crops, land, structures and graves affecting 91 PAPs. The total compensation is 424,282,498 Million Tshs.

## **4. BASELINE CONDITIONS**

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### **4.1 PHYSICAL ENVIRONMENT**

#### **4.1.1 Location**

The city is located in the southern highlands of Tanzania. It is accessible by road and TAZARA railway from Dar es Salaam as well as by air destined at Songwe airport 30km from the City centre.

#### **4.1.2 Climate**

Climate is generally tropic with marked seasonal and altitudinal temperature variations and sharply defined dry and rainy seasons.

The climate is influenced by its attitude and receives a mean annual rainfall of 1200 mm (November-May) accompanied with mean temperature ranging between 110 C -250C. Mbeya City is generally characterized by a moderate climate.

#### **4.1.3 Topography**

The City Council is situated at an elevated land along the slopes of the Mbeya Range at an altitude rising from 1600 to 2400 meters above sea level.

#### **4.1.4 Geology**

The core of the Mbeya Range, including Mbeya peak is basically composed of metamorphic and Intrusive rocks. In the North-East of the range the rock structure is predominantly banded, streaky, composed of iron and quartz elements which form upstanding hills and ridges. Similarly intruding in the Chunya area are rocks which may be members of the metamorphic complex. The greater part of Mbeya range and its foothills to the North-East also have characteristics of quartz over a large area particularly along the Songwe Scarp of Mbeya range and in the region of Itete, the rocks have been felspathised, carbonatite and silicified during emplacement of carbonatite along the Songwe Scarp. Associated with carbonatite is an intrusive rock containing rounded and angular fragments of altered country rock. The composition of silicon and iron matrix is largely obscured by iron staining.

Lake beds mostly white sands and volcanic silts are well developed around Shanya hill in the Songwe Scarp overlain with pebble beds, gravels, pumice and tuffs which contain a lot of material from Rungwe volcanic province. In the area where the Tanami highway traverses the floor of the Songwe valley, these deposits are widespread; the pebbles and boulders being set in a matrix of tuff and pumice, a situation which probably extends further North. Hot springs are to be found in the lakebed lime stones at the northern end of the Mbeya Range.

#### **4.1.5 Hydrology**

The Ruaha – Rufiji basin extending from the south highlands on the southern plateau of Tanzania forms a watershed area of the main rivers draining the Region towards the east.

Main rivers include the Great Ruaha which is considered as one of the great inlets of the Indian Ocean. Lake Rukwa basin in the northwest of which the rivers Zira and Songwe form the inland drainage into Lake Rukwa.

Lake Nyasa basin in the south forms another inland drainage, of which the rivers Kiwira, Lufilyo, Mmbaka and Songwe are considered to be major sources of water to Lake Nyasa. Water from Lake Nyasa drains to the Indian Ocean through Shire and Zambezi River in Malawi.

#### **4.1.6 Soils**

The soils in Mbeya region therefore vary from the shallow rocky and Stony (Chromic Cambisol, eutric Cambisol) suitable for forestry and grazing and a variety of food crops to deep brown clay loams (Mollic Andosol and Haplic Andosol), deep red clays (Ferralic Cambisol), shallow gravelly (Iron stone overlying soft weathering rock, orthic Ferrasol), deep sandy clay over sandy loam (Albic Arenosol, Fine Sodic Eutric Gleysol); Excessively drained highly sodic soils (Sodic Regosols, Gleyic Solonetz); dark brown to yellow brown loam calcareous and saline (Calcic Cambisol, eutric). These soil types define the agro-ecological regime for Mbeya Region.

In the arable areas soils are most commonly of moderate fertility, coarse or medium in texture and varying from sandy loam and alluvial soils to cracking clays. Large part is dominated by crystalline and mainly fersic gneiss and granite rocks covered with thick layers of volcanic and alkali basalt.

### **4.2 BIOLOGICAL ENVIRONMENT**

#### **4.2.1 Biological environment**

The Mbeya Region is endowed with a varied flora and Fauna with extensive populations of eucalyptus and pine tree genus. The City Council has two tree seedlings some of which have been planted in water sources, schools, residential areas, commercial areas and offices and some given to Wards for planting. According to the Regional Natural Resources Secretariat based at the regional headquarters in Mbeya, there exists a re-forestation programme for the Mbeya range.

The Secretariat also has plans to re-introduce indigenous tree species long lost through use for firewood by the local population and introduce broad-leafed perennials and annual species particularly shrubs for the urban areas. Forestation and re-forestation efforts are in line with universal efforts of combating global warming by creating carbon sinks.

Miombo (*Brachystegia julbernadia*) woodland is predominant in Mbeya. Those areas with higher rainfall support forest, often evergreen and bamboo thickets, except at the highest elevation, where afro-alpine grasslands exist.

All these basins and river courses are greatly linked to the city land area and contribute to the hydrologic dynamics in the city.

### **4.3 SOCIO-CULTURAL ENVIRONMENT**

#### **4.4.1 Population and Administration**

The population is approximately 305,319 persons (2012 census). Economy depends on trade, business and tourism in the CBD supplemented by urban agriculture and mining in the outskirts.

### **4.5 AGRICULTURE**

Agriculture is therefore the main occupation for City residents. MCC has a total of 21,400 hectares and 9,937 hectares (46%) is suitable for agricultural activities. The land which is currently utilized for agriculture is 44%, out of which maize, beans, potatoes, wheat and vegetables are the food crops produced while, coffee, tea and sun flower are produced as

cash crops. For the year 2007/2008 44% of the land was cultivated and produced about 32,920 tons, with potatoes yielding the highest tonnage per hectare

### **4.5.1 Land Use**

There are three main types of land use along within the subject areas. The big part of the area is used for residential settlements as well as community infrastructures such as roads including social services like schools, medical facilities and etc. Majority live on their own land because the survey results reveal that only 8.6% did not have own houses, whereas the rest 91.4% possess at least one house structure located on legally owned land.

Moreover, respondents claimed that all land they acquire is cultivated/ developed and no more land space is left without development within their plots. This is because land value in the city is very valuable, and developing a structure within the plots secures lives of the developer even up to old age. On the other hand, 14.3% of respondents as shown in figure 7 below claimed to have located cemeteries along their plots.

### **4.5.2 Family Units and Size**

Majority of families comprises of father, mother and children. However, like other African communities, most families in the study area have extended family set up. It is possible to find married couples living with one of their parents, orphan children, brother/sisters, in-laws or even uncles and aunts. Regarding family sizes in the project area, household survey results show that number of people in each unit vary from two to 10 and above. It also shows that 12.9% have a big family of people ten people, in some cases even more.

Such family size surpasses the national population statistics which show that the average Tanzanian household has 6 members. However, this does not necessarily imply that the communities in this area have high fertility rate. The survey revealed almost in all households there was at least one person who is not a member of the nuclear family. Presence of so many extended family members increases the dependency ratio.

### **4.5.3 Land Tenure and Availability**

In the project area there are three main land tenure systems as revealed in the household survey carried out during the ESIA study. More than half of the interviewed respondents (54.3%) got land through inheritance whereas 42.9% bought land. Very few people (2.9%) were allocated by the government showing that majority live in squatters.

Most of the street government regimes do not have land left under their supremacy to allocate to the needy. People who are in need of land will have to acquire it through buying from those who have extra plots or those who want to migrate out of the area.

### **4.5.4 Household Income**

Distribution of income among the inhabitants differs tremendously, based on their occupations. For the livestock keepers and peasants earn very little income from their farms and livestock produce due to nature of production system which is not market oriented or low prices paid to farmers. On the other hand, those who are engaged in trading have relatively better earnings.

### **4.5.5 Housing**

Household survey explored from the respondents about the ownership and status of the house structures. The results show that all respondents possess at least one structure that belongs to the families. These structures have diversified sizes depending on affordability of



the head of household. Data shows that about half of the houses (48.5%) have 3-6 rooms followed by 27.1% that have 1-3 rooms.

On the other hand, 15.6% have 7-9 rooms. The rest 8.6% of the structures are large containing 10 and above rooms. The study wanted to explore the uses of the structures. Purposes of the main house structures owned by the respondents in the project area shows that 84.3% are residential structures whereas 11.4% are rental houses.

Ownership of house structures in the project area: Majority of the affected household structures are mainly owned by male. This situation is common in many African societies where men are the head of households as well as properties of the households. They own most of means of production. Women are mainly considered as helpers who obey their husband. Survey showed 84.3% of the structure owners are male whereas 15.7% are female owned properties

## 4.5.6 Education

### **Primary education**

Mbeya Municipal (City) Council (MCC) has 83 Primary school, 74 are owned by the Council and 9 are privately owned with a total number of 3,290 pupils (1,671 boys and 1,619 girls). There are 66,871 pupils enrolled in primary schools; 32,506 boys and 34,365 girls. All schools have pre-primary classrooms with a total of 5,344 pupils being 2,721 boys and 2,643 girls. Among the schools, three are special schools with 214 disabled pupils. Important Education Indicators are:-

- Standard one enrolment rate is 108% in 2012 (National 100%)
- Pupil's book ratio is 1.3 (National 1:1)
- Teacher pupil ratio 1:74
- Performance of attendance 99%
- Standard seven Examination pass 76.3% (2011 Examination)
- Government Secondary Schools selection 100% (2012)

### **Secondary education**

MCC has 52 Secondary Schools of which, 21 are privately owned and 31 are under government. Out of the 31 government secondary schools, 3 are boarding schools with a total number of 24,492 students of which 1,821 are boarding students.

MCC has 832 teachers and 60 non teaching staff making a total of 892 staffs. In 2012/ 2013, the council has a shortage of 302 teachers especially in science subjects.

Other Education Institutions in the City are:-

1. TheofiloKisanji University
2. Mzumbe University Campus
3. Open University of Tanzania
4. Moshi University of Co-operative and Business Studies (MUCCoBS)
5. Mbeya Institution of Science and Technology (MIST)
6. Vocation training Centres
7. Tanzania Institute of Accounts (TIA)
8. Agricultural Research Institute (ARI)
9. Mbeya Lutheran Teachers College
10. Assistant Medical Officers College.
11. Arusha University.

## 4.5.7 Urban Planning and Housing

Majority of city inhabitants live in un-surveyed areas. About 65 percent of City residents are estimated to live on such areas.

