UNITED REPUBLIC OF TANZANIA
MINISTRY OF WORKS

TANZANIA NATIONAL ROADS AGENCY
(TANROADS)

P. O. BOX11364,
3rd Floor, Airtel House, Ali Hassan Mwinyi Road/Kawawa Roads Junction,
Dar es Slaam Tanzania

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR IMPROVEMENT OF UBUNGO INTERSECTION

FINAL REPORT

Submitted to:

National Environment Management Council
Regent Estate, Plot No 29/30
P. O. Box 63154, Dar es Salaam
Tel. +255 22 2774852
E-mail: nemc@nemctz.org

Consultant

Godwin C.Maleko
P.O.Box 7018, Dar es Salaam
Phone: 0754 268446/0713 492496
Email: gchrismale@yahoo.co.uk

January , 2015

ACKNOWLEDGEMENT

The ESIA team wishes to convey heartfelt thanks and appreciation to all stakeholders who in one way or another supported the completion of this assignment. Thanks very much all of you. Special thanks should be given to TANROADS HQ and Regional Office, Kinondoni Municipality and other departmental staff for their prompt assistance during the undertaking of Environmental and Social Impact Assessment for this project. Last but not least we thank the streets and wards leaderships for their cooperation and assistance during the field work to facilitate the completion of ESIA report.

Table of Contents

ACKNOWLEDGEMENT.....II
LIST OF ABBREVIATIONS.....VI
ESIA STUDY TEAM.....VII
EXECUTIVE SUMMARY.....VIII
1.0 INTRODUCTION 1
1.1 PROJECT BACKGROUND.....1
1.2 OBJECTIVE OF THE ESIA STUDY.....2
1.3 SCOPE OF WORK.....2
1.4 METHODOLOGY.....3
1.4.1 Adherence to ESIA Procedures.....3
1.4.2 Formation of Study Team 3
1.4.3 Field studies 3
1.4.4 Public Consultation 4
1.4.5 Direct Observation.....4
1.4.6 Project Impact Assessment.....4
1.5 BOUNDARIES OF THE EIA STUDY.....4
1.6 REPORT STRUCTURE.....4
2.0 PROJECT BACKGROUND AND DESCRIPTION.....6
2.1 INTRODUCTION.....6
2.2 OBJECTIVE OF THE PROPOSED PROJECT.....6
2.3 LOCATION OF THE PROJECT.....7
2.4 PROJECT JUSTIFICATION.....8
2.5 BRIDGE AND ROAD DESIGN 9
2.5.1 Basic policy of F/O Bridge design.....9
2.5.2 Road Alignment and Road Design Policy.....9
2.5.3 Design Approach.....9
2.5.4 Drainage Structures Design.....10
2.6 PROJECT PHASES.....10
2.6.1 Mobilization or Pre-construction Phase.....10
2.6.2 Construction Phase.....11
2.6.3 Operation Phase 12
2.6.4 Demobilization Phase.....12
3.0 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK.....13
3.1 POLICY FRAMEWORK.....13
3.1.1 National Environment Policy (1997).....13
3.1.2 National Transport Policy (2002).....13
3.1.3 National Policy on HIV/AIDS (2001).....14
3.1.4 National Human Settlements Development Policy (2000).....14
3.1.5 National Land Policy (1995).....15
3.1.6 Women and Gender Policy (2002).....15
3.1.7 National Water Policy (2002).....16
3.1.8 National Strategy for Growth and Reduction of Poverty (2002).....16
3.1.9 National Energy Policy (1992).....16
3.2 LEGAL FRAMEWORK.....17
3.2.1 The Constitution of Tanzania (1977).....17
3.2.2 Environmental Management Act (2004).....17
3.2.3 The Environmental Impact Assessment and Audit Regulations (2005).....18
3.2.4 National Road Act (2007).....18
3.2.5 The Land Act (1999) and the Land (Amendment) Act (2004).....19
3.2.6 Land Use Planning Act (2007).....20
3.2.7 The Water Resource Management Act (2009).....20

3.2.8 The Forest Act (2002)....21
3.2.9 The Mining Act (2010)....22
3.2.10 The Road Traffic (Amendment) Act (1990)....23
3.2.11 Explosives Act (1963) and Explosives Regulation (1964)....23
3.2.12 The Occupational Health and Safety Act (2003)....24
3.2.13 Employment and Labour Relations Act of 2004 24
3.2.14 HIV and AIDS (Prevention and Control) Act (2008)....24
3.2.15 Local Government (District Authorities) Act (1982) and the Local Government Laws (Miscellaneous Amendments) Act (1999)....25
3.2.16 The Land (Compensation Claims) Regulations (2001)....25
3.2.17 The Land (Assessment of Value for Compensation) Regulation (2001)....26
3.3 ADMINISTRATIVE FRAMEWORK....27
3.3.1 Overall Management Responsibility....27
3.3.2 Minister Responsible for Environment....27
3.3.3 National Environmental Advisory Committee 28
3.3.4 Division of Environment....28
3.3.5 National Environment Management Council (NEMC)....29
3.4 WORLD BANK SAFEGUARD POLICIES 32

4.0 BASELINE ENVIRONMENTAL AND SOCIAL CONDITION....33

4.1 PHYSICAL ENVIRONMENT....33
4.1.1 Location 33
....34
4.1.2 Administrative Boundaries....34
4.2.1 Climate....35
4.2.2 Soil....35
4.2.3 Natural Environment/Vegetation....35
4.2.4 Hydrology/Water Resources....36
4.3 SOCIO – ECONOMIC AND CULTURAL ENVIRONMENT....36
4.3.1 Population and Demography....36
4.3.2 Water Supply and Consumption....36
4.3.3 Health Services 37
4.3.4 Security 38
4.3.5 Sanitation....38
4.3.6 Education System....38
4.3.7 Energy Sources....39
4.3.8 Land Use and Tenure....39
4.3.9 Household Income....40
4.3.10 Road Infrastructure....40
4.3.11 Waste Management....41
4.3.12 Economic Activities....41
4.3.13 Formal and Informal Employment....42

5.0 STAKEHOLDERS CONSULTATION AND PUBLIC PARTICIPATION....44

5.1 BACKGROUND....44
5.2 IDENTIFICATION STAKEHOLDERS....44
5.3 PUBLIC CONSULTATION PROCESS....45
5.4 MAJOR ISSUES AND CONCERNS 46

6.0 PROJECT ALTERNATIVES....51

7.0 IDENTIFICATION AND ASSESSMENT OF THE IMPACTS 60

7.1 METHODOLOGY FOR IDENTIFICATION AND ANALYSIS OF IMPACTS....60
7.2 IDENTIFICATION OF IMPACTS....60
7.3 ANALYSIS OF NEGATIVE AND POSITIVE ENVIRONMENTAL IMPACTS....69
7.3.1 Impact Boundaries....69
7.3.2 Impact Significance....72

9.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN 85

10.0 ENVIRONMENTAL MONITORING AND AUDITING 90

10.1 Environmental Monitoring 90
10.2 Environmental Audit 96
10.3 Personnel and Training 96
10.4 Institutional arrangements and Reporting Procedures 96
11.0 RESOURCE EVALUATION 98
12.0 DEMOBILIZATION PLAN 100
13.0 CONCLUSIONS AND RECOMMENDATIONS 101
APPENDICES 102

LIST OF ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
BRT	Bus Rapid Transit
CBOs	Community Based Organizations
CRB	Contractors' Registration Board
DAWASA	Dar es Salaam Water and Sewerage Authority
DAWASCO	Dar es salaam Water and Sewerage Company
DoE	Division of Environment
EAMGRS	Environmental Assessment and Management for Road Sector
EIA	Environnemental Impact Assessment
EIS	Environnemental Impact Statement
EMA	Environnemental Management Act
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
GOT	Government of Tanzania
HIV	Human Immunodeficiency Virus
MOW	Ministry of Works
NEMC	National Environment Management Council
NEP	National Environmental Policy
NGOs	Non-Government Organizations
OSHA	Occupational and Safety Health Act
ROW	Right of Way
SATCC	Southern Africa Transport and Communications Commission
SEA	Strategic Environmental Assessment
TAC	Technical Advisory Committee
TANESCO	Tanzania Electric Supply Company
TANROADS	Tanzania National Roads Agency
TCRA	Tanzania Communication Regulatory Authority
TOR	Terms of Reference
TPDC	Tanzania Petroleum Development Corporation
TTCL	Tanzania Telecommunication Company Limited

ESIA STUDY TEAM

Expert's Name	Position/Responsibility
Godwin C.Maleko	Environmentalist and Team Leader
Michael Mpuya	Sociologist

EXECUTIVE SUMMARY

Project: Improvement of Ubungo Intersection

Proponent: The United Republic of Tanzania, Ministry of Works, through Tanzania National Roads Agency (TANROADS)

Proponent's Contact: TANROADS, P. O. BOX11364,
3rd Floor, Airtel House,
Ali Hassan Mwinyi Road/Kawawa Roads Junction,
Dar es Slaam Tanzania
E-mail: tanroadshq@tanroads.org

EIA Expert: Godwin C. Maleko
P.O.BOX 7018, Dar es Salaam,
Tel/Fax +255 222866221
Mobile: 0754 268 446/0713492496

E-mail: gchrismale@yahoo.co.uk

INTRODUCTION

Dar es Salaam where the proposed project is located is the largest City in Tanzania. Dar es Salaam is actually an administrative region within Tanzania, and consists of three local government areas or administrative districts: Kinondoni to the North, Ilala in the centre of the region, and Temeke to the South. The City is estimated to have a population of 4,364,541 as per 2012 census. Located on a harbour on the Indian Ocean, it is the main port for Tanzania, handling exports of minerals and crops. In addition it is the hub of Tanzanian's national transport system as major highways and all railways originate in or near the city.

Due to the major development and population growth in the City, currently, the traffic congestion has become one of major issue for citizen. Nowadays it is approximated that more than 120,000 private vehicles move on the city's roads daily, and the traffic jams are becoming even more acute as they can also be noticed during weekends. The Centre for Economic Prosperity (CEP) recent study indicates that a motor vehicle often spends up to two hours to cover a 16- kilometer trip, a distance which could have spent only 15 minutes, if there was no traffic congestion.

During the colourful ceremony for foundation stone laying for the Phase 1 of the construction of Dar es Salaam Bus Rapid Transit (BRT) infrastructure, his Excellency Dr. Jakaya Mrisho Kikwete, the President of the United Republic of Tanzania was briefed about the current design at the Ubungo junction that; the design provides for at grade traffic crossing which is controlled by traffic lights. In order to give priority to BRT buses, the right turn is not allowed at the junction, instead the right turning vehicles have to turn first to the left and then make a "U" turn to the junction. This arrangement was noted to inconvenience significantly the mixed traffic movement and will create traffic congestion at the junction.

Following the briefing; the President supported the idea of constructing Grade Interchange at the junction and directed that, the World Bank should be requested immediately for financial support. In order to avoid disruption of the BRT operation in future, it is important for the construction of the Grade Separated Intersection to be done concurrently with the ongoing construction of the road.

In fulfilment of the above mentioned President's directive to improve the current design of the Ubungo Intersection. the Government has undertaken economic evaluation study, preliminary design, detailed engineering design and preparation of tender document for a grade separated intersection at Ubungo.

TANROADS engaged has Hamza Associates of Egypt in association with Advanced Engineering Solutions LTD of Tanzania to carry out the Economic Evaluation, Preliminary Design, Detailed Engineering Design and Preparation of Tender Documents of the Ubungo Intersection.

In order to implement the proposed project in a sustainable manner, TANROADS has also engaged an individual Consultant to undertake Environmental and Social Impact Assessment (ESIA) for the project. The Environmental Impact Assessment has been conducted in accordance with the requirements of the Environmental Management Act No. 20 of 2004 and Environmental Impact Assessment and Audit Regulations (2005) and applicable World Bank Safeguard policies. Other important legal provisions, which provide guidance on environmental issues pertaining to road sector have been consulted such as the Road Act (2007), Environmental Code of Practice for Road Works (2008), and Environmental Assessment and Management Guidelines in the Road Sector (2004).

PROJECT ENVIRONMENT

The characteristics of project environment of the project area are almost the same as those of the whole Kinondoni Municipality or Dar es Salaam City which are as follows:

a) Boundaries: The City is bounded by the Indian Ocean on the east and by the Coast Region on the other sides

b) Surface area: The total surface area of Dar es Salaam City is 1,800 square kilometers, comprising of 1,393 square kilometers of land mass with eight offshore islands, which is about 0.19% of the entire Tanzania Mainland's area. Temeke Municipality has the largest land surface area followed by Kinondoni while Ilala has the smallest area.

c) Air: The air in the project area is considered to be very clear with low levels of pollutants. This observation is based on low record of pollution related infections in the medical centres as no detailed measurements were undertaken. The main source of pollution is generally dust generated by traffics.

d) Topography: The target road is situated on coastal hills at an altitude of around 10m and its topography is composed of plateaus with altitudes from 40m high to 200m high and flatlands in the seashore area. The City is divided into three ecological zones, namely the upland zone comprising the hilly areas to the west and north of the Dar es Salaam City, the middle plateau, and the low lands including Msimbazi valley, Jangwani, Mtoni, Africana and Ununio areas. Surface soil is composed of sand, gravel, mud and clay of the alluvial epoch.

e) Climate: The proposed project area experiences a modified type of equatorial climate. It is generally hot and humid throughout the year with an average temperature of 290C. The hottest season is from October to March while it is relatively cool between May and August with temperature around 250C. There are two rain seasons: - short rain from October to December and long rain season between March and May. The average annual rainfall is 1300mm. Humidity is around 96% in the mornings and 67% in the afternoons. The climate is also influenced by the Southwest monsoon winds from April to October and Northeast monsoon winds between November and March.

f) Geology/ Soils: The project area is covered by Neogene Semi-Consolidated Clay – bound sands possibly unconformable upon the Pugu Sandstones. Both geomorphology and geological map show that there is a normal block faulting which is trending North - South cross through Ubungo starting from Kawe (Mbezi) passing along University of Dar es salaam, Ubungo, Kinyerezi to Ukonga Prison.

The project area has two different soil types; the top soil layer of about 30cm thick consists of manmade soil (filled materials), well compacted and levelled. The second layer is generally dump, dark grey, firm sandy clay

g) Vegetation: Ubungo as part of the earth's surface is mainly composed of various vegetations like grass and trees. These trees are either exotic or indigenous species. Among the exotic species commonly observed at Ubungo includes ashok trees. In the existing ROW there is no vegetation cover, but area required for intersection improvement will affect vegetation cover especially trees found in TANESCO and SONGAS premises.

h) Hydrology/Water Resources: At project area ground water table was encountered at approximately a depth of 3.0m. The ground water table has to be monitored for a period of time to establish its seasonal fluctuation. The storm water was not noticed in the area because the area is well drained. However, in the project area the prominent surface water resources are two rivers which are Kibangu River and Ng'ombe River. Both the rivers are seasonal.

PROJECT STAKEHOLDERS AND INVOLVEMENT

The major relevant stakeholders were identified during scoping stage. These stakeholders have different roles and responsibility on the proposed project. However, their main roles were to contribute in ESIA process in order to reduce or eliminate the impacts. The followings were stakeholders identified:

Stakeholder Group	Members

Authorities or decision makers	- Ministry of Works - TANROADS - Vice – President Office - World Bank - National Environment Management Council - Ministry of Lands and Human Settlement Development - Kinondoni Municipal Council
Interested parties	- NGOs - Individuals
Affected parties	- Local communities Kinondoni Municipality - Ministry of Water - TANESCO - TTCL - DAWASA - DAWASCO - SONGAS - BRT - TBS - TCRA - TPDC
Developer	- Ministry of works - TANROADS HQ, DSM - TANROADS Regional Office DSM

A wide public consultation was carried out during the fieldwork covering both environmental and social aspects. During the public consultation, meetings and interviews were carried out with stakeholders. Among others, the issues raised by stakeholders were categorised into four main groups these are: environmental issues, economical issues, health and safety issues and social issues. The following were the issues raised by stakeholders.