The number of buildings and establishments in the City are as follows:

1.	Residential houses in survey areas	14,000
2.	Commercial houses in survey areas	2,000
3.	Industries	100
4.	Government and Institution house	200
5.	Private Institution house	60
6.	Uncompleted houses	1,140
7.	House being constructed locally (unplanned)	32,500
	<b>Total</b>	<b>50,000</b>

#### 4.5.8 Works and Communication

In 2010, the network in MCC had the following types of transport infrastructure:

Tarmac road	-	24.55 km
Gravel roads	-	87.55 km
Earth roads	-	292.92 km
<b>Total</b>	-	<b>405.45 km</b>
Bridges	-	32
Culverts	-	104
Drifts	-	10

About 90 percent of roads are passable throughout the year. The 2010- 2013 period experienced remarkable improvement of tarmac roads following the implementation of Core TSCP. Because of the topographical situation of Mbeya City and heavy rains, as well as absence of storm water drainage to most of the roads poses a major problem in the road maintenance. The Council aims to improve earth roads to gravel roads and gravel to tarmac roads to minimize maintenance costs and increase efficiency to road users and community. The Council plans to procure motor grader, supervision vehicle, motor bikes, precision tools, weights and measures for road inventory and maintenances.

#### 4.5.9 Economic conditions

The main occupation of the people in Mbeya City is revealed by 2002 census is:-

- (i) Agricultural and livestock keeping which employs 33.3% of the people.
- (ii) Informer sectors and petty business or small trade employs 43.4%.
- (iii) 21% are employees,
- (iv) 1.4% as contributing family workers and
- (v) 0.9% in rest of categories.

The estimate per capital income is Shs. 675,047. The present characteristic for the sites proposed for works are presented in **Error! Reference source not found.**

#### 4.5.10 Transport

Roads are the major means of transport within and outside the project area. All villagers access busses for transport within their own streets at distances of 0-1kms from their compounds. The distance is similar for transportation facilities of goods and commodities



#### **4.5.11 Waste Management**

Most of the households do not have adequate solid and liquid waste disposal. The solid and liquid wastes are disposed haphazardly, some are used for manure on backyard garden while others burn or bury the waste. People urinate just anyhow within the house compound, on bushes and along roads where there are trees or vegetation to hide. Poor sanitation is main causes of some of water-borne diseases including diarrhoea.

#### **4.5.12 Health**

Out of existing 19 Government Health facilities, 4 Health centers and 6 Dispensaries are owned by the Council. The major problems faced by the sector are inadequate number of health staff; insufficient drug supplies, equipment and health service delivery points. The Council is expecting to inaugurate its own City Hospital by upgrading Igawilo Health Centre by July 2010.

The major top ten (10) diseases in MCC are:-

1. Malaria;
2. Acute respiratory infections;
3. Sexually transmitted Infections;
4. Diarrhea diseases;;
5. Pneumonia;
6. Skin infections;
7. Intestinal worm Infestations;
8. Minor injuries;
9. Urinary Tract Infections; and
10. Eye infections.

In ensuring that the Health service becomes accessible and available to majority of people, the Council is expecting to start implementing the Health Sector Development Program by improving infrastructure to its old health facilities as well as constructing new facilities to eligible wards.

#### **4.5.13 Energy**

Electricity, fuel wood, charcoal and kerosene are the main source domestic energy. Very few households are not connected to electricity. Data obtain from household survey pertaining to number of household connected to electricity shows that 71.4% are connected to electricity whereas 28.6% are not. However, data do not reflect the situation of people in the project area because part of the project area is far from the main road where situation might be different. Those connected to the electricity use it for lighting and operating radio and TV and other electronic facilities.

Cooking energies remain to be charcoal and firewood. Due expansion of the city, fuel wood and charcoal have become scarce commodities. Majority buy from retailers near their home compounds therefore Women and girls (who bear the responsibility for cooking) spend few minutes to get it. Kerosene is used for lighting as majority cannot afford its prices.

#### **4.5.14 Water Supply / services**

Mbeya City Water services are run by the Urban Water Authority. Currently there are 10 water sources within the City which are run by the Water Authority in the City. These sources provide 29,000 M3 of water which is 85 percent of the total demand. The authority's laboratories and those of private companies such as the Coca Cola bottling plant monitor the quality of the water on a monthly basis from eight (8) water sources. The sources include: Ivumwe Streams, Nzovu springs, DP Makunguru, Ivumwe springs, DP Iwambi and Nsalanga There are three basic drainage systems:

Water sector in the project area is favorable because all respondents access water within their own street majority of them (91.4%) walks less than 1 KM and the rest walk 1-2 KM from their own compounds. Regarding private water connection 81.4% of the households are connected to water services in their own compounds whereas the rest 18.6% depend on communal water sources.

## 5 STAKEHOLDERS CONSULTATION AND PUBLIC INVOLVEMENT

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### 5.1 Consultation

ESIA was prepared for the first phase and EIS certificate given for the project. The public consultation process in Mbeya was conducted in accordance with the Tanzanian Environmental Impact Assessment and Audit Regulation of 2005. Importantly, the stakeholders were given information about the improvement works and allowed to give their concerns or opinions about the planned works. This experience from phase I (package II and I) and how to improve the situation.

The objectives of public consultation were:

- Provide clear and accurate information about the Project to communities living in the sub-project area, especially along the proposed road sub-projects in order to obtain feedback/valuable suggestions directly from impacted communities on their preferred mitigation measures;
- Promote understanding through the active engagement of individuals, groups, stakeholders, organizations who have a stake in the sub-project and its outcomes. Public consultation plays a critical role in raising awareness of impacts of the new developments;
- Share information with stakeholders on proposed improvement works, implementation schedule and expected impact on the physical, biological, and socio-economic environment of the sub-project;
- Understand stakeholder concerns regarding various aspects of the subprojects and the likely impacts in different phases of construction and operation.
- Share experience from implementation of previous TSCP works particularly how impacts were mitigated and
- How best to enhance peoples participation and involvement.

In our public consultation process we focused on the consultations with city council or high level executives and in particular the heads and staff of relevant departments of the city authority. The affected and beneficially communities were consulted.

### 5.2 Issues and Concerns of stakeholders

The outcome from consultation meeting in particular the concerns is provided in Table 3.

Table 3: Issues and Concerns as raised during stakeholder meeting for proposed work

Stakeholders/ Ward Officials	subproject	Issues Raised	Response / Comment
<p>Eng. Oswald Kasambala- TSCP Component I coordinator. January Kazoba – CEMO Mbeya City. January Ndunguru – Environmental Officer Mbeya City. OnnaGeofrey – Community Development Officer. Happy Luteganya – Committee for HIV/AIDS Counselling – Mbeya City.  HIV/AIDS Coordinator</p>	<p>General works</p>	<p>Failure of contractor to fully implement mitigation measures Improvement works should specifically include mitigation of dust pollution HIV/AIDS mitigation Implement regular prevention and training Ensure collaboration between contractor and Municipal Council Include surrounding communities in HIV/AIDS mitigation Set a separate and adequate budget for HIV/AIDS Implement HIV/AIDS testing and counselling Use cinemas for public education. Avoid contractor's secrecy about HIV/AIDS budget Identify and protect road utilities e.g. water and power supply</p>	<ul style="list-style-type: none"> <li>- Contractors' contract should be appended by include ESMP.</li> <li>- Contractor will prepare revised ESMP for Developers approval.</li> <li>- HIV/AIDS mitigation will be addressed in ESMP and budget provided.</li> <li>- Utilities companies will be involved or consulted during design.</li> <li>- Identification and mapping of utilities before commencement of works.</li> <li>- Severed utilities will be restored.</li> <li>- Impacts associated works e.g. spread of HIV/AIDS have been addressed in ESMP</li> </ul>
	<p>Road works</p>	<p>The main issues raised are: Provide access roads should be ensured to residential and business properties. Some roads left unconnected in the previous phase of TSCP e.g. TheofloKisanji - /TANESCO- TAZAM, Ilomba – Bus Stand-Isyesye Section Block C Madaraka-Kabwe TheofloKisanji - SIDO Street Light are important in all roads Provide adequate Traffic / Road signs to prevent accidents Activities for Improvement works are same as previous phase thus require same mitigation measures.</p>	<ul style="list-style-type: none"> <li>- Impacts associated with road construction have been addressed in ESMP</li> </ul>

Stakeholders/ Ward Officials	subproject	Issues Raised	Response / Comment
		The Environmental and Social Management Plan (ESMP) for previous phase was good but implementation was insufficient; Control of traffic accidents. Storage of overburden material	
	Drainage canals	Improve flood prone areas such as Theo floKisanji University College (TECU) Hostels Old Airport Ituha Sae Dispensary New Forest area	- Careful design in poorly drained areas.
Mr. Johnson Ndaro - Health Department	camps	Adequate provision of adequate sanitary facilities to all gender at contractor's camps Provide shower and changing rooms at camps Provision of sufficient PPEs is crucial Provision of adequate water supply for sanitation and cater Provide sanitary food catering at camps Cover soils and fine material to control dust. Water or irrigate soil piles to prevent dust pollution Involve City Health Management Committee (CHMC) in HIV/AIDS mitigation Dust pollution will cause respiratory diseases.	- Developer will ensure the contractor observe better practises e.g. Roads management and OSHA Regulation.  - Issues of sanitation, control dust and provision of PPEs addressed in ESMP..
Joseph Butuyuyu – Asst RAS – Environmental issues		Disposal of Solid waste (SW) is a critical problem	- Control of SW pollution be addressed in ESMP.

### Consultation in July 2016

No	Name/stakeholders	Issues/Concerns
1	Eng Kasambala TSCP-AF Coordinator	<ul style="list-style-type: none"> <li>The project is a continuation of the TSCP that improved various infrastructures within the City Council</li> </ul>

		<ul style="list-style-type: none"> <li>• For Mbeya among others the project will improve storm water drainage to reduce floods, road furniture's that will enhance safety and security as well as upgrade roads and solid waste.</li> <li>• We urge locals to accept the project as the purpose is to improve the infrastructures within the Municipal.</li> </ul>
2	Mr January – Environment Officer	<ul style="list-style-type: none"> <li>• These projects will have economic benefits to the community</li> <li>• We urge people to form the GRC and to use this committee as a mechanism to file complains</li> <li>• Complain should also include those associated with misconduct of the contractor</li> </ul>
3	Mwakibete, Ilomba, Forest and Iyela Wards	Within the proposed project area there are some utilities such as those of water and electricity, what will happen if they are damaged?
4	Mwakibete, Ilomba, Forest and Iyela Wards	During construction, the contractor is likely to close the roads and this might limit access and affect businesses in the area
5	Mwakibete, Ilomba, Forest and Iyela Wards	The project is very much appreciated as it will minimize flood impacts as well as improve roads in the city.
6	Mwakibete, Ilomba, Forest and Iyela Wards	In case any of the locals is affected by the construction activities, the City Council should ensure that the PAP is compensated on time and fairly
7	Mwakibete, Ilomba, Forest and Iyela Wards	The storm water drainage should be covered as much as possible to minimise impacts such as accidents
8	Mwakibete, Ilomba, Forest and Iyela Wards	Regarding valuation, it should be transparent, the affected person should be notified of their compensation amount prior to receiving payments
9	Mwakibete, Ilomba, Forest and Iyela Wards	Who will be responsible to carry valuation if once property is damaged by the contractor during construction phase
10	Mwakibete, Ilomba, Forest and Iyela Wards	What if the project affects only annex structures will they be compensated?
11	Mwakibete, Ilomba, Forest and Iyela Wards	We accept the project as it will reduce floods in the area
12	Mwakibete, Ilomba, Forest and Iyela Wards	For those who will be affected by construction activities they should be compensated on time and fairly



## 6 ASSESSMENT OF IMPACTS AND IDENTIFICATION OF ALTERNATIVES

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### 6.1 Introduction

The potential environmental and social impacts for the proposed improvement works are presented in this chapter.

The proposed works are expected to cause negative and specific impacts on the physical and biological environment. The impacts will be realized within and around the site where the infrastructure will be constructed.

Direct impact will be within the boundaries of the proposed subprojects. These impacts are predominately short-term and temporary in nature and are likely to affect the human and physical environment. Impacts presented in this section are a result of field observation, consultation and prediction of impacts.

Generic predictions of impacts are also presented at this stage. The neighboring community was informed about the project details through the consultation process during the main approved ESIA in 2010. Their concerns were recorded and addressed in the first Environmental Impact Statement (EIS).

This assessment is not considering an alternative to the sites provided for improvement works because the selection is based on suitable potential options for development as judged by engineering side. Thus, the developer has made decisive economic commitments. For example, the developer considered a range of factors such as land ownership by municipality, engineering feasibility or design, settlements and social aspects as well as environmental considerations.

### 6.2 Identification of project boundaries

Identification of boundaries within which the EIA was undertaken as an important component of the study. The identification process focuses and delineates the project within an area where impacts both positive and negative will be felt on the environment, economy and local community. The types of boundaries considered are institutional, temporal and spatial boundaries.

#### **Spatial boundaries**

Spatial boundaries refer to the area affected by the project. The area of direct impact for the proposed roads and drains will be within the legal boundaries of Road Reserve where most of the activities will take place. The immediate impact area is adjacent to the road reserve where some of the impacts, such as the damage to peoples properties or interference to business; traffic accidents; spread of communicable diseases such as HIV/AIDS and STDs/ public health; and dust pollution will be felt directly.

The influential impact area is defined as the one comprising areas where decisions are made. For this project, decisions are made mainly at regional, district/ Municipality, ward and village administration levels. In addition, PO-RALG, the Ministry of Lands, Vice Presidents Office/ Environment and District Authorities may all have input regarding land ownership and construction permits and issues.

#### **Temporal boundaries**

Temporal boundaries refer to project life span and the reversibility of impacts. For example, the impact of construction works on natural vegetation may be short lived if measures to restore vegetation and the land are taken after material extraction. However, the resettlement of the community to give way for the alignment of road and storm water drain alignment if

applicable may have long lasting impact, stretching far into the future in terms of loss of income, land and disruption in cultural life and livelihood of the people.

The following are the estimated temporal boundaries of the project:

Project Phase	Duration
Mobilization period:	1-2 weeks
Construction period:	6 months
Demobilization period:	1-2 weeks
Design life of the roads/ drains	20 years

**Institutional boundaries**

The institutional boundaries are comprised of institutions and sectors, which are relevant to the project development. These can be determined from the political boundaries, regulations, institutional mandates and structures. The proposed project is likely to affect directly or indirectly the interests of the surrounding institutions. Therefore, these institutions will be adequately consulted during the ESIA process.

The institutional framework for environmental management and handling ESIA requirements in the country exists at national, sector, regional, Mbeya City/ District Council / local government and Ward and Village. The relevant institutions for handling ESIA requirements for the construction sector include the following: National Environment Management Council (NEMC), PO-RALG, RAS – Mbeya Region and Districts/ Municipal Environment Management Committees, Ward Committees and Street Committees.

**6.3 Impacts analysis method**

These impacts are those predicted for the project as per project design and plans. Where details have not yet been determined for the project, realistic assumptions have been made and qualified. The impacts may be positive as well as negative, they may be **short or long-term, temporary and reversible** as well as **permanent**.

The impact assessment for the improvement works has considered the level of the potential impacts, this being based on both the value of the environment and the **nature** and **magnitude** of the potential impact.

It is important at this stage to qualify what level of impact this assessment will consider as resulting in a 'significant impact'. For the purposes of the assessment, those impacts identified as being major or Moderate have therefore been evaluated as 'significant impacts'. This is not to say that minor impacts will be disregarded, but that their impact, whilst detectable, is not considered significant. The overall level of predicted impacts, this being both positive and negative ones, are evaluated as shown below.

Impact		Definition
None (0) or Minimum		Insignificance or No detectable change to the physical, biological and human (social) environment.
Positive & Negative	Low	Small but detectable and permanent change to the environment; or larger short-term / temporary change to the physical, biological and human environment.
	Moderate	larger, but non-fundamental permanent change to the physical, biological and human environment; or short-term / temporary large change to the environment.
	High	fundamental (permanent, detrimental) change to the environment.

Potential direct environmental and social impacts are a result of interactions between sub-projects' activities with the relevant baseline aspects (valued receptors). Principles guiding impact identification involve the following:

Impacts identification link to causes of impacts (cause-effect interactions) and identification shall extend through entire sub-project cycle. All valued receptors – physical, chemical, biological, built or human on sub-project site, immediate vicinity or off site locations needs to be considered as required during the planning, designing and implementing stages of sub-projects. The impacts were categorized as direct versus indirect and whether they are positive or negative.

***Impact Evaluation:***

Evaluation of impacts was based on the following criteria:

Extent - the spatial boundary where impacts will occur i.e. within the project primary corridor of impact, secondary impact area or general project area of influence.

Duration - whether the impact shall be temporary or permanent.

Magnitude - the extent in which the impact will alter the natural or social systems and baseline conditions.

## **6.4 Resettlement and Grievances Resolution**

Findings from ESIA reveals there are **no resettlement issues at the site designated for the construction of additional** roads. Works will be confined within legal boundaries of road Right of Way (RoW) or infrastructure reserve. The design team will avoid interference with private properties within and close to subproject sites especially along the proposed storm drain canal. MCC will collaborate with the contractors to resolve any unforeseen disputes or compensation guided by existing legislations.

For the establishment of a buffer zone for the land fill the ESIA reveals that there are resettlement issues; and therefore the MCC prepared an ARAP report. The resettlement will involve the impact of 1,846 assets that includes crops, land, structures and graves affecting 91 PAPs. The total compensation is 424,282,498 Million Tshs.

However, any unforeseen grievances or complaints that will arise from loss of land and crop or land take during project implementation will be valued and compensated as per the TSCP-AF RPF.

## **6.5 Positive Impacts during Construction phase**

### Storm Drains

The storm drain will improve drainage in the area and consequently reduced mosquito infestation and malaria disease. It will also easy access to residential and educational facilities in Mbeya City during rainy season.

### Street lights

Solar lights absorb energy from our sun and turn it into area illumination when it is dark. Their integrated photo voltaic module, micro controller and lithium battery combine with high output LEDs and a human infrared sensor to achieve multiple features such as low power consumption with high luminance. Their design delivers a long lifespan with minimal maintenance and provides a complete solution for off- grid or remote applications. The rated components ensure endurance against harsh weather and keep solar lights free from corrosion and premature failure.

Street lights will improve night vision and security as well as increased income to people as they will have more hours to do business thus increased income. Installation of poles will be

spot activities with no negative impact. Any impact related to foundations of poles will be confined within zone set for service utilities and treated to that of road auxiliaries / furniture.

Roads subproject

The project is expected to have positive impacts upon the stakeholders that outweigh any negative impacts. The most significant and long lasting impacts result from the provision of roads giving year round access for presently disadvantaged urban communities or tenants. Stakeholders expect the project to bring a number of positive benefits such as; Improved Access to Social Services, income and road safety. Expansion of commercial activities and trade within the project area. In addition, land and property values are expected to increase thus increased rent and income.

Road works will lead to reduced vehicle operation and maintenance costs due to improved road conditions.

The work force in construction phase will be comprised of the following team members for each subproject; Site Engineers, Foremen and skilled and non-skilled labour. In addition, there will be Project Manager and Quantity Surveyors. Skilled and semiskilled people will be employed permanently during the operational phase to manage the new infrastructure.

Stakeholders accepted the proposed works will create temporary and permanent employment during construction (roads/ street lights, drain) and operation (roads) phase respectively, a number of these are likely to be sourced within Mbeya City.

During operative phase, the project will employ permanent workers road maintenance; the source of these will depend on labour market competition. Therefore, all the proposed works will provide the residents of Mbeya City with important employment opportunities.

Employment impact is therefore, Low to Moderate positive. The effect is spread between construction and operational phases. Evaluation of impact is as follows:

Impact Assessment/ Subproject	Road activities	Storm drains
Significance	Low Positive	Low Positive
Occurrence phase	Construction and operation	Construction
Area of influence	Direct	Direct
Permanence (No change, temporary, Permanent))	Temporary and long term	Temporary

**6.6 Negative Impacts during construction and operation**

Notably, the erection of poles is assumed to be of same pattern for all roads and will take place along road reserves and it will involve excavation and use of equipment similar to those used in road construction.

**6.6.1 Climate**

The planned improvement works for roads, drains, street lights and landfill have no negative impacts on climate change because it will not involve significant generation of carbon emissions. It is also not associated with the extraction of wood from forest, which is sinks for carbon. However, the landfill will be managed in manner that will not allow burning. Gaseous will be collected by pipes, stored or used in economical manner

**6.6.2 Soil erosion**

Land clearing during construction phase will disturb the land but not likely to trigger significant soil erosion because of the flat topography/terrain of the sites. Observation

indicated no visible evidence of vulnerability to soil erosion on the proposed sites for roads or poles for street lights.