S/NO	Environmental issues	Responses by the Consultant
	Deterioration of Air quality due to exhaust fumes from machinery and equipment and dust from construction activities.	Contractor should consider selection of good machinery and vehicles, lubricants, regular service and lubrication to reduce fumes from construction machinery and vehicles. Contractor should conduct watering to suppress dust in the working sections including areas of cutting and filling, haul roads,
	Noise and vibrations will be generated due to increase in traffic movements and construction activities	Contractor should control noise and vibration to acceptable levels by using new equipment and to avoid unnecessary movement of trucks. Where it is necessary appropriate protective gears will be provided to the

		workers
	Soil and ground water pollution caused by improper handling of oil spills, effluents, bitumen, used oils and other chemicals.	Ensure daily environmental and safety management best practices to minimise and prevent spills of hazardous materials, soil pollution and improve waste management system.
	Economic issues	
	The improvement of Ubungo Intersection will significantly improve transport services and reduce transport costs from wayside areas of Morogoro road, Sam Nujoma and Mandela roads such as (Mwenge, Magomeni, Buguruni, Kimara etc),	This is the main objective of the project
	Flyover Bridge at Ubungo will lead to expansion of commercial activities in the project area.	It will increase official business opportunities resulting more earning and improve life standards.
	Employment opportunity to local in the project area. This is expected to contribute to activation and stabilization of the economic activities of the low-income group, and consequently to the eradication of poverty.	The contractor should give the priority of employment to the people hailing from Mtaas along the project site. Those people may be employed as technical personnel, labourers and watchmen. Moreover as the women groups, tearooms and food vendors exist at the project site, it is anticipated to increasing their income..
	Loss of business: As the vendors will be removed from the project area, they will lose business and thus affect their daily earnings. Alternative site for vendors: It is not likely to get the same site for doing business as currently being at Ubungo Intersection	The authorities especially Kinondoni Municipality will assist affected people to acquire new areas for settlement and business.
	Revenue collection (TANESCO) will be reduced as a result of relocation of power pole and lines	During the shifting of poles and wires, the Contractor will try as much as possible to avoid any unnecessary delays.
Health and Safety issues		
	The health problems may increase due to exposure to polluted air, unnecessarily long periods spent on roads such as mental stress, tiredness, and headache. There will be a lot of inconveniences due to traffic congestion at the intersection as experienced from BRT project.	The Contractor will provide working gears to the workers and practise working shifts To avoid and control traffic congestion at the intersection during construction TANROADS/Contractor in collaboration with other government authorities and local community should improve feeder roads and introduce bypass for trucks before they reach Ubungo to avoid congestion at

		intersection.
	There will be a blockage of entrance and access to the working places or business centers during construction phase as observed in BRT project.	Contractor should consider alternative access to avoid interference
	Traffic speeds will increase during operation phase result into increased road accidents due to change of driving pattern around Ubungo Intersection	There will be a behaviour change programme for road users since the fly over is new for most of road users especially drivers and pedestrians
Social issues		
	Spread of HIV/AIDS and other diseases due to increase Social interaction	There will be a separate consultant to implement and manage HIV/AIDS alleviation programs. The Contractor will create awareness for construction workers and communities through seminars and awareness campaign on HIV/AIDS Prevention programs.
	The improvement of Ubungo intersection will bring social benefits to the road users like low traffic congestion especially at peak hours, this will reduce delay to public services, improve access to the public services such as market places, educational services, working places etc. and to the health services.	It is true; this is a purpose of road improvement strategy. Members of local communities will be able to get access more easily to social facilities such as schools and other amenities in commercial centres. The time served will be used for other economic activities and increase earnings of individual and community as a whole.
	At the Intersection, there is land constrains due to presence of private buildings and public utilities such as electricity, water supply, sewerage, telecommunication cables and poles, and gas pipelines. It is likely that some of utilities will suffer for space for relocation. In this regard, the cost of relocating all the utilities will be too high and affect the viability of the project.	The affected land and properties like buildings will be compensated to pave the space for relocating utilities.
	The flyover bridge will beautify the area and increase the value of the area.	It is true
	There will be a cut-off of public services like power and water supply due to construction activities.	It is advised to TANESCO that during construction is better to opt for live line works technology to avoid power cut off. Also the utilities have to provide early notice on the cut off services to their customers.
	The compensation should reflect the real value of affected property and be paid on time:	The valuation of the affected properties will be conducted according the national law and compensation will be implemented as soon as possible.
	Kinondoni Municipal Council has to be involved in all stages of the project cycle; at least two engineers should be involved and not only consult	The Engineers from the Municipality will be involved in the site meetings.

	them when there are problems.	
	The people were happy with the project and they wanted the construction of Flyover to commence as soon as possible.	The proposed project will be implemented as soon as possible.

IDENTIFICATION OF ENVIRONMENTAL AND SOCIAL IMPACTS

The following are the potential impacts for the proposed project.

Positive Impacts:

- **Job Creation and Increased Income to Local Communities**

During construction most of casual labourers and some skilled workforce will be absorbed from the nearby project areas. Apart from the opportunities for self-employment the intersection improvement will promote income generating activities like selling food and other merchandise to the construction workforce.

- **Improved Accessibility to Markets Centres**

The improved road will facilitate the transportation of the products from project area to the markets in area of consumption as well as smooth transport of people from their homes to market centres.

- **Improved Access to Services**

The proposed road improvement will improve transportation and enable easier purchase and delivery of drugs/medicines to health care facilities. Patients will receive faster medical attention (especially emergency cases). Health workers will enjoy easier access to work than before. Members of local communities will be able to get access more easily to social facilities such as schools and other amenities in commercial centres

- Reduction in Travel Duration and Distance to Services

The improvement of the intersection will facilitate easy transport and transportation within Kinondoni Municipality and other suburban areas as well as increasing communication among the communities along the Morogoro road, Sam Nujoma and Nelson Mandela roads to Dar es Salaam City Centre, hence reduced travel time and costs and increase socio-cultural interaction.

- Promote Investment and Industrial Sector

The Ubungo Intersection connects three roads (Morogoro road, Sam Nujoma road and Mandela road). Morogoro Road gives access and exit from Dar es Salaam to up-country Cities and neighbouring countries. The Nelson Mandela Road has formed one of the logistic distribution networks to connect inland areas to Dar es Salaam Port for transporting not only

domestic goods but also goods to the landlocked countries. This project will reduce the transport cost of materials and products to the Dar es Salaam Harbor, and in industrial areas which in turn contribute to activation of the wayside commercial activities.

- Easing of Domestic and International Physical Movement of People and Goods

This project will reduce traffic congestion of three roads which form intersection (Morogoro, Sam Nujoma and Nelson Mandela roads) which in turn reduces the time for road traffic of cargoes to the Dar es Salaam Harbour, city centre, industrial areas and inland countries. In consequence, physical flow to and from inland countries will become more active.

Negative Impacts

- Land Expropriation and Loss of Structures

The use of land for improvement of the intersection may entail the voluntary sale or compulsory acquisition (expropriation) of homes, property, businesses, and other productive resources. Involuntary displacement or resettlement would cause social disruption and economic loss for the affected individuals and their families. Currently Ubungo Intersection is famous for vending businesses which are carried out within the road reserve. During the construction works, all these businesses will be affected. About 59 properties will be affected by implementation of the project.

- Interruption of Public Services

The proposed project will involve the relocation of utility facilities such as water supply, sewer pipes, telephone, electric cable and gas pipes. During the relocation of these utilities the communities will suffer from the service cut-off.

- Increased Traffic Congestion and Accidents

During construction, the increased traffic movements will result into traffic congestion and disruption specifically at road crossings. Also in this phase there will be a labor accident including falls involving pedestrians and street vendors. On the other hand, because the improvement of Ubungo intersection will be of its kind in Dar es Salaam city, traffic accidents may increase at the initial stage of construction.

- Cutting trees

There are no trees found inside the ROW. However, there are few trees found within the premises of TANESCO and SONGAS. In order to secure the required area to enable the construction works to proceed, it will be necessary to cut down these trees.

- Surface Water and Soil Pollution

Pollution of ground water and soil may occur due to accidental spillage of fuel, motor oils, and chemicals like paints. Deposition of concrete and fine sediments during construction may cause effects to the Kibangu/Ubungo river crossing Mandela road about 100 m from the intersection and Ngombe river crossing Sam Nujoma about 100m from the intersection.

- Noise and Vibrations

Increased traffic movement across the project area is likely to cause considerable noise and vibrations. The noise and vibrations will be produced by construction equipment and trucks during transport, and delivery of construction materials to the project site.

- Air Pollution

Dust generated from land clearing, extraction, transportation, offloading, stockpiling and spreading of sand and gravel will have negative impact to the air quality. Another source of air pollution will be due to exhaust fumes from operating construction machinery, equipment and vehicles. In addition, there will be clouds of dusts due to movements of vehicles and construction machinery.

- Soil Erosion

Removal of soil cover due to site clearing as well as other earth works will make soil susceptible to water and wind erosion. Also dumping of spoil materials are likely to increase soil erosion

- Occupational Health and Safety

The road construction activities will be associated with the following Occupational Health and Safety issues;

- Injuries or death due to lack or poor separation of working areas and traffic area
- High generation of dust which exposes the laborers and the general public to bronchial and other respiratory track diseases

- Transmitted Diseases

The road construction activities will be associated with the followings transmitted diseases:

- STI, and HIV/AIDS due to increase immigrants and higher earnings of the construction workers which attract women in sexual relations.
- Water borne diseases due to poor sanitation

- Surface Water Flow Modification

Construction of approach road embankments is likely to interfere with natural surface flow patterns. The additional discharge of storm water collected from the roadsides also present a particular hydrological problem, where by concentrating flow in one direction, resulting into channel modification.

- In-migration

The improvement of Ubungo Intersection will be accompanied by in-migration of job seekers while during operation opportunistic businesses and speculators for expansion of business areas will increase. The influx of the people in the project area may acerbate the vending problems in the project area.

- Increase child labour

The available opportunity for employment may attract child to seek temporary jobs, It has been evident that most development projects trigger engagement of children less than 18 years to work contrary to the national and international laws which prohibit child labour.

- Generation of liquid and solid waste

The liquid wastes that will be generated are waste water from camp sites, and used oils. Solid wastes will include cement bags, wood, plastic and metal containers such as drums, and tins, bottles etc. During construction there will be waste materials generated from soil cutting, filling and leveling of road alignment, this include uprooted trees and surplus materials.

- Reduce Water Quality due to runoff

In the operation phase, the motor vehicle emissions and contaminants carried by the tires may participate and stay on the roads. Surface run-off formed during rain will carry the contaminants to the water sources.

- Loss of Employment

During decommission phase people will lose their jobs and employment. This situation will threaten the security of their lives and create a negative thought of losing a good relation with their family members. This financial burden will lead to stress.

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The environmental options to minimize or prevent the identified adverse impacts are given in this report and are contained in the Environmental and Social Management Plan (ESMP).The mitigation measures are further reflected in the bidding documents (conditions of contract, specifications, drawings and bills of quantities as appropriate) to ensure that they will be implemented by the parties to the contract.

The ESMP describes the implementation schedule of the proposed mitigation measures as well as planning for long-term monitoring activities. It defines roles and responsibility of different actors of the plan. The associated costs for implementing mitigation measures for improvement of Ubungo Intersection is tuned to Tshs 73,000,000.00 and environment monitoring costs is tuned to Tshs 11,200,000.00. The cost for compensation of affected properties is Tshs 10,560,997,472.00 and the cost for relocation of utilities is Tshs 24,185,961,263.00 excluding water supply utilities. The mitigation measures for the identified impacts are as indicated below:

Impact	Mitigation measure	Responsible Institution	Time Frame	Estimated Costs (TZS)
Land Expropriation and Loss of Structures	○ Realigning the bridge structure and approach roads to minimize land take and effects to the building structures ○ PAPs' compensations before project implementation phase	○ Design Engineer ○ TANROADS	Before construction phase –short term	Valuation Report
Interruption of public utilities	○ Realigning the bridge structure and approach roads to minimize the effects to the electricity facilities ○ Relocating utilities (Electricity,)	○ Design Engineer ○ Contractor ○ TANROADS ○ TANESCO	Before construction phase	Cost estimates from TANESCO
	○ Realigning the bridge structure and approach roads to minimize the effects to the telecommunication facilities. ○ Relocating utilities (Telephone)	○ Design Engineer ○ Contractor ○ TANROADS ○ TTCL	Before Construction phase – short term	Cost estimates from TTCL
	○ Realigning the bridge structure and approach roads to minimize the effects to the water supply and sewerage facilities ○ Relocating utilities (Water Supply and Sewerage facilities)	○ Design Engineer ○ Contractor ○ TANROADS ○ DAWASA ○ DAWASCO	Before construction phase	Cost estimates from DAWASA (Not yet done)
	○ Realigning the bridge structure and approach roads to minimize the effects to Gas pipeline ○ Relocating Gas pipeline	○ Design Engineer ○ Contractor ○ TANROADS ○ SONGAS ○ TPDC	Before construction phase	Cost estimates from TPDC
Increase Road Accidents during operation phase	○ Provide road signs ○ Installation of speed humps ○ Provision of enough designated people crossing points to avoid people crossing at any road point	○ Design Engineer ○ Contractor ○ TANROADS ○ Dar es Salaam City	Long-term (Operation phase)	5,000,000.00

Impact	Mitigation measure	Responsible Institution	Time Frame	Estimated Costs (TZS)
	○ Adequate lighting	Council ○ Traffic Police		
Loss of vegetation	○ Confine clearance to corridor of impact ○ Tree planting after construction	○ Contractor ○ TANROADS ○ Environmental Supervisor	Before and during construction phase	3,000,000.00
Water and soil pollution	○ No refueling of plant or transfer of materials near watercourses ○ Installing spill kits at every refueling/transfer area ○ Establish and maintain proper and orderly material storage compounds and vehicle maintenance yards ○ Construct concrete pads with catch drains for spillage containment in the workshop for repair of vehicle and heavy equipments ○ Construct culverts and drainage channels at selected best discharge points	○ Contractor ○ TANROADS ○ Environmental Supervisor	Short-term (Construction phase)	3,000,000.00
Noise, Vibration and Air Pollution	○ Watering working road section (near human habitation and uninhabited sections to reduce occupational exposures and to improve traffic visibility) ○ Proper selection of construction machinery and vehicles ○ Regular services and lubrication ○ Use machinery with noise reducers ○ No working at night especially in areas with settlements ○ No quarry or borrow pit in neighbourhood of residences ○ Periodic water sprinkling on working sections.	○ Contractor ○ TANROADS ○ Environmental Supervisor ○ OSHA	Short-term (Construction phase)	30,000,000.00
Soil erosion	○ Avoid unnecessary ground clearance ○ Provide adequate drainage channels	○ Contractor ○ Design Engineer ○ TANROADS	Short-term	2,000,000.00

Impact	Mitigation measure	Responsible Institution	Time Frame	Estimated Costs (TZS)
	○ Tree planting ○ Environmental awareness			
Road Safety Risks	○ Detailed engineering design should include road signals and signs ○ Provision of adequate insurance cover to all workers ○ Provide diversions and deploy a person responsible for traffic safety to avoid interference of traffic flow ○ Special arrangement with local traffic police for security purpose ○ Adequate lighting	○ Design Engineer ○ TANROADS ○ Local Traffic Police ○ Ministry of labour ○ CRB	Long-term during (Construction & Operation phase)	5,000,000.00
Occupational Health and Safety	○ Establishing Occupational Health and Environment induction course ○ Provide working gear and camp management that is both hygienic and safe ○ Installing well-stocked First Aid Kit at every camp site and working site	○ Contractor ○ TANROADS ○ Environmental Supervisor ○ OSHA	short-term (Construction and operation phase)	7,000,000.00
Transmitted Diseases	○ Support HIV/AIDS campaigns ○ Provide working gear and camp management that is hygienic ○ Proper disposal of wastes	○ Contractor ○ TANROADS ○ Environmental Supervisor ○ Local Government ○ Ministry of Health	short-term (Construction and operation phase)	3,000,000.00
Landscape Modification	○ Stockpile topsoil ○ Design cut and fill to minimize material import and disposal of spoil material ○ Advance notice to the local government leaders for the arrangement of relocation and compensation if any	○ Contractor ○ Design Engineer ○ TANROADS ○ NEMC ○ Local community	Construction and operation phases (long term)	5,000,000.00
Interference to local water drainage	○ Provision of drainages to allow water flow in the natural streams ○ Efficient drainage system ○ Advance notice Dar es Salaam Water Supply and Sewerage Authority for piped water present in the carriage way ○ The Contractor shall seek Water Use Permit to draw	○ Contractor ○ Design Engineer ○ TANROADS ○ NEMC ○ MoW, ○ Local communities	Long -term (during Construction &Operation phase)	2,000,000.00

Impact	Mitigation measure	Responsible Institution	Time Frame	Estimated Costs (TZS)
	water from existing sources ○ The contractor should think of use of alternative water sources e.g., drilling boreholes			
In-migration	○ Implementation of DSM Master Plan ○ Enforce land use plan ○ Awareness creation	○ Contractor ○ TANROADS ○ Local Government (All Municipalities in DSM City), Ministry of Lands ○ NGOs	Long –term and During construction and Operation phase	2,000,000.00
Child labour	○ Recruitment and employment of casual labours before commencing of construction works ○ Employment will be given to people above 18 years and will be based on employment policy and regulations of Tanzania.	○ Contractor ○ TANROADS ○ Labour Authority	Short-term (Construction phase)	2,000,000.00
Solid waste generation	Proper disposal of debris and other wastes resulted from construction activities and dispose in the designated municipal dumping site	○ Contractor	Short-term (Construction phase)	4,000,000.00
Total Estimated costs for mitigation measures				**73,000,000.00**

RESOURCE EVALUATION

The economic analysis for the proposed Improvement of Ubungo Intersection has been prepared as part of this consultancy. The analysis was performed using the Highway Design and Management Model (HDM4 version 2.4). In the analysis it was indicated that if the mitigation measures proposed will be implemented, the economic benefits will overweigh the negative environmental effects.