### 6.6.3 Dust and emissions

During clearing of vegetation and movement of vehicles and the operation of heavy machinery will increase the levels of dust. The effect will be nuisance and even cause health problems to the community around the project site.

During clearing of vegetation and demolition of concrete structures, movement of vehicles and the operation of heavy machinery will increase the levels of dust. The effect will be nuisance and even cause health problems to the community around the project site.

The construction of works for road and storm drains will involve earth works or excavations and transportation of fine / stock piles. Air pollution due to dust together with exhaust emissions from excavations, breaking up, crushing, transportation and stockpiling of overburden and spoil materials as well as emission of exhaust fumes from heavy trucks, machinery and construction equipment. Hauling of aggregates from long distances may cause dust pollution.

Overall, the impact as result of dust or emission pollution will be confined to the proposed working sites and within the short period of road and drain construction. The projects are small and construction period is short. Overall, the impact is rated as low Negative for road and drain. The evaluation is made as follows:

Impact Assessment/ Subproject	Road	Storm drains
Significance	Low Negative	Low Negative
Occurrence phase	Construction	Construction
Area of influence	Direct	Direct
Permanence (No change, temporary, Permanent))	Temporary	Temporary

### 6.5.4 Noise pollution

Movement of vehicles and the operation of heavy machinery will increase the levels of noise in the local environment where works will be confined. The effect will be cause health problems such as respiratory diseases around the subproject sites for road, drains and road and storm drains. Equipment which will be working at borrow pit and crusher sites will generate noise nuisance. Evaluation of the impact is presented below:

Impact Assessment/ Subproject	Road	Storm drains
Significance	Low Negative	Low Negative
Occurrence phase	Construction	Construction
Area of influence	Direct	Direct
Permanence (No change, temporary, Permanent))	Temporary	Temporary

### 6.5.5 Pollution by Solid Waste

Solid wastes can be in the form of plastic, cement bags or other packing materials at workshops, workers' camps and working sites. This applies to road and storm drain drains sub-projects. The effect will be localized around working sites or work facilities during the construction phase. The actual amount of waste will depend on methods applied by contractor. Generation of waste will depend on material, organization of works, types of equipment and construction methods.

These impacts are mostly confined to the construction phase and to the specific project working sites (camps, workshops etc.). In general, the impact is considered Low Negative (road and drain). The Evaluation of impacts for the subproject can be presented as follows:

Impact Assessment/ Subproject	Road	Storm drains
Significance	Low Negative	Low Negative
Occurrence phase	Construction	Construction
Area of influence	Direct	Direct
Permanence (No change, temporary, Permanent)	Temporary	Temporary
Reversibility	Reversible	Reversible

### 6.5.6 Storm water

Some parts of the Mbeya city are vulnerable to flooding or water logging because of poor drainage and high water table. The storm water impact is predicted to occur during the construction and operational phases if careful design and management of storm is not applied by developer and subsequent the Municipal Authority respectably.

During the operational phase, storm water flows due to rapid overland flow of rain water, clogging or dirty canals and culverts. Clogging of culverts and obstruction inside drains along roads or storm drain may occur due to under design of culvert diameter, dumping of solid waste, silting and blocking by debris. As result, it will cause flooding of people's houses during rainfall.

Major storm drain may spill water to individual and institutional properties or houses if not well design or not directed to discharge water to proper water way or body e.g. Nzowa Stream.

The project is more concerned by the effect, which may be caused by project development and to take precautionary measures against those. This impact is likely to affect area along the proposed for the proposed works for storm drain and road sub-projects. It will take place especially in the peaks of rainfall season.

Overall, the impact is rated as Moderate negative (road) and could occur in both construction and operational phases, and especially in the flood prone pockets of the town. Storm water effect can be evaluated as shown in the table below:

Impact Assessment/ Subproject	Road	Storm drains
Significance	Moderate Negative	Low Negative
Occurrence phase	Construction and operation	Construction and operation
Area of influence	Direct	Direct
Permanence (No change, temporary, Permanent))	Temporary	Temporary
Reversibility	Reversible	Reversible

### 6.5.7 Occupational Health and safety

Occupational health and safety risks to workers due to exposure to dust emissions as well risk of accidents during operation of heavy equipment and labour intensive works. However, improvement is expected on health and hygiene conditions among the local communities of the project areas as result of improved management of air and dust pollution. This category of impact is likely to affect all subprojects of road/ street lights and storm water drains. The impact may affect project and non-project workers.



For example unsuspecting people e.g. pedestrians who may be burnt by hot asphalt or children who may be hurt by project equipment and open trenches/ drains. The impact will be localized with project sites and be more significant during construction period.

Overall, impact as regards to human health and safety is rated Moderate to High negative. It will be significant in the absence of proper mitigations. The impact is most likely to fall within the construction phase and to specific projects such roads/ street lights and storm water drains during the operational phase. They are not expected to extend far beyond the boundaries of sub-projects.

This type of impact may be long term on human health, site specific and restricted to the short period of construction (road/ street lights, storm water) phase. Erection of poles is assumed to resemble that of road works, it will take place along road reserve.

Therefore, as per the table below the impact on occupational health and safety is ranked as Low to moderate as can be managed through better practices.

Impact Assessment/ Subproject	Road	Storm drains
Significance	Moderate Negative	Low Negative
Occurrence phase	Construction	Construction
Area of influence	Direct	Direct
Permanence (No change, temporary, Permanent))	Permanent	Permanent
Reversibility	Reversible	Reversible

### 6.5.8 The spread of social diseases (HIV/AIDS)

The influx of job seekers to the project area during the construction phase will result in social interaction and consequently the risk of spreading social or communicable diseases among workers or neighboring community, in particular HIV/AIDS and STDs in the absence of adequate control measures. The effect can result in death or other irreversible outcome.

Safety and health issues shall be addressed through various training program for workers and local communities through meetings, seminars, posters and leaflets. Consulted stakeholders showed their concerns that the project may increase the problem if proper mitigation measures are not instituted. Importantly, the advised collaboration and involvement of relevant department in Mbeya city).

The risk of HIV/AIDS spreading is confined in the construction phase when activities are at climax and involvement of manpower is high. The impact is direct and indirect as it can spread beyond project boundaries. Additionally, the effect can continue after the project and result in loss of life in the absence of proper preventative measures.

Overall, the impact of the spread of HIV/AIDS is considered Moderate Negative due to the size of project and short duration and unlikeness to bring large working force from outside and establishment of camps. Evaluation is summarized as follows:

Impact Assessment/ Subproject	Road	Storm drains
Significance	Moderate Negative	Low Negative
Occurrence phase	Construction	Construction
Area of influence	Direct and Indirect	Direct and Indirect
Permanence (No change, temporary, Permanent))	Permanent	Permanent
Reversibility	Irreversible	Irreversible

## 6.6 Traffic Accidents

Road works are generically associated with increase of traffic accidents during construction phase. However, the positive impacts associated with the project include reduced accidents and vehicle congestion in town center because of alternative access within the town. There may be eminent risk for increased traffic accidents along project sites or in congested areas around central market during road works as result of frequent movement and stopping of construction vehicles/equipment. The risk for traffic accidents is especially considerable for young children and elderly people.

The overall impact assessment on traffic accident shows the project will create Low to Low negative impact. The risk lies most within the short period of construction phase and localized along the proposed drain and road sites. The overall evaluation is as per the table below::

Impact Assessment/ Subproject	Road	Storm drains
Significance	Moderate Negative	Low Negative
Occurrence phase	Construction	Construction
Area of influence	Direct	Direct
Permanence (No change, temporary, Permanent))	Temporary	Temporary
Impact reversibility	Reversible	Reversible

## 6.7 Damage to Public Utilities

There is potential risk for disruption of public service utilities of water, communication and power (TANESCO) during improvement works for roads/ erection of poles for street lights and drains. See Figure 4. This impact lies with roads and storm drains. The potential for damage during road and drain works are high if careful design and sharing of information with owners will be undertaken.

The subprojects risk prediction on water and power utilities shows it will be low to moderate negative and more pronounced on drain and road works respectively. The damage risk is direct and confined in the work sites and reversible through repair. The evaluation is summarized in the table below;

Impact Assessment/ Subproject	Road	Storm drains
Significance	Moderate Negative	Low Negative
Occurrence phase	Construction	Construction
Area of influence	Direct	Direct
Permanence (No change, temporary, Permanent))	Temporary	Temporary
Reversibility	Reversible	Reversible

## 6.8 Disruption of business, pedestrian and vehicular movement

Disruption of traffic flow and increased risk of traffic accidents will occur during construction of roads and storm drains. The impact may be caused by overstay of piled material for road construction or poor organization of works. Observation shows there are foot path crossing the proposed storm drain in Mwakibete area thus access slabs are important. See Figure 4.

Erection of poles for street lights will take place at designated small spots as discussed in Chapter 2. Its effect in this regard is minor or none.

There are ongoing business along roads where works will be implemented and thus at risk of been interfered or disrupted during works.

Evaluation of this risk can be as follows:

Impact Assessment/ Subproject	Road	Storm drains
Significance	Moderate Negative	Low Negative
Occurrence phase	Construction	Construction
Area of influence	Direct	Direct
Permanence (No change, temporary, Permanent)	Temporary	Temporary
Impact reversibility	Reversible	Reversible

## 6.9 Dust pollution

During clearing of vegetation and demolition of concrete structures, movement of vehicles and the operation of heavy machinery will increase the levels of dust. The effect will be nuisance and even cause health problems to the community around the project site.

The construction of works at road and water storm structures will involve earth works or excavations and transportation of fine / stock piles. Air pollution due to dust together with exhaust emissions from excavations, breaking up, crushing, transportation and stockpiling of overburden and spoil materials as well as emission of exhaust fumes from heavy trucks, machinery and construction equipment. Hauling of aggregates from long distances may cause dust pollution.

Overall, the impact as result of dust or emission pollution will be confined to the proposed working sites and within the short period of road and drain construction. The projects are small and construction period is short. Overall, the impact is rated as low for road and storm water drains. The evaluation is made as follows:

Impact Assessment/ Subproject	Road	Storm drains
Significance	Low Negative	Low Negative
Occurrence phase	Construction	Construction
Area of influence	Direct	Direct
Permanence (No change, temporary, Permanent))	Temporary	Temporary

## 6.10 Noise pollution

Movement of vehicles and the operation of heavy machinery will increase the levels of noise in the local environment where works will be confined. The effect will be cause health problems such as respiratory diseases around the subproject sites for road and storm drains. Equipment operating at borrow pit and crusher sites will generate noise nuisance. Evaluation of the impact is presented in the table below:

Impact Assessment/ Subproject	Road	Storm drains
Significance	Low Negative	Low Negative
Occurrence phase	Construction	Construction
Area of influence	Direct	Direct

## 6.11 Impacts during Demobilization

Demobilization will occur after the end of construction activities. As much as possible after construction, all areas not covered by proposed works especially around camps or workshops shall be rehabilitated and reinstated to the original landscape. The activities under demobilization will entail the following:

- a) Removal of temporary works and associated installations,
- b) General cleanliness to the areas affected by the contractor's activities, all wastes to be disposed to designated disposal sites,
- c) Removal of physical structures such as offices, workshops, storage and foundations has the potential to generate noise, dust and possibly pollution of surface and ground water, and soils. These shall be undertaken under careful supervision, and
- d) After removing facilities and clearing all waste and debris, the contractor will rehabilitate the disturbed sites e.g. at borrow pit sites by contouring, replanting and re-vegetation.

## 6.12 Analysis of Alternatives

In the course of developing the proposed sub-projects for road, storm drain, street light and landfill structures, alternatives were compared in terms of potential environmental and social impacts; capital and operating costs, land availability and; suitability under local conditions. It was imperative to also examine and review different sub-projects settings, designs, and construction alternatives where two options were considered: No sub-project option and, Alternative sites.

### No sub-project' option

The investment sub-projects for the Mbeya City Council under the proposed TSCP - AF are expected to improve sanitation and public health, promote safe and efficient mobility in the towns, improved economy and the general well-being in the city setting.

With contemporary fast increase of the population in the city, the challenge still prevails of inadequate stock and quality road, drainage, street lighting and waste disposal infrastructure. However, the sustainability of those infrastructure facilities depends on the good operation and maintenance of the facilities that will be adopted by the municipal authority.

If the 'no project' option was chosen, from the economic standpoint and social considerations, the following benefits will be foregone: i) improved transportation; ii) long life span for roads, iii) employment; iv) low incidence of accidents and v) controlled flooding inside urban centres against water stagnation. vi) good visibility and security at night and whenever natural light is dim, and vii) improved environmental sanitation in the city. Hence, for TSCP – AF sub-projects, the alternative of “no-project” would increase the risks on traffic and pedestrian accidents, flood damages to houses, vandalism of the infrastructure, untidy environment and general poor public health.

Thus, the 'no sub-project' option will not be a viable alternative under TSCP – AF sub-projects in Mbeya City Council.

Today the urban population is growing fast amid absence of adequate and quality road infrastructure, for instance. From the hydrological characteristics of high water table in Mbeya

city land area, the sustainability of roads largely depends on Mbeya drainage for storm water. Hence, if the 'no project' option was chosen, from the economic standpoint and social considerations, the following benefits will be foregone: i) improved transportation; ii) long life span for roads, iii) employment; iv) low incidence of accidents and v) controlled flooding inside urban centers against water stagnation. For this project, the alternative of "no-project" would increase risk on road accidents, flood damages to houses and poor public health (Malaria prevalence). The 'no sub-project' option is therefore not a viable alternative.

In addition, the client has made comprehensive consideration about choice of technology in formulating the project. For example, the plan for asphalt roads is environmentally friendly as it will create less soil erosion and sedimentation of waterway. In addition, gravel roads are vulnerable to potholes and consequently fast deterioration hence tarmac roads are stronger and durable.

## 6 ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES

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### 7.1 Introduction

The identification of appropriate mitigation measures is an important aspect of the supplement ESIA. Many of the potential impacts identified in the preceding chapter can be eliminated or reduced through the implementation of appropriate mitigation measures at a strategic planning level or when applied to specific project tasks and activities.

### 7.2 Identification methods

The level of predicted impacts can be reduced through appropriate mitigation measures. Such mitigation may involve design measures aimed to reduce the impact before it occurs, they may involve direct mitigation at the point of impact to reduce or remove the impact or they may be indirect measures to respond to the impact.

Mitigation measures presented are designed to reduce the impact of the project, both with regard to its construction and operation. In some cases, mitigation measures, as with the project itself, may provide beneficial effects for the local environment. In all cases, the mitigation measures seek to reduce the potential impacts to a level which is insignificant on the environment.

### 7.3 Enhancement measures during pre-construct phase

Enhancement mitigation measures will include the following;

- Implementation of measures to safeguard local employment including regards to gender. For example, encourage women employment.
- Proper remuneration
- Spread of diseases for employees.

### 7.4 General Commitments

Much of the mitigation proposed for the proposed works can be considered under a range of general commitments.

#### Information and Awareness Raising

An important mitigation measure across the project is consultation and the availability of information. Many of the impacts and problems predicted for the project may be associated with insufficient or inadequate information being provided to the affected communities and people. Whilst provision of information for the project has already started as part of the EIA consultation process, it is important that this continue throughout the project both from the contractor and from developer.

Should the project progress to the implementation and construction phase, information and awareness creation will be an important component from the outset. Key issues to be raised and addressed will include, but not be limited to, the following:

- Nature and details of construction works and program, control and management;
- Technical issues such as fire risks and safety issues;
- Social issues such as restrictions, information relating to working areas, progress and project timing; and
- Indirect risks from construction such as spread of social diseases (HIV/AIDS) and other STDs, traffic safety, etc.



The transparency and ready availability of information to the local communities and affected people will be an important component in the successful implementation of the project.

## **7.5 Management of Construction Site**

It is important that the construction site be managed appropriately, both from a health and safety perspective as well as with regard to impacts on the physical, biology and human environments.

Responsible person will be appointed for the construction site and an instruction manual or handbook for site procedures is developed. This will include, but not be limited to, the following topics.

- Control of site including workshops;
- Securing (fencing) and management of the working area;
- Working hours;
- Control of discharges;
- Storm water or runoff management including emptying into safe ends;
- Management of waste materials (plastics);
- Management and removal of wastes;
- Control of noise and dust;
- Liaison with local community / residents;
- Landscape restoration; and

Following completion of the construction works, appropriate consideration will be given to the decommissioning of the construction site. This will ensure that no significant impacts are caused in the process of withdrawal of construction workers and equipment. For example, aversion of contamination, waste or damage.

## **7.6 Health and Safety Measures of OSHA**

As a basic, the contractor / developer will be required to prepare a Health and Safety Plan / Procedure for the construction works and to ensure and monitor its implementation.

The contractor will ensure compliance of the project with the national Health policy, construction policy and Occupational Health and Safety Act (OSHA).

Health and Safety measures will be important for not only the construction work force but also the public.

Key consideration for Health and Safety include:

- Responsibility for health and safety issues placed under appointed person or contractor;
- Personal protective equipment (PPE) should be provided and used on site as appropriate;
- Appropriate warning and control signs should be used;
- First aid facilities and competence should be readily available;
- Appropriate welfare facilities should be available at construction site; and
- Measures against work place accidents.

## **7.7 Mitigation measures during pre-Construction phase**

### **7.7.1 Landscape and soil erosion**

The following mitigation measures are presented to minimize the predicted impacts on soils and landscape of the project area:

- Storage of soil will be undertaken in accordance with best practice. This will include stockpiling in a way to limit compaction and avoiding the mixing different qualities;

- Minimization of soil and landscape disturbance.
- Limit soil works to the design, avoid tempering with steeping ground.
- Application of geo-technical expertise to cater for tank farm excavation.

It is possible that site-specific impacts identified during the ESIA study can be mitigated through adjustments to the design, such as cuts and fill works.

## **7.7.2 Clearing of natural vegetation**

Little natural vegetation may be cleared or removed at proposed roads and storm drains. Therefore, the developer or Municipal council is obliged to re-vegetate the area by tree planting. This will serve as landscape restoration. The developer will plant desirable species in particular those resembling the original ones. However, emphasis will be put on use of indigenous species. Other general mitigation measures are:

- Careful design to minimize environmental disturbance;
- During the detailed planning stages, an assessment will be made as to the exact positioning of the cells and construction works to reduce the impact on natural; and
- Need for a restoration plan with regard to vegetation following completion of works.

## **7.8 Mitigation measures during construction phase**

### **7.12.1 Solid waste management**

The contractor is required to comply with work place and environmental safeguards including proper disposal of solid waste such as plastics and liquid waste. Cement bags and other packed materials which generate solid waste particularly plastics should be properly disposed and destroyed.

The service and maintenance of equipment and machines should take place away from project site to avoid oil spillage to natural waterways. Additionally, measures to recover solid materials from working sites should be implemented.

The design works should ensure that the appropriate structures for safe disposal of solid and liquid waste are included in the main design for long-term operation. This will include pits and incinerators for solid waste. Also, sign boards to warn people against haphazard waste disposal should be put in place in risk areas. During operation phase, these facilities should be given regular maintenance services.

The contractor is obliged to reduce generation of solid waste during construction including construction materials, excess unsuitable spoil material, vegetation and litter.

### **7.12.2 Storm water management**

Careful design of the works for associated with roads and storm and any pavement works will ensure proper collection of storm water and discharge to safe ends away from the construction sites and surrounding properties. The contractor is obliged to control storm water and ensure protection to private properties, business and households. Road structures such as side drains and culverts (diameter) should be carefully designed to allow the flow of storm water and consequently flooding and damage to private properties.

The contractor is obliged to direct surface water flow to properly designated channels, existing natural drainage and safe ends. He is also required to construct sufficient water outlets and discharge points depending on the runoff water from the catchment areas or road surface. Special emphasis will be given to areas with steep slopes or vulnerable to flooding as pointed out during consultation with stakeholders.

The construction of runoff surfaces and storm drains for roads should observe local conditions and the slope of the site as shown in the drawings.

Collaboration is required with other utilizes such as road authority and water supply authority to avoid interference or damages.

### **7.12.3 Health and Safety**

The contract for contractors should have an attachment of safety rules for worksite personnel as established in the Occupational Health and Safety Act No. 5 of 2003 and Standard Specifications for Road Works (2000), Section 1237. The contract should have a plan for emergency procedures in case of accidents. Measures to avoid disruption of vehicle movement along City roads during construction should be instituted.