DEMOBILIZATION PLAN

During the demobilization, all the scarred area will be restored by planting tree or grass. After the construction the campsites may be reverted to public services.

CONCLUSION

The implementation of the Improvement of Ubungo Intersection will entail no detrimental impacts provided that the recommended mitigation measures are adequately and timely put in place. The identified adverse impacts shall be managed through the proposed mitigation measures and implementation regime laid down in this ESIA. The total cost for implementing Environmental Social Management Plan including the monitoring plan is tuned to Tshs 84,2000,000.00 where as cost for compensation of affected properties is Tshs 10,560,997,472.00 and the cost for relocation of utilities is Tshs 24,185,961,263.00 excluding water supply utilities.

1.0 INTRODUCTION

1.1 Project Background

Dar es Salaam is the largest City in Tanzania. It is also the country's richest city and a regionally important economic centre. Dar es Salaam is actually an administrative region within Tanzania, and consists of three local government areas or administrative districts: Kinondoni to the North, Ilala in the centre of the region, and Temeke to the South. The Dar-es-Salaam Region is estimated to have a population of 4,364, 541 as per 2012 census. Located on a harbour on the Indian Ocean, it is the main port for Tanzania, handling exports of minerals and crops. In addition it is the hub of Tanzanian's national transport system as major highways and all railways originate in or near the city.

Due to the major development and population growth in the city, currently, the traffic congestion has become one of major issue for citizen in Dar es Salaam. Nowadays it is approximated that more than 120,000 private vehicles move on the city's roads daily, and the traffic jams are becoming even more acute as they can also be noticed during weekends. The Centre for Economic Prosperity (CEP) recent study indicates that a motor vehicle often spends up to two hours to cover a 16- kilometer trip, a distance which could have spent only 15 minutes, if there was no traffic congestion.

During the colourful ceremony for foundation stone laying for the Phase 1 Construction of Dar es Salaam Bus Rapid Transit (BRT) infrastructure held on 19th September 2012 at Jangwani area, his Excellency Dr. Jakaya Mrisho Kikwete, the President of the United Republic of Tanzania was briefed about the current design at the Ubungo junction that; the design provides for at grade traffic crossing which is controlled by traffic lights. In order to give priority to BRT buses, the right turn is not allowed at the junction, instead the right turning vehicles have to turn first to the left and then make a "U" turn to the junction. This arrangement was noted to inconvenience significantly the mixed traffic movement and will create traffic congestion at the junction.

Following the briefing; the President supported the idea of constructing Grade Interchange at the junction and directed that, the World Bank should be requested immediately for financial support. In order to avoid disruption of the BRT operation in future, it is important for the construction of the Grade Separated Intersection to be done concurrently with the ongoing construction of the road.

In fulfilment of the above mentioned President's directive to improve the current design of the Ubungo Intersection and to explore and assess alternative options, the government has undertaken economic evaluation study, preliminary design, detailed engineering design and preparation of tender document for a grade separated intersection at Ubungo.

On 20th January 2014, TANROADS engaged Hamza Associates of Egypt in association with Advanced Engineering Solutions LTD of Tanzania to carry out the Economic Evaluation,

Preliminary Design, Detailed Engineering Design and Preparation of Tender Documents of the Ubungo Intersection.

The improvement of Ubungo Intersection will play a critical role in enhancing the BRT services as well as the DMDP local roads component in Dar Salaam city.

In order to implement the proposed project in a sustainable manner, TANROADS has engaged an individual Consultant to undertake Environmental and Social Impact Assessment (ESIA) for the project. The Environmental Impact Assessment has been conducted in accordance with the requirements of the Environmental Management Act No. 20 of 2004 and Environmental Impact Assessment and Audit Regulations (2005) and applicable World Bank Safeguard policies. Other important legal provisions, which provide guidance on environmental issues pertaining to road sector should be consulted such as the Road Act (2007), Environmental Code of Practice for Road Works (2008), and Environmental Assessment and Management Guidelines in the Road Sector (2004).

This report presents the Environmental and Social Impact Assessment (ESIA) and related Environmental and Social Management Plan (ESMP) taking into account World Bank requirements and compliance with the Tanzanian's Environmental Management Act and regulations.

1.2 Objective of the ESIA Study

The main objective of the ESIA study is to address environmental and social impacts related with the implementation of the Improvement activities of Ubungo Intersection and provide mitigation plan to prevent or minimize adverse impacts arising from the implementation of the proposed road project. Ultimately, ESMP will be developed of which its recommendations will be used by the Design Consultant in the finalisation of design for improvement of the intersection.

1.3 Scope of Work

The scope of this ESIA study is specifically based on the ToRs provided by the Client. Among others, the ToRs require the Consultant to conduct the ESIA for the road development project by:

- Filling of EIA registration form and prepare the Project Brief;
- Consultation with Government agencies, local communities and the private sector operating in the mtaa/areas affected by the project road.
- Carrying out scoping exercise , prepare scoping report and refine TOR to reflect stakeholders' view;
- Review of policies, legislation and administrative framework for environmental management.
- Establishment of an environmental and social baseline information for the project area and description of the proposed road works.
- Assessment and quantification of the potential environmental and socio-economic impacts resulting from the road development, especially within the zone of influence

of the project.
- Identification of key stakeholders and review on the adequacy of participatory approaches suggested;
- Assessment of the target groups to be affected; and.
- Development of Environmental and Social Management Plan (ESMP) detailing actions and responsibilities for impacts mitigation and monitoring;

1.4 Methodology

1.4.1 Adherence to ESIA Procedures

The principal legislation guiding the ESIA undertakings in Tanzania is the Environmental Management Act (EMA), Act No.20 of 2004. For matters pertaining to ESIA, the EMA is operational through the Environmental Impact Assessment and Audit Regulations of 2005. Being the road project, the ESIA exercise has also followed the procedures in the Environmental Assessment and Management Guidelines for the Road Sector (EAMGRS) of 2004.

As per the EIA regulations, the Improvement of Ubungo intersection, the project falls in the list of the projects which require a mandatory full EIA study. This entails screening, carrying out a scoping exercises, adequate public consultations, identifying environmental impacts, developing environmental and social management plan (ESMP) and developing an environmental and social monitoring plan. The methodologies applicable for carrying out ESIA for the Improvement of Ubungo intersection have fulfilled the above mentioned procedures for undertaking ESIA as stipulated in the Environment Management Act and related regulations.

The Design and ESIA study is supported by the World Bank. In this regard, the ESIA study has also followed the World Bank Guidelines for environmental and social considerations.

1.4.2 Formation of Study Team

In order to get adequate inputs for the ESIA, a study team of experts comprising various expertises participated in preparation of the ESIA to address the environmental and social issues for the project was formed. The team consisted of specialists on natural and human environment (i.e Environmentalist and Sociologist). These experts provided valuable inputs for the environmental and social analysis. The findings of the experts were also complemented by inputs from engineers, surveyors and valuers.

1.4.3 Field studies

The field visit to project area was done from July to August 2014. The field visits were essential to fully visualise the project site, capture biophysical environment and the socio-economic conditions in the project area. In the field, among others, the information was collected from various sources including TANROADS' Dar es Salaam Region, Dar es Salaam City Council as well as Kinondoni Municipality. Others sources of information were wards, Mtaa, NGOs, Religious Institutions, government institutions like DAWASCO, DAWASA, TANESCO, TBS, TTCL, TPDC, TCRA, private institutions like SONGAS and Project Affected Persons (PAPs). The information and data collected during the field visits include the land use, ecosystems and human habitat, production activities and services, livestock, demography, hydrology and other information related to environmental and socio-economic

trends in the project area. Other information was appraised through key informants interviews and experts' observations.

1.4.4 Public Consultation

Public Consultation was considered as an important element for fostering sustainable development process. In this ESIA study, various stakeholders were consulted and provide information related to the implementation of the project road. Broad consultations involving local communities and officials from mtaas, wards and municipal were carried out. During these consultations, the public had an opportunity to air their concerns. The methodology used in public participation included interviews and discussion.

1.4.5 Direct Observation

Some facts were observed directly in the study area, which were useful for the study. Some of the observation has been derived from the existing social relations, profile of the area, available properties and assets as well as observable behavioral patterns. The information obtained from this technique assisted the study team to have the starting point during one-to-one interviews with key informers for the purpose of verifications.

1.4.6 Project Impact Assessment

This involves the superimposing project elements onto the existing social and environmental conditions. It assisted to identify the potential environmental and social impacts of the proposed road upgrading. The environmental impact matrix method has been adopted in identifying impacts of major concerns.

The environmental and social impacts have been evaluated for various alternatives. Several project alternatives were considered including that of not implementing the project (i.e. *do-nothing alternative*). In so doing, the fundamental environmental protection strategy and environmental considerations influencing engineering design were incorporated in the road design.

1.5 Boundaries of the EIA Study

The study boundaries entail a core impact area, which is within the road reserved areas and the area of influence is covering the whole of Dar es Salaam city. The core impacts area covers 100m from the centreline of the road and extends to 500m in all three roads joining at the intersection. However, the impacts are even felt further to the neighbouring regions of Dar es Salaam. The economic impacts of the project may further be felt beyond Dar es Salaam City and spill over to the neighbouring countries

1.6 Report Structure

This report is divided into twelve (12) chapters conforming to the requirements of the EIA and Audit regulations (2005). Chapter 1 represent the introduction part, Chapter 2 covers the project background and description, Chapter 3 is dwelling with policy, legal and administrative framework. Chapter 4 is the baseline environmental and social conditions while Chapter 5 contains the Stakeholders' consultations and public participation. Chapter 6 narrates the Project Alternatives. Chapter 7 describes identification and assessment of impacts while

Chapter 8 presents the impacts mitigation measure, Chapter 9 presents the environmental and social management plan (ESMP). Chapter 10 describes the monitoring plan. The resource evaluation of the project appears in Chapter 11. Chapter 12 contains the Demobilization Plan and finally the conclusion and recommendations are presented in Chapter 13. The appendices containing the list of references, copy of TOR, stakeholders consulted and other important information collected during the study are attached to this report.

2.0 PROJECT BACKGROUND AND DESCRIPTION

2.1 Introduction

Traffic congestion is one of the major problems facing Dar es Salaam City and is attributed by a number of factors including rapid population increase, inadequate and poor road infrastructure, city structure, rapid increase in number of private cars and lack of physical plan to control city development. The city is already implementing a number of strategies in order to minimize traffic congestion. However, many of the strategies are focusing on improving the capacity of roads in terms of increasing number of lanes, proposing new overpasses and underpasses at the main road intersections and improving public transport.

In order to reduce private cars in roads a number of actions have been taken. These include the improvement of public transport through the introduction of Bus rapid transit system. The necessary infrastructure for phase one of the rapid transport systems includes dedicated lanes and stations along the Morogoro and Kawawa roads which are now under construction. As explained in section 1.1 above, to avoid disruption of the Bus Rapid Transit in future, it is better to consider construction of Grade Separated Intersection. So to start with, The Government of the United Republic of Tanzania (GOT) through TANROADS intends to improve the Ubungo Intersection by constructing a Flyover Bridge using the financial support from the World Bank.

Ubungo Intersection is where three roads meet i.e (Morogoro Road, Sam Nujoma road and Mandela road). The morogoro road gives access and exit from Dar es Salaam to up-country Cities and neighbouring countries. It is clearly understood that the volume to capacity ratio at Ubungo Intersection is very high and as a result there is huge traffic Jam at the intersection. There is major significant time loss experienced at Ubungo due to this bottleneck. To solve this problem and considering all modes of transport using the intersection and considering an increasing demand in future, it is proposed that construction of a mixed traffic fly over, using split design taking into account existing BRT lanes and for future BRT lanes along Morogoro road and Sam Nujoma road respectively is likely to offer most benefit in terms of intersection traffic operations.

The proposed construction of Flyover Bridge at the Ubungo Intersection will reduce traffic congestion on Morogoro Road, Sam Nujoma Road and Nelson Mandela Road, and to improve passengers and goods transportation on the international corridors.

The proposed project will entail construction of the Flyover Bridge, interchanges and approach roads, sidewalks, drainages and installation of lighting poles and guardrails at Ubungo Intersection along the Morogoro Road.

2.2 Objective of the Proposed Project

Among others, the objectives of the proposed project include: reducing traffic congestion on Morogoro Road, Sam Nujoma Road and Nelson Mandela Road, and to improve passengers and goods transportation on the international corridors.

2.3 Location of the project

As indicated before, the proposed project is located in Kinondoni District (Kinondoni Municipality) in Dar es salaam region. The project is in Ubungo ward which comprises five sub-wards of Kibo, Ubungo-Kisiwani, Msewe, Ubungo-National Housing and the Mlimani Campus. The proposed project is about nine (9) Kilometres from the City centre. The project is found at the border of Mtaa of Ubungo - National Housing, Mlimani Campus and Ubungo Kisiwani. Ubungo ward is in the western part of the Kinondoni district and is known as one of the central hubs of transportation because of its massive bus terminal. Ubungo intersection involves three key trunk roads in Dar es Salaam; these are Morogoro road, Mandela road and Sam Nujoma roads. Since the intersection involves three roads which are among the key trunk roads serving the chronic traffic congestion in the city, the project will be important for transportation in Kinondoni Municipality and metropolitan area.

Administratively, Kinondoni District is broken into 4 divisions, 34 different wards, and 117 sub-wards. The District is bordered by Bagamoyo district to the north/east, Ilala District to the south, Kibaha district to north/west and east is bordered by the Indian Ocean.

Figure 2.1 below shows the point where these three roads meet and road network of Dar es Salaam City.

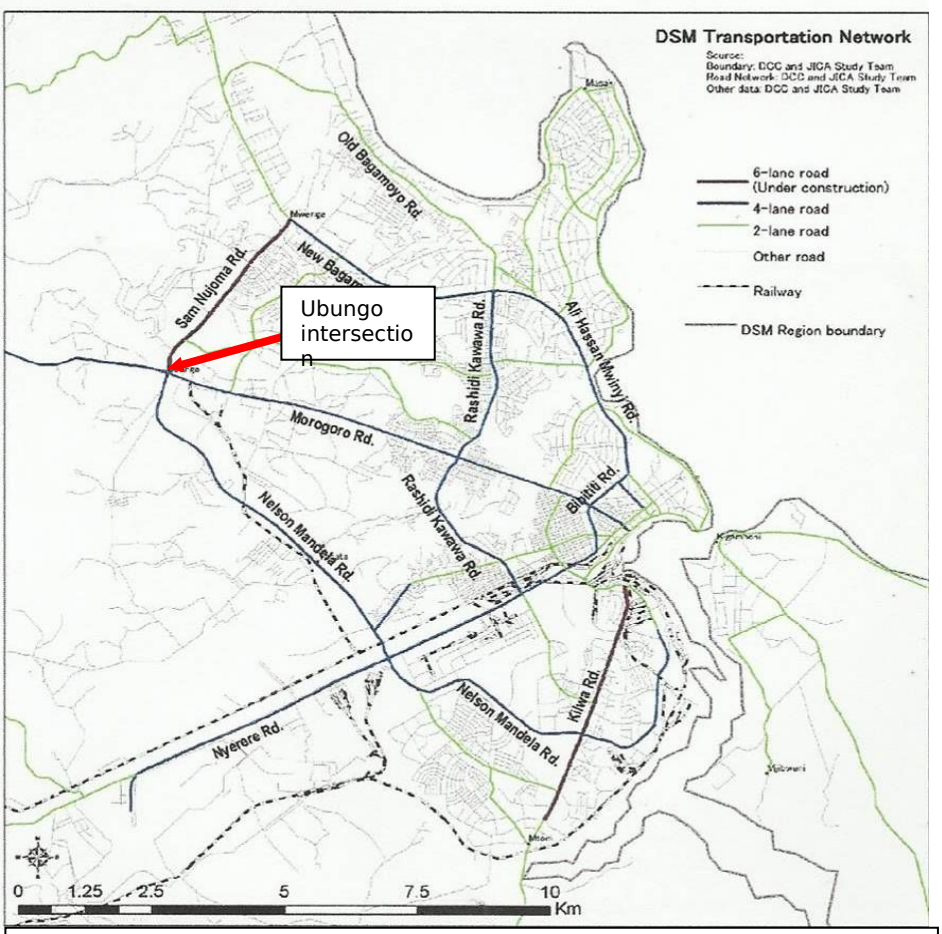

Figure 2-1: Location of the Project Area, Source-JICA (2008): Roads of DSM City

There are linkages between improvement of Ubungo Intersection and Bus Rapid Transit Project (BRT). The BRT from Kimara before entering to city centre crosses four major intersections; these are Ubungo Intersection (Sam Nujoma/Morogoro/Mandela roads), Magomeni Intersection (Kawawa/Morogoro roads),Jangwani Intersection(Morogoro/United Nation roads) and Akiba Intersection (Bibi Titi and Morogoro roads). Ubungo is one of the busiest and congested intersections, so improvement of this point will facilitate the movement of both private cars and commuters which will use BRT lanes. The improvement of the intersection will facilitate smooth flow of traffic as well as assurance of road safety to road users, such as pedestrians and drivers. The improvement of Ubungo Intersection will also influence the need for improvement of aforementioned intersections as well as other intersections in the City.

2.4 Project Justification

This project will be implemented at Ubungo Intersection, along which a relatively low-income group lives, crosses with Nelson Mandela road which formed one of the logistic distribution networks to connect inland areas to Dar es Salaam port for transporting not only domestic goods but also goods to the landlocked countries. Therefore Improvement of this intersection is expected to improve accessibility of wayside residents to the daily traffic while contributing to smooth international cargo transport.

2.5 Bridge and Road design

2.5.1 Basic policy of F/O Bridge design

The proposed project aims to improve infrastructure that is currently incapable of supporting sustainable economic development and to relieve traffic congestion arising in line with population growth and increased car ownership. Concerning the plan to improve Ubungo Intersection the bridge design should consider the following concepts:

- The flyover bridge and approach road shall meet Tanzanian design criteria;
- Width and load bearing capacity in conformance with Tanzanian design standards shall be secured;
- Traffic volume and characteristics (large vehicles, small vehicles and bus traffic) and related plans (BRT program) shall be examined and reflected in the plan
- The gradient should consider the large –sized vehicles
- Clearance for passing under the flyover bridge at the intersection is based on the Tanzanian standards
- Span length at the Intersection should consider the pedestrian crossing and stopping line,
- Lane width should consider the shoulder
- Abutment height should consider existing sceneries,
- Main material of flyover should be concrete
- Safety facilities shall be installed and consideration shall be given to traffic safety
- The road shall be planned so that it can be kept in good condition over the long term by conducting simple maintenance;
- The road shall be planned so that it can be kept in good condition over the long term by conducting simple maintenance;

2.5.2 Road Alignment and Road Design Policy

The proposed Ubungo Intersection improvement will follow the existing road alignment as far as practicable and the design standards are complied with. The Right of Way for adopted alternative is about 95m at the Ubungo intersection and the width of the road is about 49m excluding 8m of either side of the center line which has been evaluated for compensation for accommodating the utility such as telephone cables, electrical cable, water pipes and gas pipes.

2.5.3 Design Approach

Based on TANROADS requirements, the scope of work, engineering requirements and confirmation of the road function, the following general design approach has been adopted:

- Maximum use of existing right of way;
- The proposed horizontal alignment design should satisfy the geometric elements and maintain performance of the existing road. Introduction of larger size curves attains smoothness of alignment and brings comfort for the drivers

- Ancillary facilities such as bus stops, lined drains, pedestrian crossings and speed humps to be provided in the populated areas.
- The road cross section shall be designed within the available land and the cross sectional elements shall satisfy the geometrical requirements.
- Intersection design: since there is no intersection design manual or guidelines in Tanzania, the Act Grade intersection plan and design manual, Japan society of traffic engineers shall be applied.

2.5.4 Drainage Structures Design

The drainage structures along the road alignment are proposed at natural watercourses and where required to relieve side drains and catch water drains. It has also been ensured that no new drainage structure will be of a smaller water opening than the existing drainage structure on the same watercourse.

All new drainage structures (pipe culverts and box culverts) are proposed to be constructed from the reinforced concrete. The full width of the carriageway (road and shoulders) shall be accommodated on all structures to be provided.

All pipe and box culverts will be constructed with monolithic head – and wing-walls, aprons and cut-off walls. Additional erosion protection of gabions, riprap and stone pitching will be provided as required to prevent erosion of the road embankment and foundations for the drainage structures both up and downstream of the crossing.

The box culverts opening to be provided will be in accordance with the Standard Manual for Box Culverts prepared by MOW in June 1991. Major box culverts designed carries the full SATCC trunk road design bridge. In addition the culverts have been designed to carry the overburden depending on the fill thickness. These have been designed to cater for the predicted 50-year return period flood discharge.

The choice between replacing an existing drainage structure with a box culvert was based on the design runoff and the nature and geometry of the channels.

2.6 Project Phases

2.6.1 Mobilization or Pre-construction Phase

This phase entails mobilization of labour force, equipment and construction of offices/camps as well as acquisition of various permits as required by the law. Any outstanding compensation of the properties and resettlement of individuals will take place during this phase. During this phase, the utilities such as electricity, water supply, gas, telecommunication facilities and petrol station will be relocated.

The Contractor will identify an area for camp site construction which will include Engineer's camp in which the supervising Consultant will have his accommodation and offices and Contractor's camp which may include accommodation of his personnel, offices, workshop etc. These two camps are usually close to each other. The Contractor will build both camps and

choose location of the sites, although these locations must be approved by the resident Engineer (in consultation with the client).

Specifications Section 1300 indicates that location of camps must be agreed with the Engineer and construction must comply with regulations of relevant authorities and those of the Engineer. At the end of contract during Final Clearance (Clause 1229) the contractor shall remove (unless this was agreed otherwise with land providers etc) all temporary buildings to the satisfaction of the Engineer.

2.6.2 Construction Phase

The major construction activities include extraction and transportation of materials (gravel, sand, hard stones, aggregates, water and bitumen). Careful attention will be given to the social conditions, work items and movement of equipment on site for the preparation of an appropriate construction schedule. Construction materials will be produced or procurable within Tanzania as much as possible. The materials involved in road construction will include: Concrete, asphalt, cement, and sand.

A thorough materials investigation has done by the Design Consultant to identify and quantify the construction materials availability, which are documented in the Materials Report of the Consultant's submission. The Consultant identified two quarries in Coast region which are located at Lugoba and Msata along Dar es Salaam – Chalinze – Segera road about 125 km from Dar es Salaam City. These quarries are operational; the Lugoba Quarry is operated and owned by NOREMCO Construction Company while Msata Quarry is operated and owned by SPENCON Construction Company. These quarries are authorised to produce construction materials. The rocks from these quarries have been used in various projects in Dar es Salaam for concrete production, asphalt concrete production, surface dressing aggregates, crushed stone base with an excellent in-service records.

The investigation identified one borrow pit area for natural gravel located about 13.5 km from Wazo Hill junction in area called Boko, along Dar es Salaam – Bagamoyo road. The borrow area is located about 1.2 km off left hand side of the Dar es Salaam – Bagamoyo road. This borrow area is an existing one and is currently used by Konoike as source of construction such as sub-grade material [G7 and G15] and also as source sub-base material [G25 and G45]. The available area is huge and can be extended further. Currently the excavation of the material is done up to about 7 m deep.

The geotechnical investigation for identifying source of natural sand for concrete production was carried. Two famous sand sources namely Mpiji and Mbagala were identified. These two sources are the most common sources of natural sand in Dar- es - Salaam. Considering that the project is located near Mpiji, then Mbagala pit sand was not preferred. From the laboratory analysis the sand is complying with the requirement of BS 882. Considering that crushers are located several kilometers out of Dar es Salaam, the use of crushed sand is uneconomical for concrete production in particular also considering that the crushed sand normally requires more water for concrete production due to large surface area thereby increasing the cement demand.

The above mentioned sources of materials are operated commercially by privates. In this regard, the contractor will be buying these construction materials.

The cement, steel and reinforcement are available in Dar es Salaam region. Bitumen can be imported or bought from bulk suppliers such as GAPCO, Oryx, TEMCO Tank LTD etc.

The project is located within Dar es Salaam town, thus it is envisaged that water from Dar es Salaam Urban Water Supply will be used during construction. The same water can be also be used for concrete production.

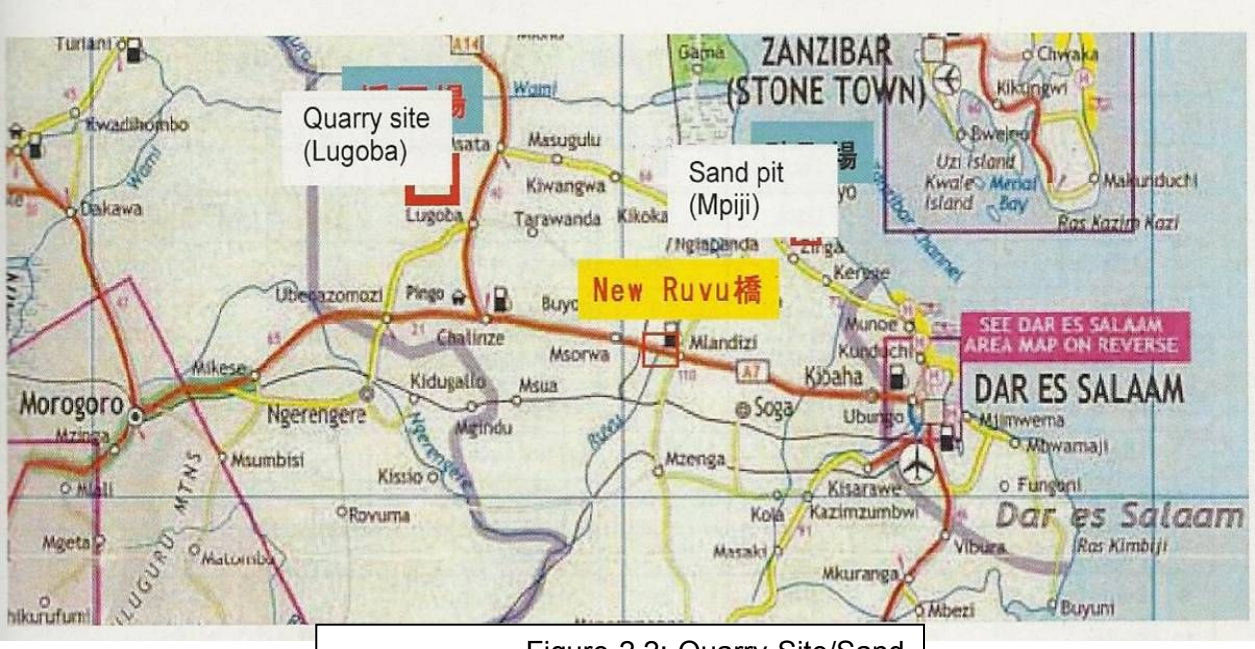

Figure 2.2: Quarry Site/Sand Pit

2.6.3 Operation Phase

The actual/smooth usage of the road is expected to commence after the construction works. The project road is under “trunk road” category and therefore the periodic inspection and minor repair/maintenance will be carried out under TANROADS. The design period is 15 -20 years and the normal cost for operation and maintenance per year after 5 years is estimated to be 0.02% of the investment cost. During this time, TANROADS will carry out routine maintenance by attending to pot holes, clearance of vegetation within the ROW and monitoring.

2.6.4 Demobilization Phase

Decommissioning of temporary structures will be done as and has to be contained in the contract i.e. proper restoration of the site (e.g. removing/spreading top-soils piled along the road, restoration of borrow pits to required grades and removing all temporary structures). The campsites may be left to the local governments depending on agreements that will be reached during the demobilization phase.

3.0 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

3.1 Policy Framework

3.1.1 National Environment Policy (1997)

The National Environment Policy (NEP, 1997) is the main policy document governing environmental management in country. The policy addresses environmental issues as both natural and social concerns, and adopts the key principle of sustainable development.

The policy requires EIA to be mandatory for all development projects which are likely to have significant environmental impacts. The intention is to ensure that the development projects are implemented in an economically sustainable manner while safeguarding environment and social issues for the benefit of the present and future generations.

Relevance to the project

The contractor will be required to address policy objectives by ensuring that environmental degradation is minimized during implementation.

3.1.2 National Transport Policy (2002)

The policy vision is to have efficient and cost effective domestic and international transport services, while at the same time maintaining maximum safety and minimum environmental degradation. It emphasizes on having bitumen roads for all trunk roads but at the same time ensure that all regional and district roads are sufficiently rehabilitated and maintained to ensure smooth traffic flow.

The policy recognizes the importance of involving the private sector and local communities in the planning and design of the road that pass within their areas. It wants the design of residential area to be done in tandem with provision of adequate transport infrastructure to ensure security, safety to pedestrians and non-motorized transport users by providing them with dedicated lanes, especially in urban areas.

The policy considers planting of flora including trees and flowers along the urban roads to provide attractive road scene and shade to pedestrians from direct sun. It requires people to influence land use planning and settlement patterns to achieve easy access to amenities. It discourages the use of road reserve which prevents smooth flow of traffic and future road expansion.

The policy recognizes the importance of providing sewerage and drainage systems when developing road infrastructure. The policy calls for timely and adequate road maintenance to avoid flooding and damage to infrastructure and road pavement.

Relevance to the project

The project involves the construction of bridge and approach roads, which are one of the important transport infrastructures. Thus, the contractor project management would be required to adhere to the relevant issues outlined in the policy. These include consideration of the private sector and local communities the planning and design; ensuring safety of pedestrians and non-motorized transport users by providing them with dedicated lanes; planting trees or retaining existing trees along the road and discourage people from encroaching into the road reserve.

3.1.3 National Policy on HIV/AIDS (2001)

The policy formulation is the result of the Government's effort with technical support from the World Health Organization Global Programme on AIDS (WHO-GPA) that led to the establishment of National HIV / AIDS Control Programme (NACP) under the Ministry of Health.

One of the government strategic initiatives is to establish Tanzania Commission for AIDS (TACAIDS) under the Prime Minister's Office. The Commission provides leadership and coordination of national multi-sectoral response to the HIV/AIDS epidemic. The management functions, institutional and organizational arrangement of TACAIDS are outlined in the policy document.

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

Relevance to the project

The project could involve construction of workers camp site, hence leading into possible interaction between the workers and the local community members. This may lead into increased transmission of HIV / AIDS to both the workforce and the local communities. In this case the contractor would be required to follow the policy directives to minimize the problem.

3.1.4 National Human Settlements Development Policy (2000)

The overall goal of the policy is to promote development of sustainable human settlement and to facilitate provision of adequate affordable shelter to all people, including the poor. The policy outlines a number of objectives including the environmental protection within human settlement and protect natural ecosystem against pollution, degradation and destruction with the aim of attaining sustainable development.

The major issues in the policy include:

- Poor management of solid and liquid waste, leading into environmental deterioration;

- Emission of noxious gases from vehicles and industrial activities as a major cause of air pollution in urban areas;
- Encroachment into fragile and hazardous lands (river valleys, steep slopes and marshlands leading into land degradation, pollution of water sources, etc.
- Increasing dependence on fuel wood and charcoal as a main source of energy in human settlements leading into depletion of forests, hence environmental deterioration and air pollution and
- Unauthorized sand mining in river valleys leading into environmental hazards.

Relevance to the project

The policy is relevant to the project since during construction of the bridge and proposed project solid wastes as well as liquid wastes are likely to be generated. The construction activities are also likely to create emission of dust and smoke.