### **7.12.4 Traffic Accidents**

The contractor and developer should implement adequate measures against traffic accidents. In particular, the developer is obliged to place warning signs / posters around the site/ roadway. Also, update design to cater for access points.

Traffic management plan shall be incorporated in the designs to include for example details of signs, markings, intersection layouts, access restrictions, bus stops, crossings, footpaths etc.

The designs shall take account of safety concerns especially at human habitation crossings e.g. installation of bus stops at settlement canters.

Speed bumps/ Signboards will be necessary in controlling the speed of vehicles especially close to site. To make this measure a success, the developer will create liaison with local authority and Traffic Police.

Additionally, awareness creation about possible accidents is important to both drivers and project workers. Use of signboards, periodic checking and maintenance of project vehicles and equipment is necessary.

### **7.12.5 The spread of social diseases (HIV/AIDS)**

Since construction works will attract job seekers and trade mongers, the contractor shall collaborate with local authorities to encourage local employment in order to reduce prevalence of communicable diseases (especially HIV/AIDS and STDs).

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.

In order to prevent more HIV/AIDS infection, during the implementation phase, the project should 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. It is important that Mbeya and Municipal Committee for Counseling and Testing (MCTC) be involved at all levels of mitigation.

The education and awareness creation campaigns should target workers and community in the project area and those competing for work. There is a need for contractor to collaborate with the client to formulate messages against STDs and HIV. The contractor is obliged to provide zero accommodation at site.

## 7.12.6 Noise and Dust pollution

Noise and air pollution impacts are predicted around the project area. They are in general short-term temporary impacts associated with the construction works. As such, mitigation measures relate primarily to construction procedures.

Consultation with affected communities is an initial mitigation measure, which is important to ensure that those likely to be affected by the works are aware of what the works will entail, the duration and likely impacts on them.

Control of construction site represents the best potential means to mitigate noise and air pollution. Measures will be detailed as part of the construction procedures which will be drafted during the design stage. Typical measures to control noise and air pollution may include:

- Sensitive location of noise sources / machinery;
- Working day in accordance with legal requirements, night working avoided where possible;
- Limiting working day for noisy activities;
- Screening of activities by iron fencing
- Liaison with local community for suitable timings of noisy activities (noisy excavation);
- Observe noise limits during procurement and installation of equipment. Use standard levels from OSHA or Tanzania Bureau of Standards (TBS);
- Covering of stockpiled soil/aggregates during the dry season;
- Spraying of loose soils and construction site with water;
- Putting in place all important infrastructures and supporting materials to avoid unnecessary accidents and consequential injuries and fatalities; and
- Use of high efficiency vehicles for transportation of raw materials and products and measures against dust pollution and accidents prevention.

The client is committed to maintain noise emission to the level accepted in the country. The National standards of maximum permissible continuous or intermittent noise levels (dB) per given period at work places is shown in Table 4: .

Table 4: Permissible noise levels in Tanzania

Noise level (LeqdB)	Duration in minutes/ hours per day	Duration in minutes/ hours per week
85	8 hrs	40 hrs
88	4 hrs	20 hrs
91	2 hrs	10 hrs
94	1 hr	5 hrs
97	30 min	2.5 hrs
100	15 min	1.25 hrs
103	7.5 min	37.5 min
106	3.75 min	18.75 min
109	1.87 min	9.37 min

## 7.12.7 Protection of public Utilities

There is a need to observe the following;

- Proper design to safeguard utilities of TANESCO, Optic Fiber, oil, water supply pipes and other utilities; and
- Sharing of design information with local leaders and owners of utilities.
- Prompt replacement of severed services or payment of compensation.

### **7.12.8 Disruption of business and vehicular movement**

The construction works for roads and storm drains are likely to interrupt traffic and pedestrian movement. These problems can be mitigated by:

- Adequate measures should be instituted to ensure the construction works do not disrupt traffic flow or entrances to properties along the RoW.
- Use of signs and warning posters at project sites about road diversion to avoid confusion.
- Abide to Road Management Regulation of 2009.
- Measures will include timely removal or spreading of material piles and provision of alternative routes.
- The contractor shall ensure unimpeded vehicular movement and access to properties along the road including business, religious, educational and residential buildings.
- Particular attention should also be paid to entrance to residential and institutional properties and religious houses from roads.
- Regular or daily monitoring and inspection will be instituted during the construction phase and especially during rainfall season.
- Provide
- Installation of pedestrian lanes at human settlement crossings

As for storm drains and road side canals, the MCC shall drainage crossings to provide access paths where the drain is constructed near house, school, religious institution etc. Also, these crossings should be provided wherever there was an access path.

### **7.13 Mitigation measures for operation phase**

During operation phase some impacts may occur such as accidents and flooding due to blockage of storm drains and culverts. Measures will include;

- Replacement of accident warning signs
- Regular cleaning of water drains
- Unblocking of culverts
- Community involvement in sustainable management of infrastructure.

### **7.14 Summary of Mitigation Measures for Negative Impacts**

This section present summary of mitigation measures basing on stakeholders input, expert analysis, experience with similar and or related projects and best practice. The predicted impacts and mitigation measures are presented below.

### **7.15 Summary of Mitigation Measures for Negative Impacts**

This section present summary of mitigation measures basing on stakeholders input, expert analysis, experience with similar and or related projects and best practice. The predicted impacts and mitigation measures are presented in Table 5.

Table 5: Summary of Mitigation Measures for Roads and Storm Drains

Topic / Impact	Predicted Impact/ activity	Type of works (Road drains D =R, Street lights= S)	Impact phases	Mitigation Measures
Loss of trees	Some valuable plants will be destroyed along roads to give way for construction works..	D, L	Construction	Proper design to minimize impact. Compensate unforeseen damages by use of existing regulations
Noise pollution	Construction works will disturb neighbours/ public by creation of noise.	D, L	Construction	Observe ambient sound levels and attenuate equipment. Observe noise limits for equipment. Awareness creation
Air pollution by dust	Dust during transportation of sand, stockpiles and aggregates to working sites. Road works for clearing, excavation.	D, L	Construction and Operation	Watering and covering of earth materials Watering of loose soils
Spread of social diseases (HIV/AIDS)	Risk for spreading of communicable diseases such as HIV/AIDS between workers and host community	D.L.	Construction	Awareness creation Counseling and testing Involvement of Municipal HIV/AIDS committee.
Traffic Accidents	Interruption of traffic and pedestrian movement by project activities. Reckless driving	D, L	Construction & Operation	Careful design Awareness creation Use sign/warning materials. Bumps to slow down speeding vehicles.
Disruption of business, traffic and pedestrian movement	Road drains works will interfere with normal traffic flow and pedestrian movement. Overstay of stock piles along roads	D,L	Construction	Awareness creation. Prompt spreading of stock piles along roads Provide access slabs and crossings to properties.
Occupational Health and safety .	General construction works. Electrocution along energized street-light poles.	D, L	Construction & Operation	Adhere to OSHA* and contractors regulations. Practice safety and Health measures/policy. Regular maintenance of equipment. Measures against <b>electrocution</b> along street lights



Solid waste	Haphazard disposal of solid waste e.g. plastics	D, L	Construction Operation	Proper handling of waste by installation of facilities for solid waste facilities.
Management of Storm water	Some project sites are located in poorly drained areas. Storm water effect is expected in rainy season. Storm Drains planned to improve drainage.	D	Construction & Operational	Careful road design. Regular maintenance; cleaning and unblock culverts and drainage canals. Awareness creation. Discharge storm water into safe ends.
Damage of Road Utilities.	Improvement works may sever water pipes/DUWASA, optic fiber, oil, gas and power/TANESCO.	D, L	Construction	Careful design of Infrastructures to include layout for water, communication cables and power and other utilities. Replacement/compensation for damaged utilities. Liaison and sharing of design.
Soil erosion	Excavation works may trigger soil erosion on sloping ground around the road and storm water drains	D	Construction	Proper design. Confine works to design borders. Stabilizations of embankments and Restoration of landscape.
Employment	The project will create benefit in terms of temporary employment.	D, L	Construction	Encourage local employment and gender balance. Liaise with local leaders in recruitment of workers.

## 8 ENVIRONMENTAL AND SOCIAL MANAGEMENT

### 8.1 Personnel and Capacity Building Requirements

The environmental sustainability of the landfill, roads, storm water drains and street lights investment sub-projects is highly dependent on the capacity of institutions at all levels (i.e. staffing, training, and other necessary support services) to carry out the associated ESMP implementation work. Thus, it is vital that MCC allocates sufficient resources for training and capacity building. These efforts will not only benefit MCC, but will also build local capacity to undertake other development initiatives.

The institutional capacity to monitor and enforce implement and monitor subproject environment was assessed based on the technical, financial and physical capability of the Community leaders, local NGOs, Mbeya city. They are responsible to carry out ESMP activities. The findings indicated that these different groups have different capacity building and training needs in terms of raised awareness, sensitization to the issues, and detailed technical training. General awareness on environmental issues exists within MCC and, focused training and capacity building would enhance the ESMP implementation capacity substantially on their part.

It is recommended that capacity building and training should take place at all levels i.e., wards, local NGOs and CBOs, government officials, community leaders, extension teams and Mbeya city management. The MCC's Environmental Unit personnel should be exposed to short-term and long-term training in the management of environmental issues. The training program for various role players will include an orientation program on the ESMP, Environmental Assessment Processes, Participatory Methodologies and Project Management. The training on ESMP may be integrated with social framework and other related training program for cost effectiveness.

Estimated cost for implementing this capacity building strategy is included in the overall cost for implementing the ESMP and Monitoring Plan in the following section.

#### 8.1.1 Training Programs

Training programs will be developed and delivered project developer for the implementation of environmental safeguards of the proposed subproject.

Following training needs assessment; specific and tailored training will be developed and agreed upon developer and key stakeholders for implementation of safeguards in the course of project implementation.

- Target groups for the training: MCC Engineers, Environmental Officers, Community development staff, Contractors and community representatives in the project area.
- Training schedule: at least 2 weeks to 1 month before construction starts.