Thus, the contractor will be required to ensure that local residents living in the surrounding environment is not polluted due to solid and liquid waste generation. The contractor will also ensure that local residents near the project site are not affected due to dust and smoke emission.

3.1.5 National Land Policy (1995)

National Land Policy recognizes the need for protecting environmentally sensitive areas. The policy emphasizes on the protection of environment and natural ecosystem from pollution, degradation, and physical destruction.

In addition, the policy recognizes the importance of social services such as water, roads, energy, and solid waste management for environmental protection. Finally, the policy identifies the need for conservation and preservation of prehistoric/historic sites and buildings.

Relevance to the project

The project is likely to affect public service utilities such as water supply utilities (water pipe lines and domestic water points), electricity power lines and transformers. The contractor will be required to make sure that public service utilities are restored immediately to avoid inconvenience to the public. The contractor will also be required to ensure proper disposal of solid waste. The contractor will also be obliged to protect any prehistoric / historic sites / buildings and salvage any identified archaeological artefacts during excavations.

3.1.6 Women and Gender Policy (2002)

The objective of this policy is to provide guidelines to ensure gender sensitive plans, programmes and strategies in all sectors and institutions. The policy gives emphasis on gender equality. The policy aims at establishing strategies on poverty eradication through ensuring that both women and men get access to existing resources for their development. It values the role played by women in bringing about development in the society.

The road sector is also highly committed to gender mainstreaming at all levels, through provision of equal opportunities to both men and women in road works and related activities.

Relevance to the project

The contractor will be required to ensure that gender issues are given emphasis during construction. The contractor will be required to ensure that women and men are given equal employment opportunities in the project, whenever possible.

3.1.7 National Water Policy (2002)

The policy objective is to develop a comprehensive framework for sustainable management of the national water resources. In this case the policy recognizes the need to protect water sources against pollution and environmental degradation.

Relevance to the Project

The construction activities could result into pollution of water sources if not carried out properly. In this case the contractor will be required to ensure that pollution of water sources is avoided or minimized during construction.

3.1.8 National Strategy for Growth and Reduction of Poverty (2002)

The National Strategy for Growth and Reduction of Poverty (NSGRP, 2005)[1] is a national strategy to achieve economic growth and reduce poverty. The strategy emphasis is on the growth momentum to fast tract the targets of vision 2025 for high and shared growth, high quality livelihood, piece, stability and unity, good governance, high quality education, and international competitiveness.

The NSGRP calls for involvement of all stakeholders from grass root to central government. The strategy pays attention at mainstreaming cross-cutting issues such as environment, HIV / AIDS, gender, employment, and settlement.

Relevance of the project

This is a Works project in this regards the contractor is required to address all cross-cutting issues mentioned in the policy.

3.1.9 National Energy Policy (1992)

The objective of the policy is to provide input into development process through the establishment of an efficient energy production, procurement, transportation, distribution and end use in an environmentally sound manner and with due regard to gender issues.

[1] *The NSGRP is popularly known by its Kiswahili abbreviation of MKUKUTA*

The policy recognizes the critical role of energy in all sub-sectors of the economy, including the road sector. It underscores the importance of having sufficient supply and efficient use of energy in order to realize sustainable development and satisfy basic needs of the society.

The policy recognizes the relationship between road condition and fossil fuel consumption by vehicles, which is one of the important sources of energy in the country. Therefore, the policy recognizes the need to have good roads to minimize fuel consumption.

Relevance to the project

The project aims at reducing traffic congestion, which is one of the major causes of fuel consumption by vehicles. Not only that traffic congestion also leads into increased emission of exhaust fumes, hence increased air pollution.

3.2 Legal Framework

3.2.1 The Constitution of Tanzania (1977)

The constitution of the United Republic of Tanzania (1977 – 1995, Revised 1997) recognizes the basic rights for its people as outlined in Part III section 14 and 24 (Act No. 15 of 19874). Section 14 states that every person has the right to life – that every person has the right to live and to the protection of his / her life by the society in accordance with the law.

Section 24 stipulates that every person is entitled to own property and has a right to the protection of his property held in accordance with the law.

However, there are certain limitations upon enforcement and preservation of basic rights, freedom and duties as stipulated in the Act No. 15 of 1984 Section 6 and Act No. 34 of 1994.

Relevance to the project

The national constitution must be observed by the project proponent, especially in matters concerning human rights as stipulated in the constitution. This should be the case because the project may lead into land acquisition and loss of private properties. Under such circumstances the project proponent would be required to execute compensation in accordance with the country laws.

3.2.2 Environmental Management Act (2004)

The Environmental Management Act No. 20 of 2004 is the principle legislation governing environmental management in the country. The Act recognizes the right of every citizen to clean, safe and heath environment, and the right of access to environmental resources for recreational, educational, health, spiritual, cultural and economic purposes."

Thus, the Act provides a legal framework for coordinating harmonious and conflicting activities by integrating those activities into overall sustainable environmental management system by providing key technical support to Sectoral Ministries.

For effective implementation of the national environmental policy objectives the Act has identified and outlined specific roles, responsibilities and functions of various key players and provides a comprehensive administrative and institutional arrangement.

Relevance to the project

The Act is relevant to the project because the project is expected to have some impacts (noise and air pollution) to the environment. Thus, monitoring of the mentioned parameters would require adherence to the developed environmental standards.

3.2.3 The Environmental Impact Assessment and Audit Regulations (2005)

The Environmental Impact Assessment and Audit Regulations (2005) are made under Environmental Management Act No. 20 of 2004. The regulations provides basis for undertaking Environmental Impact Assessment (EIA) and Environmental Audit for various development projects with significant environmental impacts in the country. This section gives a brief description of some provisions in the regulations that are relevant to this study.

Relevance to the project

The project management will be required to undertake environmental monitoring and environmental audit.

3.2.4 National Road Act (2007)

The Act is an amendment to Highway Ordinance No. 27 of 1967. The Act has the following relevant Sections outlined in Part V and VI of the Act:

Part VI Section 31 – deals with removal or obstruction or encroachment to the public right of way (ROW). It restricts people from constructing, farming or doing any activities within the road reserve. Under the Act the Road Authority can enter into a house, garden, enclosure or any other premises with instruments / machinery for removal or abatement and recover the cost thereby occasioned from the person so offending.

Section16 stipulates that where it becomes necessary for the road authority to acquire land owned by any person, the owner of such land shall been titled to compensation in accordance with the written laws.

Section 29 specifies that the road reserve is exclusive for the use of the road, development and expansion or any related activities. According to the Act, the road authority may permit any person or authority to temporarily place public utilities such as lighting, telegraph, adverts, telephone, electric supplies and posts, drains, sewers, and water mains only in such cases where such use do not hinder any future use of the road reserve by the road authority.

Section 30 requires the road authority to be responsible for the protection of environment

as well as waste disposal.

According to Section 33 the road authority shall ensure to the safety of road users during the design, construction, maintenance and operation of a public road by providing sidewalks, overhead bridges, zebra crossings and other matters related thereto.

Relevance to the project

The contractor will be required to demarcate the road reserve by putting beacons and warning signs to prevent people from encroaching into the road reserve. The project is likely to lead into land acquisition, hence payment of compensation to the affected people. The environmental safeguards shall be taken into consideration during construction and operation phase by the contractor and road authority, respectively.

The public water supply is within the road reserve, hence likely to be affected. In regards the relevant water authority will be required to remove and relocate the water supply pipeline before commencement of construction works.

3.2.5 The Land Act (1999) and the Land (Amendment) Act (2004)

The Land Act No. 4 of 1999 provides for the basic law in relation to land other than the village land, the management of land, settlement of disputes and related matters. The Land (Amendment) Act No, 2 of 2004 is an Act to amend the Land Act of 1999, which is the principal Act.

The Land Act of 1999 recognizes the land to have a value and therefore must be compensated, as opposed to the Land Acquisition Act of 1967, which recognizes only a superstructure. However, according to Section 4 of the Land Amendment Act of 2004 all lands acquired by non-citizens prior to the enactment of the Act, shall be deemed to have no value, except for un-exhausted improvements for which compensation may be paid under this Act or any other law."

Section 156 of the Land Act 1999 requires compensation to be paid to any person for the use of land of which he / she is in lawful or actual occupation as a communal right of way and with respect to a way leave. These include:

- Any damage suffered in respect of trees, crops, and buildings as result of creation of way leave;
- Damage due to surveying or determining the route of that way leave.

According to the Act, it is the responsibility of any government department / ministry, local government authority or corporate body that applied for right of way to pay compensation.

Relevance to this project

The project may involve land acquisition, hence requiring compensation to be effected according to existing legislation. The project management will be required to make

consultation with relevant authorities to devise appropriate way of paying compensation for affected crops, trees and buildings.

3.2.6 Land Use Planning Act (2007)

The Land Use Planning Act No. 6 of 2007 provides for procedures for preparation, administration and enforcement of land use plans, to repeal the Land Use Planning Commission and to provide for related matters.

The Act has distinctive authorities of land use planning in Tanzania, and establishes land use planning authorities. It outlines their functions and powers conferred upon. The authorities established under the Act include:

- Village Councils – which plan and manage village lands
- Municipal/Town/District Councils – which plan and manage all land in the Municipality/Town/ district and assist Village Councils to plan and manage their areas of jurisdiction.
- Land Use Planning Commission – which prepares national land use planning framework plan and assist the lower echelon to prepare plans and manage their lands.

Relevance to the project

The contractor will be required to follow procedures outlined in the Act, including consultation with land use planning authorities. The project proponent must be aware and well informed of the current land use plans in the project area to avoid any possible conflicts or incompatibility with current and future land use plans.

3.2.7 The Water Resource Management Act (2009)

The Water Resource Management Act No. 11 of 2009 was enacted to provide for institutional and legal framework for sustainable management and development of water resources; to outline principles for water resource management; to provide for the prevention and control of water pollution; to provide for participation of stakeholders and general public in implementation of the National Water Policy, repeal of the Water Utilization (Control and Regulation) Act Cap. 331 of 2002 and to provide for related matters.

The objective of this Act is to ensure that water resources are protected, used, developed, conserved, managed and controlled in ways which take into account fundamental principles. Section 5 outlines the principles of sustainable water resource management. These include:

- the precautionary principle;
- polluter pays principle;
- the principle of eco-system integrity;
- The principle of public participation in the development policies, plans and process for the management of the water resources;
- The principles of international co-operation in management of environmental resources shared by two or more states; and
- The principle of common but differentiated responsibilities.

Section 9 requires Environmental Impact Assessment to be carried out for any proposed development in a water resource area or watershed to which this Act applies, whether that development is proposed by or is to be implemented by a person or organization in the public or private sector in accordance with the provisions of the Environmental Management Act Cap 191 of 2004.

Section 63 deals with discharge permits, whereby it requires any person who wishes to discharge effluents from commercial, industrial or agricultural sources or from any sewerage works or trade waste systems or from any other source into surface water or underground strata to apply to the Basin Water Board.

Relevance to the project

The project implementation involves the use of water for construction works. In this regard this act is relevant

3.2.8 The Forest Act (2002)

The Forest Act No. 14 of 2002 is an Act to provide for the management of forests, to repeal certain laws relating to forests and for related matters.

Section 17 - (I) provides for removal of trees in specified circumstances. The Act states "*it shall be lawful for an authorised officer, either of his own motion or at the request of an occupier of land and on being satisfied of the facts, to enter on land and cause to be cut down and destroyed or removed any tree, whether a reserved tree or not and whether within a reserve or not which is deceased or which is a result of natural causes or human activity on or near the tree or on land nearby the tree is in condition which is a danger to persons living, working or passing near to the tree or to the property adjacent to it".*

Subsection 17(2) requires the occupier of land to pay fees for any tree removed by an authorized person. The Act states *"Where an authorised officer takes action under subsection (1) in respect of a tree on land which is occupied as a place of residence or for commercial or industrial purposes, whether the occupation is by a person or organisation in the public or private sector, it shall be lawful for the employer of that authorised officer to charge a reasonable fee to the occupier of that land for the performance of that action".*

Subsection 17(3) provides for penalty to any person who has caused damage to a tree, hence resulting into its removal. The Subsection states *"Nothing in this section shall absolve any person who by his actions has contributed to or caused the condition of the tree which necessitates action under subsection (1) from any civil or criminal liability arising out of those actions".*

Sub-section 18(1) of the Act requires Environmental Impact Assessment to be undertaken for any development within a forest reserve, private forest or sensitive forest area, including watersheds.

The Act requires EIA to be carried out for any development to be undertaken in a forest reserve, private forest or sensitive forest area including watersheds

Sub-section 18(3) requires Environmental Impact Assessment to be carried out in accordance with the Tanzania guidelines or international guidelines in case there are no national guidelines.

Relevance to the project

The Act governs the activities undertaken in the Forest Reserve. The activities like borrow pitting in the forest should follow the principle stipulated in the Act.

3.2.9 The Mining Act (2010)

An Act to re-enact with substantial amendments the provisions that regulate the law relating prospecting for minerals, mining, processing and dealing in minerals, to granting, renewal and termination of mineral rights, payment of royalties, fees and other charges and any other relevant matters. The Act applies and extends to and in respect of the sea bed and subsoil of the continental shelf as well as the land beneath the territorial sea of the United Republic of Tanzania. The Act does not apply for the search for or production of petroleum.

The "land to which this Act applies" means: (a) land in Tanzania; (including land beneath the territorial sea and other territorial waters); and (b) the seabed and subsoil of the continental shelf;

According to the Act the term “Mineral” means any substance whether in solid, liquid or gaseous form occurring naturally in or on the earth, or in under the seabed formed by or subject to a geological process but does not include petroleum or surface water.

Part II Section 5 specifies that the entire property and control over minerals on, in or under the land to which this Act applies is vested in the United Republic.

According to Section 6(1) no person shall, on or in any land to which this Act applies, prospect for minerals or carry on mining operations except under the authority of a mineral right granted or deemed to have been granted, under the Act.

Subsection 6(2) states that the activities carried on by the Agency in the course of geological mapping shall not be treated for the purpose of Subsection (1) as prospecting for minerals or mining operations.

According to Subsection 6(3) any person who contravenes Subsection 6(1), commits an offence and on conviction is liable:

(a) in the case of an individual, to a fine of not exceeding five million shillings or to imprisonment for a period not exceeding three years, or to both;
(b) In the case of a body corporate, to a fine of not less than fifty million shillings.

Subsection 6(4) states that any minerals obtained in the course of unauthorised prospecting or mining operations shall be forfeited.

Relevance to the project

The project may involve search for and extraction of gravel from borrow pits and stone aggregates from quarry sites. Thus, the contractor will be required to obtain Mineral Grant as prescribed in the Act.

3.2.10 The Road Traffic (Amendment) Act (1990)

The Road Traffic (Amendment) Act No. 4 of 1990 amended Section 28 of The Road Traffic Act of 1973, which is the principal Act. The Act deals, among others, with damage or destruction of traffic signs, electric poles or any other structures erected along the road. It requires individuals to pay sum equal to the cost of repairing any damage or destruction so caused.

Relevance to the project:

The Act will require the Contractor to ensure that all road signs are properly placed and protected during construction. Contractor should take appropriate measures against individuals who vandalize the road / traffic signs.

The local authorities in collaboration with TANROADS Regional Manager should ensure that the bridge structure and road signs are protected during operational phase. This should include among others, creation of awareness among the local people on the importance of protecting the bridge structures and road signs. The local people must be made aware on the linkage between destruction of road signs and traffic accidents.

3.2.11 Explosives Act (1963) and Explosives Regulation (1964)

The Explosive Act of 1963 and the Explosives Regulations of 1964 provide for the control of the manufacture, importation, exportation, purchase, sale, possession and use of explosives.

According to the provisions of the Act and its Regulations no person is allowed to acquire, possess and disposal of explosives without permission from the Commissioner of Mines. The regulation requires such a person to obtain a license from the Commissioner for Mines and such person must hold a Blasting Certificate in order to carry out blasting operations.

Relevance to the project

The project may involve the use explosives for rock blasting during construction. In such circumstance the Contractor shall be required to adhere to the conditions of dealing with explosives as stipulated in the legislations.

3.2.12 The Occupational Health and Safety Act (2003)

The Occupational Health and Safety Act No. 5 of 2003, deals with regulation of health, safety and welfare of workers in factories / workplaces. Some of the provisions that could be relevant to the road sector are outlined in this section.

Relevance to the project

The Act will require the Contractor to:

- Appoint safety and health representative and committee;
- Register their workplace (campsite, borrow pit and quarry sites) before operation.
- Provide safety precautions;
- Ensure health and welfare of workers
- Ensure proper handling of hazardous materials / chemicals and process.

3.2.13 Employment and Labour Relations Act of 2004

The Act provides for core labour rights to establish basic employment standards to provide a framework for collective bargaining; to provide for the prevention and settlement of disputes and to provide for related matters.

The Act applies to all employees in public service of the Government of Tanzania Mainland except to members in the Tanzania People's Defence Force (TPDF); Police Force; Prisons Service and National Service. One of the objectives of the Convention is to give effect to the core Convention of the International Labour Organization (ILO) as well as other ratified Convention.

The Act restricts child employment under 14 years of age and under 18 years of age in a mine, factory or on ship or in any hazardous work conditions. However, it permits a child less than 18 years of age if that work is part of the training. The Act prohibits discrimination in the place of work directly or indirectly. It provides for the freedom of association by allowing an employee to form and to join a trade union. It also provides for an employer to form and join and employer's association.

Relevance to the project

The contractor will be required to adhere to the provisions outlined in the Act. The contractor must comply with the provisions of the by avoiding employment of children less than 14 years or under 18 years of age. The contractor must avoid discrimination in place of work directly or indirectly. The contractor is also required to pay minimum wages and salaries as prescribed by the Government of Tanzania.

3.2.14 HIV and AIDS (Prevention and Control) Act (2008)

This is an Act to provide for prevention, treatment, care, support and control of HIV and AIDS, for promotion of public health in relation to HIV and AIDS; to provide for appropriate

treatment, care and support using available resources to people living with or at risk of HIV and AIDS and to provide for related matters.

Section 4(1) requires every person, institution and organization living, registered or operating in Tanzania, to:

- Promote public awareness on causes, modes of transmission, consequences, prevention and control of HIV and AIDS.
- reduce the spread of HIV / AIDS and STIs prevalence and adverse effects of HIV / AIDS in the populations

The Act also gives the duty to employers and private sectors to

- integrate or prioritize HIV and AIDS in their proceedings and public appearances
- advocate against stigma and discrimination of people living with HIV and AIDS

Relevance to the project

The construction workers are likely to interact with the local communities, hence increasing the prevalence of HIV / AIDS and STIs. Thus, the contractor will be required to develop and implement HIV / AIDS prevention and control programme during construction. The contractor will also be required to make sure that HIV / AIDS victims are taken care and avoid discrimination of people living with HIV / AIDS.

3.2.15 Local Government (District Authorities) Act (1982) and the Local Government Laws (Miscellaneous Amendments) Act (1999)

The Local Government (District Authorities) Act (1982) enables local authorities to enact by-laws regarding soil protection, agriculture, natural resource exploitation, etc. The Local Government Laws (Miscellaneous Amendment) Act (1999) is an Act to amend certain written laws pertaining to the local government and related matters.

Local Government (District) Authorities Act of 1982 as amended by Act No. 6 of 1999 establishes the Ward Development Committee (WDC). The WDC is comprised of a councillor representing the ward in the District Development Council and chairpersons of all village councils within the ward. The WDC also includes member(s) of the district council, who ordinarily reside in the ward; and invitees from, for instance NGOs and other civic groups involved in the promotion of development in the ward. The WDC is responsible for developing general development plans for the ward .The WDC is responsible for management of disasters and environmental related activities within its ward.

Relevance to the project

The contractor will be required to ensure that natural resources in the project area are not depleted and prevent land degradation. The proponent is required to involve the WDC in the environmental compliance monitoring during construction.

3.2.16 The Land (Compensation Claims) Regulations (2001)

The Land (Compensation Claims) Regulation of 2001 is made under the Land Act No.4 of

1999. According to regulations, the following are eligible for compensation / resettlement:

- Holder of right of occupancy (Section 22 of the Land Act of 1999);
- Urban or peri-urban land acquired by the President under Section 60 of the Land Act, 1999.

Subsection 9(2) applies to all applications or claims for compensation against government or Local Government authority, public body or institution.

According to Section 10(1) compensation shall take the form of:

- Monetary compensation;
- Plot of land of comparable quality, extent and productive potential to the land lost;
- A building or buildings of comparable quality, extent and use comparable to the building or buildings lost;
- Plants and seedlings;
- Regular supplies of grain and other basic food stuffs for a specified time.

Relevance to the project

The project is likely to affect a number of buildings, crops and farmlands due to land acquisition. Thus, the contractor will be required to follow the compensation procedures outlined in the Act.

3.2.17 The Land (Assessment of Value for Compensation) Regulation (2001)

The regulation applies to any application or claims for compensation by any person occupying land and shall include:

- The value of un-exhausted improvements on the occupied land;
- Grazing land

The regulation states: "basis for assessment of the value of any land and un-exhausted improvement shall be the market value of such land". The market value is arrived at by the use of comparative method proved by actual recent, sales of similar properties or by use of income approach or replacement cost method, in case the property is of special nature and not saleable.

According to the regulation an assessment of the value of land and un-exhausted improvements is done by a qualified property valuation officer and verified by the Chief Valuer of the Government or his/her representative. The compensation issues include:

- Value of un-exhausted improvement;
- Disturbance allowance; transport allowance; accommodation allowance and
- Loss of profits.

If the person does not agree with the amount or method of payment or dissatisfied with time taken to pay compensation he/she may apply to the High Court. The high court shall determine the amount and method of payment and make any additional costs and

inconveniences incurred.

Relevance to the project

The project proponent will be required to pay compensation promptly for acquired land or damaged properties. The value of acquired land and properties shall be done by a qualified valuation officer from the local government authority or any other officer approved by the Chief Government Valuer.

3.3 Administrative Framework

3.3.1 Overall Management Responsibility

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

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

The legal institutions for environmental management in the country include;

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

3.3.2 Minister Responsible for Environment

The Minister is responsible for matters relating to environment, including giving policy guidelines necessary for the promotion, protection and sustainable management of the environment in Tanzania. The Minister approves an EIA and may also delegate the power of approval for an EIA to the DOE, Local Government Authorities or Sector Ministries. The Minister also:

- Prescribes (in the regulations) the qualifications of persons who may conduct an EIA;
- Reviews NEMC reports on the approval of an EIA;

- Issues an EIA certificate for projects subject to an EIA;
- Suspends an EIA certificate in case of non-compliance

3.3.3 National Environmental Advisory Committee

The National Advisory Environmental Committee is comprised of members with experience in various fields of environmental management in the public and private sector and in civil society. The committee advises the Minister on any matter related to environmental management. Other functions include:

- Examine any matter that may be referred to it by the Minister or any sector Ministry relating to the protection and management of the environment;
- Review and advise the Minister on any environmental plans, environmental impact assessment of major projects and activities for which an environmental impact review is necessary;
- Review the achievement by the NEMC of objectives, goals and targets set by the Council and advise the Minister accordingly;
- Review and advise the Minister on any environmental standards, guidelines and regulations;
- Receive and deliberate on the reports from Sector Ministries regarding the protection and management of the environment;
- Perform other environmental advisory services to the Minister as may be necessary.

3.3.4 Division of Environment

The Director of Environment heads the Office of the Director of Environment and is appointed by the President of the United Republic of Tanzania. The functions of the Director of Environment include:

- Coordination of various environmental management activities undertaken by other agencies;
- Promotion of the integration of environmental considerations into development policies, plans, programmes, strategies, projects;
- Undertaking strategic environmental risk assessments with a view to ensuring the proper management and rational utilization of environmental resources on a sustainable basis for the improvement of quality of human life in Tanzania;
- Advise the Government on legislative and other measures for the management of the environment or the implementation of the relevant international environmental agreements in the field of environment;
- Monitoring and assessing activities undertaken by relevant Sector Ministries and agencies;
- Preparation and issuing of reports on the state of the environment in Tanzania through relevant agencies;

- Coordination of issues relating to articulation and implementation of environmental management aspects of other sector policies and the National Environment Policy

3.3.5 National Environment Management Council (NEMC)

The NEMC's purpose and objective is to undertake enforcement, compliance, review and monitoring of EIA's and to facilitate public participation in environmental decision-making.

According to the Environmental Management Act (2004) the NEMC has the following responsibility pertaining to ESIA in Tanzania:

- Registers experts and firms authorized to conduct EIA;
- Registers projects subject to EIA;
- Determines the scope of the EIA;
- Set-ups cross-sectoral TAC to advise on EIA reviews;
- Requests additional information to complete the EIA review;
- Assesses and comments on EIA, in collaboration with other stakeholders,
- Convenes public hearings to obtain comments on the proposed project;
- Recommends to the Minister to approve, reject, or approve with conditions specific EIS;
- Monitors the effects of activities on the environment;
- Controls the implementation of the Environmental Management Plan (EMP);
- Makes recommendations on whether to revoke EIA Certificates in case of non-compliance;
- Promotes public environmental awareness;
- Conducts Environmental Audits

3.3.6 Sector Ministries

The existing institutional and legal framework the Sector Ministries are required to establish Sector Environmental Sections headed by the Sector Environmental Coordinator.

The Sector Ministries' Environmental Sections;

- Ensure environmental compliance by the Sector Ministry;
- Ensure all environmental matters falling under the sector ministry are implemented and report of their implementation is submitted to the DOE;
- Liaise with the DOE and the NEMC on matters involving the environment and all matters with respect to which cooperation or shared responsibility is desirable or required;
- Ensure that environmental concerns are integrated into the ministry or departmental development planning and project implementation in a way which protects the environment;

- Evaluate existing and proposed policies and legislation and recommend measures to ensure that those policies and legislation take adequate account of effect on the environment;
- Prepare and coordinate the implementation of environmental action plans at national and local levels;
- Promote public awareness of environmental issues through educational programmes and dissemination of information;
- Refer to the NEMC any matter related to the environment;
- Undertake analysis of the environmental impact of sectoral legislation, regulation, policies, plans, strategies and programmes through strategic environmental assessment (SEA);
- Ensure that sectoral standards are environmentally sound;
- Oversee the preparation of and implementation of all ESIA's required for investments in the sector;
- Ensure compliance with the various regulations, guidelines and procedures issued by the Minister responsible for the environment and;
- Work closely with the ministry responsible for local government to provide environmental advice and technical support to district level staff working in the sector.

For the road sub-sector, the Ministry of Infrastructure Development has established the Division of Safety and Environment in which among others its role is to monitor the implementation of policies related to environmental management in road sector.

3.3.7 Regional Secretariat

The Regional Secretariat, which is headed by the Regional Environmental Management Expert, is responsible for the co-ordination of all environmental management programmes in their respective regions. The Regional Environmental Expert:

- Advises local authorities on matters relating to the implementation of and enforcement of environmental laws and regulations;
- Creates a link between the region and the DOE and the Director General of the NEMC.

3.3.8 Local Government Authorities

Under the Local Government Act of 1982 (Urban and District Authorities), Local Government Authorities include the City Councils, Municipal Councils, District Councils, Town Councils, Township, Kitongoji, Ward, Dar es Salaam Municipal Council and Village.

Under the Environmental Management Act (2004), the City, Municipal, District and Town Councils are headed by Environmental Inspectors who are responsible for environmental matters. The functions of the inspectors are to:

- Ensure enforcement of the Environmental Management Act in their respective areas;
- Advice the Environmental Management Committee on all environmental matters;
- Promote awareness in their areas on the protection of the environment and conservation of natural resources;
- Collect and manage information on the environment and the utilization of natural resources;

- Prepare periodic reports on the state of the local environment;
- Monitor the preparation, review and approval of EIA's for local investors;
- Review by-laws on environmental management and on sector specific activities related to the environment;
- Report to the DOE and the Director General of the NEMC on the implementation of the Environmental Management Act and;
- Perform other functions as may be assigned by the local government authority from time to time.

Section 118 of the Act deals with protection and management of the environment, The District Councils are required to take necessary measures to control soil erosion and desertification; to regulate the use of poisonous and noxious plants, drugs or poisons, regulate and control the number of livestock; maintain forests, manage wildlife, ensure public health, and provide effective solid and liquid waste management.

The Local Government Act of 1982 empowers the local governments to enact bylaws to protect public health and regulate land pollution problems.

The relevancy of this piece of legislation is that the project proponent has the obligation of observing the bylaws enacted to help in the administration of the local government. Project Developer and the Contractor will have to collaborate with local authorities in the project implementation. The Kinondoni Municipality through its respective department will collaborate with the Project Developer and the Contractor in terms of waste management, land acquisition processes etc.

3.3.9 Government Executive Agencies - Tanzania National Roads Agency (TANROADS)

TANROADS is responsible for procurement and management of contracts 'for design, maintenance, emergency repairs, spot improvements, rehabilitation, upgrading and construction of roads and bridges' under its control.

For environment and social issues matters, TANROADS collaborates with the Ministry of Works at each phase of the project cycle in order to reduce negative environmental impact of road projects. With regard to the new road sector guidelines, TANROADS is mandated to:

- Fill the application form for project screening and registration;
- Review ESIA Reports;
- Select the best project alternative in regard of environmental, technical and economic criteria;
- Integrate mitigation measures within technical specifications, drawings, contract documents;
- Follow-up construction activities according to the mitigation plan and EMP;
- Monitor road project activities according to ESMP; and
- Develop and implement environmental management system (EMS).

3.4 World Bank Safeguard Policies

Two main world Bank Safeguard policies triggered by this project, these are Operational Policy (OP.4.01) for Environmental Assessment and Operational Policy (OP.12) for Involuntary Resettlement (OP.12). The policy for environmental assessment help to ensure that proposed projects for world bank financing are environmentally sound and sustainable, and thus to improve decision making. The policy on Environmental Assessment provides the framework for the screening of projects; adverse environmental impacts should be identified early in the project cycle, mitigation measure for the identified adverse impacts should be proposed and timely information should be provided to stakeholders, who should have the opportunity to comment on both the nature and significance of impacts and the proposed mitigation measures.

For Involuntary Resettlement Policy, it is clearly known that, the involuntary resettlement may cause severe long-term hardship, impoverishment, and environmental damage unless appropriate measures are carefully planned and carried out. For these reasons, the overall objectives of the Bank's policy on involuntary resettlement (OP.12) are the following:

(a) Involuntary resettlement should be avoided where feasible, or minimized, exploring all viable alternative project designs.

(b) Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable the persons displaced by the project to share in project benefits. Displaced persons should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs.