#### Training Programs for Capacity Building

Target Group	Municipal Staff
Course Title	Environmental supervision, monitoring and reporting
Participants	Road Engineers, Environmental staff and Social workers
Training	Soon after project effectiveness but at least 2 weeks -1 month before start of

Frequency	subprojects work. In-service /refresher training during I operation.
Time	Short course/training twice a year, and then to be repeated on a yearly basis until year three of implementation.
Content	<ul style="list-style-type: none"> <li>• Public health and safety of Roads management</li> <li>• Road management techniques</li> <li>• Social mitigations for environmental projects</li> <li>• Community participation in environmental supervision monitoring.</li> <li>• Supervision of contractors, Subcontractors and community representatives in the implementation of environmental supervision.</li> <li>• Risk assessment, response and control</li> <li>• Awareness creation</li> <li>• Preparation of roads/storm drains management byelaws</li> </ul>
Responsibilities	MCCwith support from PO-RALG with facilitation of the World Bankto implement environmental safeguards.
Target Groups	Project Managers, Environmental and Social staff, contractors, local community leaders and NGOs/ Civil Organizations
Course Title	Implementation of mitigation measures
Participators	On-site construction management staff; environmental staff of contractors; ward/group authorities.
Training frequency	After bidding, and determine based on needs
Time	3 days of training for contractors and 2 days of training for others, to be repeated twice a year on an annual basis depending on needs
Content	Overview of environmental monitoring; Requirements of environmental monitoring; Role and responsibilities of contractors Scope and methods of environmental monitoring; Response and risk control; Preparation and submission of reports Other areas to be determined.
Responsibilities	MCC with facilitation of the World Bank
Target Groups	Local communities/ stakeholders and road/ urban infrastructure technicians/ Engineers
Course Title	Environmental sanitation and safety
Participators	Representatives of community and/or worker leaders (as appropriate)
Training frequency	Bimonthly or every 6 month
Time	One-day presentation and one-day on-the job training twice a year, to be repeated on as needed basis
Content	<ul style="list-style-type: none"> <li>• Environmental and Social safeguards</li> </ul>

	<ul style="list-style-type: none"> <li>• Safety and health issues</li> <li>• Environmental Pollution risks and management</li> <li>• Management of environmental safety and sanitation on work sites;</li> <li>• Mitigation measures at construction sites;</li> <li>• Procedures to deal with emergency situations;</li> <li>• Other areas to be determined.</li> </ul>
Responsibilities	Contractor and MCC

### 8.1.2 Grievance Management

The development of additional landfill cells will result into preparing a Resettlement Action Plan (RAP) specifically for the establishment of buffer zone. Thus, resettlement grievances or disputes are envisaged regarding compensation and valuation procedures for land and other individual properties will be resolved as will necessitate. **However, a similar arrangement using the existing Dispute Desk will be devised at MCC through to subproject Wards involving representatives from subproject areas to respond to any environmental grievances which may arise during implementation and operation.**

The MCC will resolve any arising complaint during project construction, related to work implementation such as compensation for loss or damage on individual or institutional properties. For example issue arising at borrow pit or quarry site such as crop or house damages or damage on houses and fence by construction equipment.

The contractor and MCC will resolve any arising complaint during project construction, relative to work implementation such as compensation for loss or damage of properties such as trees and buildings.

## 8.2 Environmental and Social Management Plan (ESMP)

ESMP describes in detail actions to be taken to mitigate possible impacts..Where impacts cannot be mitigated, compensation will be paid, as well as any environmental enhancement activity that will be required to offset, those impacts that cannot be mitigated. It provides a schedule for the implementation of recommended mitigation activities. The responsibility for implementing the ESMP of the additional subprojects will be of MCC Likewise, the responsibility for operation and maintenance of the works to be developed, will be vested on MCC.

To a considerable degree, contractors will be responsible for implementing mitigation measures but, in any case, the ultimate responsibility for ensuring that environmental and social protection elements are being carried out properly is of MCC. Most of the predicted impacts can be reduced or avoided through the application of sound construction management measures. Construction contracts will require all qualified bidders to include ESMPs as a part of their submitted bids. The additional costs of these plans cannot be predicted at this time, but they are considered as integral part of total project costs.

The following tables show ESMPs for proposed works for roads with side drains, storm drains, street lights and the Uyole landfill; as shown in 6 and 7.

*Table6: ESMP for roads, stormwater drains and street lights*

Project Impact/Phase	Mitigation Measures	Measurements units/Standards	Timing	Responsibility	Cost (Tsh) '000
<b>i) Pre-Construction Phase</b>					
Dust	-Control ambient air quality especially air dust level. -Scheduling of dusty activities -Provide PPEs during mobilization phase	PM: Not to exceed 250mg/Nm <sup>3</sup> (24h mean value (Tanzania) for Dust	Mobilization phase	Construction Contractor (CC) / Resident (supervising) Engineer	Part of contract sum
Noise pollution	-Control noise levels during mobilization phase -Scheduling of noisy activities -Provide PPEs -Careful selection of equipment / servicing	dBA for Noise and. Use WHO and Tanzania standards. Max 85 dBA/ 8 hr day time	Mobilization phase	CC/ RE	Part of construct sum
Compensation for properties and resolution of disputes	-Resolve any pending dispute over land and properties. -Use Roads Management Regulation and Land Acquisition Act.		Before the start of works	CC/ RE	6,000
Implementation of Environmental Management Requirements	-Prepare revised ESMP and submit to supervising Engineer.		Before works		3500
<b>ii) Construction phase</b>					
<b>Solid waste disposal</b>	-Comply with environmental requirements and	WHO standards for liquid waste	Throughout construction	Mbeya City	Part of contract

	<p>roads specifications/ Management Regulation</p> <p>-Provision of solid waste/ collection facilities</p> <p>-Adequate sanitary facilities at camps/ offices including shower and toilets</p> <p>-Proper handling Solid waste as per Roads Management Regulations (2009)</p>	pollution	n phase	Council (MCC) / Municipal Environment Management Officer (MEMO)	sum
Storm Water management	<p>-Proper engineering design. Flood prone areas.</p> <p>-Proper control of storm water and discharge to proper or designated ends</p> <p>-Liaison with LGAs and local leaders in identifying flooding or high water table areas.</p>		Throughout construction phase	CC/ Resident Eng Mbeya Municipal Council (MMC) / Municipal Environmental Officer (MEO)	2000
Occupational Health and safety	<p>-Comply with OSHA requirement/ regulation.</p> <p>-Provision of PPEs (e.g. helmet, boots and ear plugs)</p>		Throughout construction phase		Contractual budget
HIV/ AIDS prevention	<p>-Awareness campaign by cinema, local radio, leaflets. Flies and meetings</p> <p>-Training and counselling</p> <p>-Condoms</p>		Every 2 month in construction phase	CC/ MMC/ HIV/AIDS coordinator/ Community and Social Department of MC/ Municipal HIV/AIDS Testing and counselling	3500



	distribution			Committee (MHTC)	
Traffic Accidents	<ul style="list-style-type: none"> <li>-Awareness creation and warning signs. Sensitive in dense populated areas e.g. Sae and Mwakibete</li> <li>-Speed limits (Bumps)</li> <li>-Prepare Traffic management Plan</li> <li>-Proper Design</li> </ul>		Throughout construction phase	Developer (Design Engineer)/ CC/ Traffic Police	3000
Damage to utilities	<ul style="list-style-type: none"> <li>-Carefully design and involve utility companies.</li> <li>-Identify water, optic fibre, water supply pipes (MUWASA) and power supply utilities.</li> <li>-Prompt replacement of severed services</li> </ul>		Throughout construction phase	Developer/ CC/ MUWASA	4,000
Dust/ Air pollution	<ul style="list-style-type: none"> <li>-Daily watering of loose soils or stock piles</li> <li>-Awareness and information about dusty activities and risks</li> <li>-Provide dust masks</li> </ul>	<p>PM: Not to exceed 250mg/Nm<sup>3</sup> (24h mean value (Tanzania) for Dust</p> <p>Tanzania Air standards (2007).</p> <p>Or WHO, WB limits for noise</p>	Monthly	Developer/ CC	Part of contract sum
Noise pollution	<ul style="list-style-type: none"> <li>-Attenuate and repair noise equipment</li> <li>-Awareness and information about noise activities</li> <li>-Complies with noise standards</li> </ul>	Max 85 dBA/ 8 hr day time	Monthly	Developer/ CC	Part of contract sum

Disruption of pedestrian and vehicular movement	-Prepare traffic management plan -Provide temporary access and notifications -Early notice to users before interruption		Monthly	Developer/ CC	1500
Employment opportunity	-Transparency on employment opportunities -Liaise with local leaders in employment		Every month 2	Developer/ CC/ local Governments	500
<b>iii) Operation phase</b>					
Traffic accidents	-Awareness raising about traffic accidents -Roads/ Traffic signs -Speed limit structures such as Road Bumps/ humps		Yearly	MMC / Traffic police	MMC operational budget
Storm water management	-Maintenance of culverts and drainage ways buy e.g. unblocking and regular cleaning		Every rainy season	MMC/ MC Engineer	
<b>Sub Total</b>					<b>24,000</b>

Table 7: ESMP for Storm Water Drains

Project Impact	Mitigation Measures	Standards	Timing	Responsibility	Cost (Tsh) '000
<b>i) Pre-construction phase</b>					
Preparation / review of ESPM	-Mitigation of environmental and social effects  -Observe EIA and Audit regulation (2005)		Before construction works	CC and RE r	2000
<b>ii) Construction phase</b>					
Dust pollution	-Regular watering of loose soils  -Public information about dusty activities  -Provision of PPEs	Dust: PM: Not to exceed 250mg/Nm <sup>3</sup> (24h mean value (TZ) for Dust	Throughout construction phase	CC/ RE MMC/ Municipal Health Officer/ MC Environmental Officer	Part of contract sum
Noise	-Public information especially around schools and colleges (TECU)  -Provision of PPEs	Max 85 dBA/ 8 hr day time	Throughout construction phase	CC/ RE and MMC	Part of contract
Occupational Health and safety	-Comply to OSHA regulation / requirement  -Provision of PPEs  -Training and awareness about risk activities		Weekly	CC/ RE MMC/ Municipal Health Officer/	Contractual sum
Disruption of business and services	-Public information around shops, bus stand and medical services.  -Scheduling of works to minimize business disturbance		weekly	CC. MMC/ MC Engineer	
Disruption of utilities	-Carefully design and involve utility companies.  -Identify water pipes and (MUWASA) and		Before works and in daily works	Developer, MMC and MUWASA	3,000

	TANESCO power lines. -Prompt replacement of severed services				
Traffic accidents	-Roads sign at working site -Comply to road traffic rules		Monthly	Traffic Police MMC	2,000
Loss of planted trees	-Avoid unnecessary tree cutting -Stick to engineering design -Pay compensation according to law		Before the start of construction phase	Developer () / MMC/ Municipal Environmental Management Officer (MEMO)	1000
<b>iii) Operation phase</b>					
Lack of access to properties	-Construct slabs to all houses and business -Design and budgeting		Before handover	CC/ RE	Part of contract sum
<b>Sub-Total Cost</b>					<b>8,000</b>

### 8.3 ESMP Cost

The total estimated cost for the various environmental and social mitigation and monitoring measures including environmental and social follow-up, capacity building, sensitization campaigns against the spread of social diseases e.g. HIV/Aids, STDs etc. and ancillary works is TShs24.0Million for roads, TShs 8.0 Million for storm drains and TShs18.0 Million for landfill additional development. This cost structure will be further refined during the implementation stage. For example for the determination of training needs. MCC will have to identify the type and number of beneficiaries, type of the training needed and where this training will occur at what cost.