(c) Displaced persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

4.0 BASELINE ENVIRONMENTAL AND SOCIAL CONDITION

4.1 Physical Environment

4.1.1 Location

As indicated before, the proposed project is located in Dar es salaam City in Kinondoni Municipality nine (9) Kilometres from the City centre. The location of the project is as indicated in Figure 4-1 and 4-2 below:

Figure 4-1: Map of Tanzania Indicating Project Region

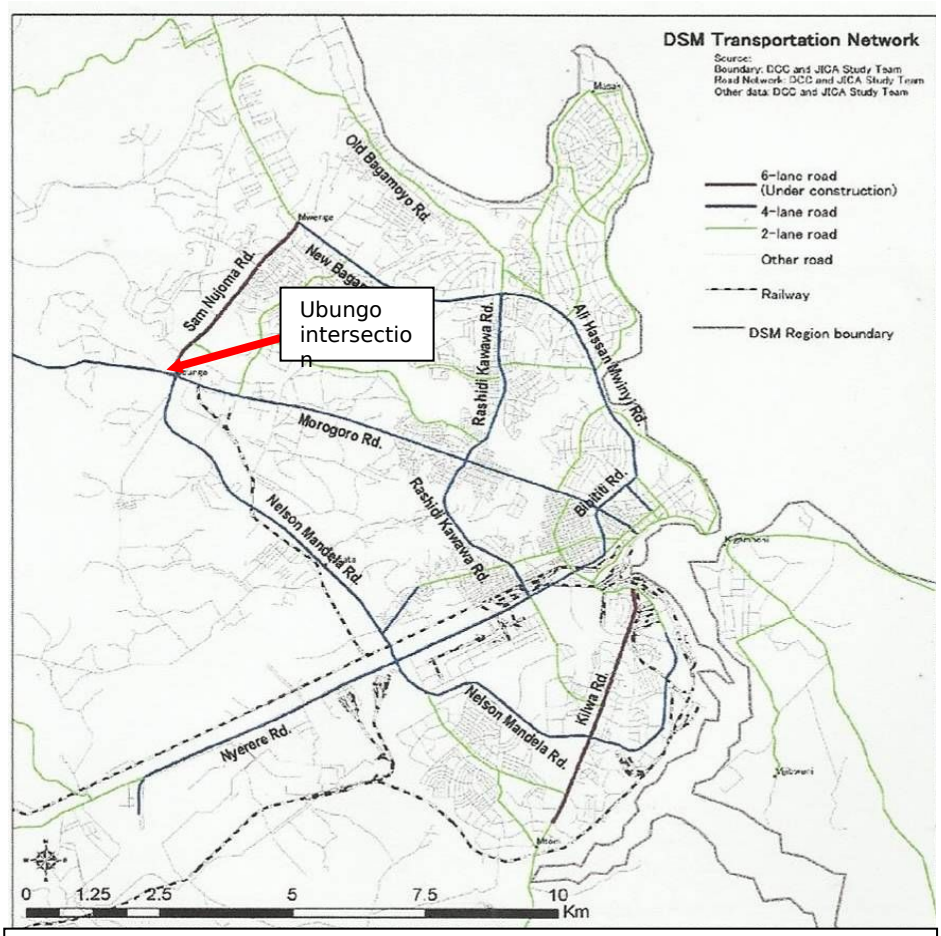

Figure 4-2: Location of the Project Area, Source-JICA (2008): Roads of DSM City

4.1.2 Administrative Boundaries

Administratively, Dar es Salaam has a regional administration headed by the Dar es Salaam Regional Commissioner. It also has a City Council administration headed by the Mayor of Dar es Salaam City. The City also has three Municipal Councils namely, Ilala, Kinondoni and Temeke. The three Municipalities are as well the three districts of Dar es Salaam Region. The distribution of Divisions, wards, mtaa, villages and hamlets is as indicated in Table 4-1 below:

Table 4-1: Number of Divisions, Wards, Mtaa, Villages and Hamlets in the Three Municipalities of Dar es Salaam

Municipality	Division	Wards	Mtaa	Villages	Hamlets
Ilala	3	22	65	9	37
Temeke	3	24	97	15	62
Kinondoni	5	27	114	14	14
TOTAL	**11**	**73**	**276**	**38**	**113**

Source: Dar es Salaam City Council Profile 2004

4.2 Bio-physical Environment

4.2.1 Climate

The project area has the same climate as Dar es Salaam city; which is a modified type of equatorial climate. It is generally hot and humid throughout the year with an average temperature of 29ºC. The hottest season is from October to March during which temperatures can raise up to 35ºC. It is relatively cool between May and August, with temperature around 25ºC. There are two main rain seasons; a short rain season from October to December and a long rain season between March and May. The average rainfall is 1000mm (lowest 800mm and highest 1300mm). Humidity is around 96% in the mornings and 67% in the afternoons. The climate is also influenced by the southwesterly monsoon winds from April to October and northwesterly monsoon winds between November and March.

The City is divided into three ecological zones, namely the upland zone comprising the hilly areas to the west and north of the City, the middle plateau these areas are observed between 5 to 20m above sea level with some minor local hollows extend several kilometers wide along the coast; geologically, its origin was a coastal plain associated with the local terrace which was formed due to past drop in sea level, last is low lands observed at elevations of lower than 5m above sea level, this lowlands spread at the bay area, river mouth and the hinterland along the coast. In these lowlands, marsh areas and swampy areas are widely spread where soft soil is deep and drainage conditions are rather poor. These areas include Msimbazi valley, Jangwani, Mtoni, Africana and Ununio areas. The main natural vegetation includes coastal shrubs, Miombo woodland, coastal swamps and mangrove trees.

4.2.2 Soil

The project area is covered by Neogene semi-consolidated Clay – bound sands possibly unconformable upon the Pugu sandstones. Both geomorphology and geological map show that there is a normal block faulting which is trending North - South cross through Ubungo starting from Kawe (Mbezi) passing along University of Dar es salaam, Ubungo, Kinyerezi to Ukonga Prison.

The project area has two different soil types; the top soil layer of about 30cm thick consists of manmade soil (filled materials), well compacted and levelled. The second layer is generally dump, dark grey, firm sandy clay

4.2.3 Natural Environment/Vegetation

The project area is located in urban setting environment where by large area is occupied by buildings and business vendors. Ubungo Intersection as part of the earth's surface is mainly composed of various vegetation types ranging from grass to tree level. These trees are either exotic or indigenous species. Among the tree species commonly observed at Ubungo Intersection includes mangoes, cashew nuts, coconuts and ashok trees. Grass patches are also found in the ROW. The improvement of the intersection will demand land acquisition for

this project which will involve the loss of vegetation. Some of the vegetation to be cleared are as indicated in Figure 4-3 below.

Figure 4.3: Trees to be affected located in TANESCO Area

4.2.4 Hydrology/Water Resources

At the project area, ground water table was encounter at approximately a depth of 3.0m; this is according to the site investigation done by TANESCO in 2010 using Light Static-Dynamic soundings (LSD). The ground water table needs to be monitored for a period of time to establish its seasonal fluctuation. No storm water was noticed in the area because the area is well drained. Faulting in the area seems to be recent activity but the coastal belt is characterized as low magnitude, infrequent earthquake zone.

In the project area the prominent surface water resources are two rivers which are Kibangu and Ng'ombe rivers. Both rivers are seasonal, Kibangu river cross Mandela road about 150m from the intersection, while Ng'ombe river cross sam Nujoma road about 100m from the intersection. The project area is not prone to flooding. However, environmental problems of the rivers are pollution from solid wastes and other domestic wastes.

4.3 Socio – Economic and Cultural Environment

4.3.1 Population and Demography

According to the 2012 population Census, the Municipality has a total area of 531 square kilometers with a population of 1,775,049 being the most populous local authority in the country, with the population growth rate of 5.0% per annum and 4 people per household. Due to rapid population growth, the Kinondoni Municipal Council (KMC) is estimated to have 1,863,801 people and hence the population density of 3,510 people/km2 in 2013.

Kinondoni Municipal has four divisions namely: Magomeni, Kinondoni, Kibamba and Kawe. These divisions are then divided in 34 wards which in turn are subdivided into 117 sub-wards commonly known Mtaa.

4.3.2 Water Supply and Consumption

Water supply for Ubungo ward in Kinondoni Municipality is mainly from two major sources, Lower Ruvu near Bagamoyo town and Upper Ruvu near Mlandizi in Bagamoyo district. These

two sources together with one located Mtoni in Temeke District are the one supplying water for the entire region of Dar es Salaam. However, some residents rely on the boreholes and local wells. The sources cannot meet the demand; still some people from ubungo and nearby areas like Kimara, Manzese, Tandale and Kinondoni are facing acute shortage of water forcing them to buy water from trucks and vendors at unreasonably high price and without any assurance of health quality.

The water supply and sewerage services for the City is under the Dar-es-Salaam Water and Sewerage Authority (DAWASA), which controls about 95% of water being consumed daily and the rest 5 % is contributed by shallow and deep wells owned both privately and by public. In Kinondoni Municipality, where the project is located, Out of the total population which is 1,083,913, only 652,800 or 60%, have direct access to clean and safe water while the rest 40 % have no direct access. DAWASCO is contracted the operation of water supply and sewerage services in the City.

In order to alleviate the water shortage problem, Kinondoni Municipality has managed to drill 25 water boreholes, among these boreholes are either hand pumped, some with diesel or petrol pumps while others are electrically powered pumps. Though there are notable successes in the drilling of boreholes, the problem is lack of resources, for constructing water distribution networks so as to be able to make use of the drilled boreholes efficiently. In the project area there are 4 boreholes.

At the project area water pipes are buried alongside Morogoro road which supply water to different places, This indicates that the water services will be affected by road project and sometimes to cause the interruption of water supply as indicated in Figure 4.2 below.

Figure 4.2: Properties belong to DAWASA at Ubungo Intersection

4.3.3 Health Services

At ward level where the project is located, currently it has a total number of 5 health facilities of which one dispensary is owned by the government ((Msewe Dispensary) while the remaining 4 are owned by parastatal, private and faith based organization. These are University of Dar es Salaam Health Center, Msewe Dispensary -Moyo Safi wa Bikira Maria, Arafa Dispensary and Natural Therapy-Antipa)

Prevailing Diseases in the Project area

The most common killer diseases in project area are HIV/AIDS pandemic malaria, cholera, dysentery and water borne diseases. The major causes of the outbreak these diseases are poor sanitation and inadequate sewage system, lack of clean drinking water, Other reasons are problem of low or irregular incomes among young women aged 15 – 45 years which is HIV/AIDS risk factor, this can influence high infection rate in the project area. At the same time, poor road networks in remote suburban centres hinder the transmission of information, education and communication on the prevention of HIV/AIDS to reach people in those areas.

4.3.4 Security

The security system for people and their properties in Dar es Salaam is fair, there are regional and district police stations which are responsible for making sure that the security system are maintained. There have been many reported cases of bandits along the project road (Morogoro road, Sam Nujoma road and Mandela Road), during the consultative meetings in the project area, people reportedly the frequent occurrence of crime incidences e.g, robbery, theft, smuggling at Ubungo Intersection. There is one police post and one police station along Morogoro road. The Police Post is located about 100m from the junction inside the bus terminal and Urafiki Police Station which is located about 500m from the Intersection.

4.3.5 Sanitation

In Ubungo ward there are waste water treatment systems, one located in University compound serve the university premises, and another one located at Mabibo serves the industries like Urafiki textile, Dar es Salaam Institute of Transport and other nearby communities. Generally, most of households in the project area use on site sanitation/disposal services such as septic tank connected to soak pit system and pit latrines. This situation imposes necessities for increasing the capacity of cesspit emptying services, which is being provided by both Municipal Council and private sector.

The inadequacy for sewerage services in project area as well as Kinondoni Municipaityl as a whole has lead to many infrastructure development problems including spontaneous flooding in the old and new developed areas. The increasing urban population and construction of the multi-storey buildings are the most pressurizing factors to improve the sewerage and drainage system in the city. The role of providing public sewer services has been given to DAWASA (Dar es Salaam Water and Sanitation Authority) through its argent DAWASCO.

The existing sewerage system in the city provides services to about 13% of the City's population. The system was developed and is owned by the Dar es Salaam Water and Sewerage Authority (DAWASA). The remaining 87% of the population use on-site sanitation System whereby 80% use pit latrines, and Remaining 20% use septic tanks with soak pits system to treat wastewater.

4.3.6 Education System

The education system in the project area is divided into stages, starting from pre-primary education to the tertiary education. In the past, the education services were left to the government to provide pre-education. However, due to the rapid population increase and the

failure of government to provide enough schools then private organizations and religious organizations started providing the education.

In the project area there are five (5) government primary schools namely: Mlimani, Msewe, Ubungo NHC, Urafiki and Kibo. One secondary school called Mugabe; Intermediate Colleges include Ubungo Water Institute, the Amazon Universities and University of Dar es Salaam.

4.3.7 Energy Sources

The City dwellers of Dar es Salaam like others in Tanzania depend on different sources of energy such as electricity, kerosene, charcoal, fire wood, solar, etc. The main source of power for lighting, business and industry in the project area is electricity, which is generated, transmitted and supplied by a sole utility agent, Tanzania Electricity Supply Company Limited (TANESCO). Residents commonly use kerosene, firewood and charcoal for cooking and few families afford to use electricity and gas for cooking as the tariff prices are relatively high. The project area is characterized as the main connection stations of energy source like Ubungo electricity sub-station station and SONGAS Plant.

4.3.8 Land Use and Tenure

The proposed site is within the planned industrial area zone. The intersection is immediately bordered by properties owned by TANESCO, SONGAS Gas Power Plant as well as Tanzania Bureau of Standards and OILCOM Petroleum Station. Adjacent to OILCOM there is a mosque used for staff and other people living around the station. The project area is also accommodating public utilities like water supply, power cables and electric reticulation poles, Songas' gas infrastructures, fibre cable and telephone lines. On the right hand side of the intersection to Morogoro there is a lot of small businesses especially mobile vendors. So relocation of these properties is inevitable since the project will acquire more land apart from existing ROW for implementation. The businesses conducted at Ubungo Intersection are as indicated in Figure 4.3 below

Figure 4.3: Different businesses and mobile phone shops at Ubungo

4.3.9 Household Income

Poverty remains high despite the interventions which have been put in place to check on poverty in the country. The Household Survey 2000/2001 showed that 7.5% of Dar es Salaam population as being unable to get adequate food (food poverty) and 17.6 % unable to get basic needs (basic needs poverty).

It is estimated that about 95 % of City residents are working in the informal sector, while the remaining 5 % are employed in the formal sector including the government and public institutions. Based on statistics for 2002, unemployment in the City of Dar es Salaam was 46.5% while in other urban areas it was 25.5% and in rural areas was 18%.

The major source of household income of people in the project area is small businesses, livestock keepers; food vendors etc, the distribution of income among the inhabitants differ tremendously, based on their occupations and gender. The majority who are livestock keepers and small-scale farmers earn very little income from their activities and livestock produce due to low prices. On the other hand, those who are engaged in trading have relatively better earnings. The study shows that 52% of the interviewed households have irregular and insecure incomes. On the other hand, 41% of the interviewed households have intermittent and stable income. Only 7% of the interviewed household reported to have regular and stable income. These included people from formal employment who get salaries and wages.

4.3.10 Road Infrastructure

The proposed project site is easily accessible and reachable during all weather by the main roads these are Morogoro road, Mandela road and Sam Nujoma road.

Ubungo intersection has inadequate capacity to cope with increased number of cars. There is inadequate sidewalks and absence of bicycle lanes. There is big traffic congestion especially at peak hours which leads to road accidents and sometimes death. The government has taken some efforts to minimize the traffic congestion at Ubungo and other places. Among others, the actions taken were increasing road capacity like paving more roads such as Ubungo Terminal via Kigogo.

Another strategy was to reduce number of private cars in roads; this involved a number of actions which covers the improvement of public transport through the introduction of Bus rapid transit system (BRT).

In Dar es Salaam congestion is contributed by a number of factors including increase number of cars, poor road infrastructure, city physical structure, lack of updated master plan and poor development control. Increasing road capacity (means improvement of Ubungo Intersection) and improvement of public transport services (means BRT) is the main strategies to control congestion especially at Ubungo. In order for the two solutions to work more effectively and in a sustainable way, both strategies of improving road capacities and public transport should be applied together. In this regard, to the construction of flyover is necessary.

4.3.11 Waste Management

Waste management, in principle, is directly the responsibility of Local Authorities. The Local Government (Urban Authority) Act 1982 (Section 55) imposes on urban authorities the mandate “to remove refuse and filth from any public or private place” and to provide and maintain public refuse containers for the temporary deposit and collection of waste.

The Municipal Councils play an important role in the financing, planning and providing waste collection and disposal services. According to the present management structure, waste management services are placed under Waste Management Department, but other departments such as Works, Health, and Urban Planning are also involved in one way or another.

Currently, the trucks are used to collect wastes from the project area and other places of the City to the dumping site at Pugu Kinyamwezi Dump Site. Some wastes are compiled near the Intersection waiting for collection by the City waste trucks. Because of the vending at the intersection, littering of the drainages at the intersection is common.

It is estimated that the City generates about 3,000 tons of waste a day. The wastes are from residential, industrial areas and commercial establishments like markets and other informal sectors. The composition of waste generated in the City is analyzed in Table 4-5 below:

Table 4-5: **Sources of Waste and their Amounts**

S/No	Source	Amount	
		Tonnes per day	Percentage (%)
1	Kitchen waste	1,338	42%
2	Paper	222	7%
3	Textiles	129	4%
4	Grass	732	23%
5	Metal	63	2%
6	Glass	96	3%
7	Leather and Rubber	33	1%
8	Soil and Ceramic	33	1%
9	Others	510	16%
	Total	3,156	100%

Source: City Municipal Profile, 2004

4.3.12 Economic Activities

The major economic activities in the affected area are trading activities like Mama lishe, petty trade, hotel/bar and selling of green vegetables and phone vendors. Most of these businesses

operated illegally, not registered and encroach the ROW. According to the Municipal Public Relations Officer, the Kinondoni Municipal Council has put in place 26 markets intended for use by petty traders including phone vendors without being harassed. The latter nonetheless continue to conduct their businesses anywhere and everywhere else abandoning the appointed market places. It is quite common to see hawkers and other petty traders doing business at unauthorised spots such as commuter bus stages, street pavements and other public/open spaces.