## 9 ENVIRONMENTAL AND SOCIAL MONITORING PLAN

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The Environmental Impact Assessment (EIA) and Audit regulations (2005) require the developer (MCC) to prepare and undertake monitoring plan and regular auditing. This was prepared and subsequently approved by the relevant minister; and certificate was issued to PO-RALG. Therefore, this is a supplement ESIA according to the aforementioned regulation. The objectives of Environmental monitoring program are:

- to monitor the effective implementation during the construction and operation phases of proposed mitigation measures;
- to confirm compliance with environmental, public health, and safety legislation/regulations during construction;
- to control the risks and ecological/social impacts;
- to ensure best practices management as a commitment for continuous improvement in environmental performance;
- to provide environmental information to community/stakeholders;
- to provide early warning signals on potential environmental degradation for appropriate actions to be taken so as to prevent or minimize environmental consequences;

Recommendations for monitoring responsibilities and estimated costs have been included in section 3 under the implementation of the ESMP. The Monitoring Plan schedules is provided in table 6 and 7. Table 8: below provides the monitoring indicators, frequency and assigns responsibilities for monitoring activities.

### Monitoring Parameters/Indicators

The key verifiable indicators which will be used to monitor the impacts will mainly include: soil erosion, noise/dust pollution, accidents, incidence of diseases and accidents.

### Environmental Audit

Environmental audits determine the long-term effects of adopted mitigation measures and set an avenue for evaluating their effectiveness. These shall be carried out on the project as part of the on-going maintenance programme. The audits will unveil the actual performance of mitigation measures and will allow effective measures to be included in future projects based on the legislation in force. As per EIA and Audit Regulations (2005), environmental audits would be a responsibility of the developer (Local Government Authorities – Mbeya city and the National Environment Management Council (NEMC).

Table 8: Environmental Monitoring Plan for Roads and Storm Drains

Phase or Aspect	Monitoring Parameter	Monitoring Frequency	Standards	Responsible	Measurement Area	Action	Costs Estimate (TAS) '000
<b>Pre-construction Phase</b>							
Safety/Traffic Accidents	Establish the baseline information. No. of accidents	Use data from feasibility study and Traffic Police		Contractor, Developer	No. of accidents along roads	Keep records	1150
HIV/AIDS	Record of HIV/AIDS and other sexual related diseases in the area. Level of prevalence	Once before the project.	Data from Municipal Medical Officer	Contractor, Municipal HIV/AIDS coordinator/ Municipal HIV/AIDS Testing and counselling Committee (MHTC)	Project area	Establish database	3500
<b>Construction Phase</b>							
Storm water management	Distance (km) of drainage system cleaned or maintained. Number of culverts unblocked	After rainfall	Number of reported cases	Contractor, Supervisor, NGOs	RoW	Repair and compensate damages	1150
Noise and dust/ emissions at construction sites	Sampling (use dBA units for noise) Record respiratory infections Record public	Every 2 months	85 dBA /8 hrs for Noise PM: Not to exceed 250mg/Nm3 (24h mean value (TZ) for Dust	Contractor, Supervisor, NGOs	Crusher, quarry site, roads under construction, diversions, access and haul roads	Reporting	600



	complaints. Air quality: Particulate matter (PM) in the air. Assess dust effects by monitoring respiratory disease.		SO = 125 µg/m <sup>3</sup> /24Hrs (WHO) NO <sub>2</sub> = 200 µg/m <sup>3</sup> / 1Hr (WHO) CO= Max exposure of 100mg/Nm <sup>3</sup> >15min (Tz)				
Solid waste management	No. of dustbins, extent of haphazard disposal. Availability of disposal sites. Recorded complaints	Monthly		Contractor, Supervisor, NGOs	Project sites	Report	1200
Traffic Accidents	Monitor construction and efficacy of road humps. Speed control Awareness creation Erection of warning sign boards. Record keeping	Monthly	Reported cases of accidents (fatal, injuries, near miss)	Contractor, Supervisor, Traffic Police	Project roads	Report	1000
Monitor local employment (Ensure access to local employment)	Encourage local employment, including for youth and women Prepare monitoring sheet formats	Every 2months	No. of local people employed by contractor	Contractor, Supervisor, local government, NGOs	Project sites	Reporting	400

HIV/AIDS	Record of increase of HIV/AIDS and other sexual related cases the area.	Every 2 months		Contractor, Municipal HIV/AIDS coordinator, NGOs/ Municipal HIV/AIDS Testing and counselling Committee (MHTC)	Project sites	Reporting	2500
<b>Operation Phase</b>							
Human safety (to prevent occurrence of accidents in the project area)	Cases of road accidents Cases of occupational accidents for maintenance workers. Monitor efficacy of road humps. Speed control, Monitor signboards.	Every 2 months		Contractor, Supervisor, Districts, Traffic Police	Project sites	Reporting	1150
Storm water management	Annual flooding and blocking of drainage – number of cases. Number of houses and properties damaged by storm water.	After every rainy season	Identified and reported cases	City authority	Settlements	Carry out inspection before and after rainy seasons.	575
<b>Total</b>							<b>13,225</b>

Table 9: Environmental Monitoring Plan – Uyole Landfill

	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility for monitoring	Five Year costs estimates (Tsh) '000
<b>Operation Phase</b>								
Ground Water pollution	pH	Once before works	Ground water	-	pH Meter	6.5-9.2	Mbeya City Council/ Authority/ NEMC	1800
	Temperature	3 times a year		Centigrade	Thermometer	20-35		1720
	Electric conductivity	3 times a year		µs/cm	Electrode Meter			1660
	Ammonium Nitrogen	3 times a year		mg/l	Sampling and analysis (Spectrophotometer)			1640
	Chloride	3/ times a year		mg/l	Sampling and analysis (Spectrophotometer)	200		1800
	BOD			Mg/l	Sampling and analysis (BOD Track)	30		1000
	COD	Three times a year		mg/l	Sampling and analysis (Spectrophotometer)	60		12300
<b>Total</b>								<b>21920</b>

## 10 DECOMMISSIONING

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### 10.1 Management of decommissioning activities

Decommissioning of road drains infrastructure is not expected to take place in the near future. If it happens, the carriage way can be demolished together with concrete structures such as culverts and side drains.

The anticipate life span for road and drains is more than 20 year. If applicable, d decommissioning should aim at minimizing erosion problems, restoration of landscape scenery and replacement of vegetation to its near original state.

Activities of decommissioning that may affect the environment negatively are;

- Re-alignments road route
- Demolition works of bridges, road side drains and road furniture
- Removal of existing road surface
- Compaction, grading and resurfacing

The contractor shall demolish structures and clean up the project sites to a condition suitable for use by the community.

Therefore, the following mitigation measures are proposed as part of decommissioning;

- Safe removal / recycle of asphalt concrete layer
- Removal and safe disposal of concrete structures; culvers and drainage slabs
- Filling water pockets to eliminate risk of providing breeding sites for mosquitoes hence controlling malaria spread.
- Replanting of vegetation on the banks of the borrow pits to minimize the erosion

Potentially harmful contaminants at the project sites shall be removed, treated and disposed of into approved sites. Overall, the demobilization of the project will comply with environmental standards and legislation and competent engineers should be involved.

Overall, the demobilization of the project will comply with environmental standards and legislation. The developer is advised to seek or incorporate the service of qualified engineers for roads and storm water drain and environmental experts.

## 11 SUMMARY AND CONCLUSION

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The supplement ESIA study results show some limited negative environmental implications of the project, the proposed works will have high socio-economic benefits to the residents of MCC. The associated negative impacts will be significantly reduced or eliminated through careful engineering design and best construction practices. Specific mitigation measures have been suggested in this report to offset some of the inherent adverse impacts especially those linked human and social environment. Effects in the construction phase include effect on ambient air quality due to dust, noise pollution, soil erosion, poor solid waste disposal and storm water. In addition, interference to business and residential access, occupational health and spread of social diseases e.g.HIV/AIDS, STDs risk may result from project activities.

Some practical mitigation measures have been proposed for all significant impacts. Implementing these measures would safeguard the environment and make the proposed sub-projects sustainable.

It is, therefore, concluded that, effective implementation of the proposed works subprojects will mitigate the predicted impacts to harmful or near harmful levels. Their implementation should be adequate and timely. The ESMP has been prepared as shown in chapter 8. Overall, the anticipated positive impacts will outweigh the negative ones by far. In particular, transport improvement, decreased flooding or ponding along roads hence increased social development and welfare for the city community.

Predicted impacts shall be managed through the proposed mitigation measures and implementation regime laid down in this EIS. MCC is committed in implementing all the proposed recommendations and further carrying out environmental auditing and monitoring schedules.

The summary of recommended mitigation and management measures to minimize the potential impacts are:

- Proper design to accommodate measures for, storm water effects and soil erosion and slopes destabilization.
- Measures to safeguard job opportunities and gender balance.
- Measures to encourage local employment.
- Mitigation measures against workplace health and safety
- Measures against noise and dust effects.
- Management of Storm water and discharge to safe ends.
- Management of traffic accidents
- Measures against possible increase of social diseases HIV/AIDS prevalence.
- Monitor compliance to environmental, health and safety measures
- Involvement of community to safeguard infrastructure,

## **LIST OF CONSULTED PERSONS**



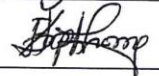

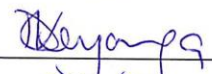


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**SUPPLEMENT ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR TANZANIA STRATEGIC CITIES PROJECT (TSCP) - DODOMA, MTWARA AND DODOMA, 2014.**

LGA/ City/ Institution: DODOMA M.C.

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