The officer established why hawkers flood the areas of Ubungo bus terminal/daladala and Mandela road opposite the Songas Power Plant. Seven years ago the Prime Minister's Office introduce a new system whereby hawkers and other petty traders could conduct their businesses during the evenings – as well as all day at weekends and public holidays. Among the areas so set aside were Manzese, Magomeni, Riverside, Biafra, Tegeta, and Mburahati. However, those arrangements never worked as intended, and hordes of petty traders went about their businesses as usual in unauthorised places like Ubungo Intersection.

4.3.13 Formal and Informal Employment

According to the surveyed households, 37.5% are in the formal employment who receives monthly salary. Most of them are either working in Government, Public or Private Sectors. About 50% of the heads of households are engaged in Informal sector whereby the majorities are doing different types of businesses**.** There are those who do not belong in the formal or informal sector, these constitute only 12.5% of the population surveyed.

There is also a number of street vendors/hawkers who do business within the Ubungo Intersection. Estimating their number is not easy due to the nature of their operation. Their numbers vary depending on time of day or season of the year. Some vendors only sell in the morning, afternoon, evening, while some sell only on the weekends; and others sell only during certain seasons. This poses a challenge of estimating the vendors that operate in any city or country.

Many studies point out that street vending attracts the disadvantaged segments of the society who have limited skills and capital; in particular women due to their low education, skills and its compatibility with child care.

Across Africa, street vendors have indicated several reasons that have driven them into the street: Lack of space in the markets, lack of school fees, search for economic opportunity and income, strategic nature of street vending, family influencing in form of supporting family member, entrepreneurship, lack of finance for large business, evading taxation, orphan hood, widowhood, low of education and poverty.

Although this survey did not directly deal with this group of people who conduct their business at the Ubungo Intersection illegally, but it is important for the KMC and the Central

Government to put an eye to this problem which has an implication socially, economically and politically.

5.0 STAKEHOLDERS CONSULTATION AND PUBLIC PARTICIPATION

5.1 Background

A wide public consultation was carried out during fieldwork. The methods for public consultation have been elaborated in Chapter 1. The issues and concerns were noted and are summarized in the forthcoming sections in this chapter. Public consultations were done for both environmental and social aspects. The consultations were done mainly to technical people in Dar es Salaam City Council and Kinondoni Municipality, TANROADS and sectoral ministries, individuals who owned the facilities within the proposed project area. Also meetings in the Mtaa/centres were conducted to probe for the environmental and social implications of the project.

5.2 Identification Stakeholders

The major stakeholders identified during scoping stage and Environmental and Social Impact Assessment study are as summarised in Table 5-1 below.

Table 5- 1: Identified stakeholders

Stakeholder Group	Members
Authorities or decision makers	- Ministry of Works - TANROADS - Vice – President Office - World Bank - National Environment Management Council - Ministry of Lands and Human Settlement Development - Kinondoni Municipal Council
Interested parties	- NGOs - Individuals
Affected parties	- Local Communities Kinondoni Municipality - Ministry of Water - TANESCO - TTCL - DAWASA - DAWASCO - SONGAS - BRT - TBS - TCRA - TPDC
Developer	- Ministry of Works - TANROADS HQ, DSM - TANROADS Regional Office DSM

These stakeholders have different roles and responsibility on the proposed project, but the main function is to contribute in the ESIA in order to reduce or eliminate negative impacts which may arise during the project implementation.

5.3 Public Consultation Process

Prior to the commencement of proposed road survey work and detailed ESIA, the project information was sent to Kinondoni Municipality asking the Authority to inform their respective Mtaa leaders, ward executive officers (WEOs & MEOs) about Environmental and Social Assessment and initiation of the early stage of design and mobilization for the construction of the proposed Ubungo Intersection Improvement.

The overall goal of the consultation process was to disseminate project information and to incorporate the views of PAPs in the design of the mitigation measures and Environmental and Social Management Plan (ESMP). The specific aims of the consultation process were to:

- Improve project design and, thereby, minimize conflicts and delays in implementation;
- Facilitate the development of appropriate and acceptable entitlement options;
- Increase long term project sustainability and ownership;
- Reduce problems of institutional coordination;
- Increase the effectiveness and sustainability of income restoration strategies.
- Provided clear and accurate information about the project to the communities along the proposed project.
- Obtained the main concerns and perceptions of the population and their representatives regarding the proposed project;
- Obtained opinions and suggestions directly from the affected communities on their preferred mitigation measures; and
- Identified local leaders with whom further dialogue can be continued in subsequent stages of the project.

An important element in the process of impact assessment is consulting with stakeholders to gather the information needed to complete the assessment. Consultations were carried out to mainly municipality, wards, mtaas and companies and business buildings owned by individuals. Fundamentally these consultations intended to disseminate project information and to collect feedback regarding the project, also to collect information regarding sources of livelihood, living standards, and views and perceptions of stakeholders regarding the project

These consultations were conducted as either;

- Direct, personal interviews with selected informants, or
- Focus Group Meetings with authorities and technical personnel Community Development Officers, Medical Officers, Water Engineers and Municipal Engineers.

Typically, the Agenda for these consultations included;

- Presenting the proposed project
- Obtaining from the authorities their environmental and socio-economic concerns and perceptions regarding the proposed project ; and
- Discuss the role of each stakeholders, especially the role of the authorities in public information dissemination, monitoring and management plan

The same approach and Agenda were used during consultative meetings at Mtaa/ward levels in the project area..

5.4 Major issues and concerns

Among others, the issues raised by stakeholders in the project area were categorised into four main groups which are environmental issues, economical issues, health and safety issues and social issues. The issues and concerns raised by stakeholders and their responses are as indicated below:

A. Environmental issues:

(i) Deterioration of Air quality:

During implementation of the proposed project, it will result into deterioration of ambient air quality by exhaust fumes from machinery and equipment. Deterioration of air quality will also be caused by dust due to construction activities, movement of vehicles, construction machinery and equipments.

Response: *The Contractor should consider the selection of good machinery and vehicles. Lubrication and regular service of construction machinery and vehicles should be done to reduce fumes. Also contractor will suppress dust by watering on dust source working sections including areas of cutting and filling and haul roads,*

(ii) Production of Noise and Vibrations:

Noise and vibrations will be generated due to increase in traffic movements and construction activities.

Response: *Contractor should control noise and vibration to acceptable levels by using new equipments and to avoid unnecessary movement of trucks. Where it is necessary appropriate protective gears will be provided to workers.*

(iii) Surface Water and Soil pollution:

This may be caused by accidental spillage of fuel, oils, and chemicals like asphalt, deposition of concrete and fine sediments during construction along the riverbanks

Response: *The Contractor should implement daily environmental and safety management best practices to minimise and prevent accidents, spills of hazardous materials, soil pollution and improve waste management system.*

B. Economic issues:

(i) Improve Transport services:

The improvement of Ubungo Intersection will significantly improve transport services and reduce transport costs between City centres and sub-urban areas like Mwenge, Magomeni,

Buguruni, Kimara etc. More cars will start operating to the project areas and make the travel more comfortably.

Response: *It is true and this is the main objective of the project*

(ii) Commercial Sector:

The improvement of Ubungo Intersection will lead to expansion of commercial activities along and in remote areas, and so creating opportunities for ordinary people with limited capital.

Response: *It will increase official business opportunity resulting more earning and good life standards.*

(iii) Employment opportunity:

There is a tendency of most of the Contractors to employ even the casual labourers from outside of the project area. This always discourages the locals taking into account that the vendors in the project area will be removed. The contractor should give the priority of employment to the people hailing from the Mtaa along the project site. Those people may not be used as labourers only but also as watchmen for security purposes. As along the project route, women groups, tea rooms and food vendors are operating; it is anticipated that during project implementation their income will increase.

Response: *The Contractor will implement the recommendation proposed.*

(iv) Losses of business:

There will be a loss of business as some vendors especially mobile phone vendors, used clothes and shoes vendors will be removed from the project area. The vendors are not likely to get the same site for doing business as is being done currently at Ubungo Intersection.

Response: *The authorities especially Kinondoni Municipality will assist affected people to acquire new areas for settlement and for their business. The women are also encouraged to participate in the road construction activities*

(v) Reduction of revenue:

Revenue collection will be reduced as a result of relocation of power line. There will be a power cut-off and customers will miss services during shifting of poles and wires.

Response*: It is true the concern is valid, but during shifting of poles and wires, the Contractor shall try as much as possible to avoid any unnecessary delays for resuming services.*

(vi) Inconveniences in Service cut off:

The customers will be inconvenienced during the power cut-off, of which the customers will miss services.

Response: *It is advised that during construction TANESCO should better opt for live line works technology to avoid power cut off. Also the utilities authorities have to be provided early notice cut off services to their customers.*

C. Health and Safety Issues:

(i) Occupational Health

The Occupational Health problems will occur due to extended exposure to polluted air and unnecessarily long periods spent on roads which will result into mental stress, tiredness, and headache. The problems will increase during construction as there will be a lot of inconveniences due to traffic congestion at the intersection as experienced from BRT project.

Response: *To avoid and control traffic congestion at the intersection during construction the TANROADS/Contractors, local governments should consider improvement of feeder roads, introduce bypass for trucks before they reach Ubungo to avoid congestion at intersection.*

(ii) Blockage of entrance and access:

The existing access to different businesses or working places along Morogoro, Sam Nujoma and Mandela roads might be blocked during construction phase and interfere with normal activities as observed in BRT project.

Response: *Contractor should consider alternative way to avoid interference of existing entrance to services*

(iii) Increased Road Accident

Traffic speeds will increase during operation phase resulting into increased road accidents due to change of driving pattern around Ubungo Intersection

Response: *There will be behaviour change programme for road users since the fly over is new for most of road users especially drivers*

D. Social Issues:

(i) Increased sexually transmitted diseases

Social interaction will increase between road labourers and community members which may facilitate the sexually transmitted infections such as HIV/AIDS etc.

Response: *There will be a separate consultant to implement and manage HIV/AIDS alleviation programs. The Contractor will create awareness for construction workers and communities through seminars and awareness campaign on HIV/AIDS Prevention programs*

(ii) Increased social benefits to the road users

The improvement of Ubungo intersection will bring social benefits to the road users like low traffic congestion especially at peak hours. This will reduce delay to public services and improve access to the public services such as market places, educational services, working places and to the health services.

Response: *It is true; this is a purpose of road improvement strategy. Members of local communities will be able to get access more easily to social facilities such as schools and other amenities in commercial centres. The time served will be used for other economic activities and increase earnings of individual and community as a whole.*

(iii) Relocation of utilities and Space for relocation

At the Intersection, there is land constrains due to presence of private buildings and public utilities such as electricity, water supply, sewerage, telecommunication cables and poles, and gas pipelines. It is likely that some of utilities will suffer for space for relocation. In this regard, the cost of relocating all the utilities will be too high and affect the viability of the project.

Response: *The affected land and properties like buildings have been valuated and will be compensated to pave the space for relocating utilities.*

(iv) Beautification of the project area

The flyover bridge will beautify the area where it will be located and increase the value of the areas.

Response: *it is true*

(v) Low compensation amount.

During the properties valuation, the Valuers normally estimate low value for the properties to be affected and cannot enable the properties owners to replace the same property bearing in mind that the price of construction materials are currently very high.

Response: *The compensation should reflect the real value of affected property and be paid on time to avoid the fluctuation of the price for the properties evaluated.*

(vi) Lack of as per built drawings:

There is a challenge due to absence of as per built drawings which show exactly the location of existing underground properties. This made some of the people encroach utilities ROW by erecting some structures and conduct business activities within the ROW

Response: *Detailed consultation and involvement of stakeholders like TANESCO, DAWASA etc must be done to know exactly existing features and boundaries in the project area.*

(vii) Involvement of Kinondoni Municipal Council

Kinondoni Municipal Council has to be involved in all stages of the project cycle; at least two engineers should be involved and not only consult them when there a problems. This involvement will updated them and inform the Municipal director in case of any support needed. Also it will build their capacity and share knowledge and experience.

Response: *The Engineers from the Municipality will be involved in the site meetings..*

6.0 PROJECT ALTERNATIVES

In the EIA process it is important to consider different alternatives, or options, which will achieve the project's objectives. It is also important to include a consideration of what would happen without the project - that is the no project alternative. The Environmental Assessment for each alternative will be carried out, since each alternative is likely to have a different set, or degree of impacts.

During the assessment, consultations with stakeholders and site visits provided basis for identifying alternatives. The alternatives discussed during the consultation are as indicated below:

(i) The 'No Action' Alternative

To leave the existing intersection without improving to Flyover Bridge could have been the best option for the purpose of leaving the environment as it is now. However, the intense level of human activity in the location has all but destroyed the original environment; the present environment is greatly and adversely affected by very detrimental ad-hoc commercial activities, waste disposal into storm water drainages, large pedestrian traffic, emissions from vehicles that idle for extended periods while waiting to advance etc. Furthermore, leaving the existing road situation which cannot secure smooth traffic flow to and fro Dar es Salaam socially and economically will not be viable. The whole concept of roads improvement especially truck roads will encourage people to use public transport rather than private; this will be a night mare if the road networks are poor.

(ii) Alternative I

This involves a double level flyover in the direction of Sam Nujoma Road serving mainly through traffic where directional movement are served through connecting ramps to Morogoro Road. It could be noted that the minimum curve radius on the main bridge is 165 meter while for connecting ramps smaller curves were implemented due to right of way restrictions and availability of land. The main bridge (level +14) length is 1258 meters and the other bridge (level +7) is 961 meters. Ramps length and horizontal alignment characteristics are also presented. The proposed alternative requires an area of 51,677 m^2. The construction period of alternative is 19 months. The alternative does not require traffic light at the intersection. The construction costs are tuned to Tsh 36,095.70 millions while the construction period is 19 months. The proposed alternative is as presented in Figure 6-1 and Figure 6-2 below.

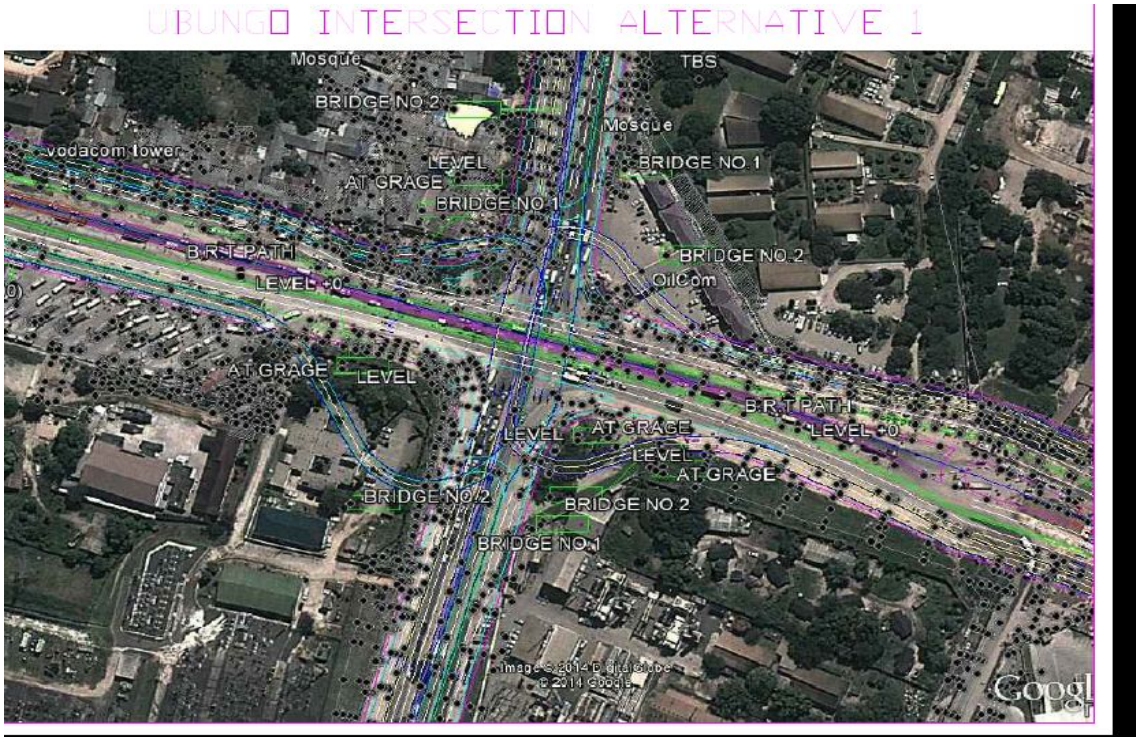

Figure 6-1: Proposed Design Superimposed on the Existing Features (Alternative I).

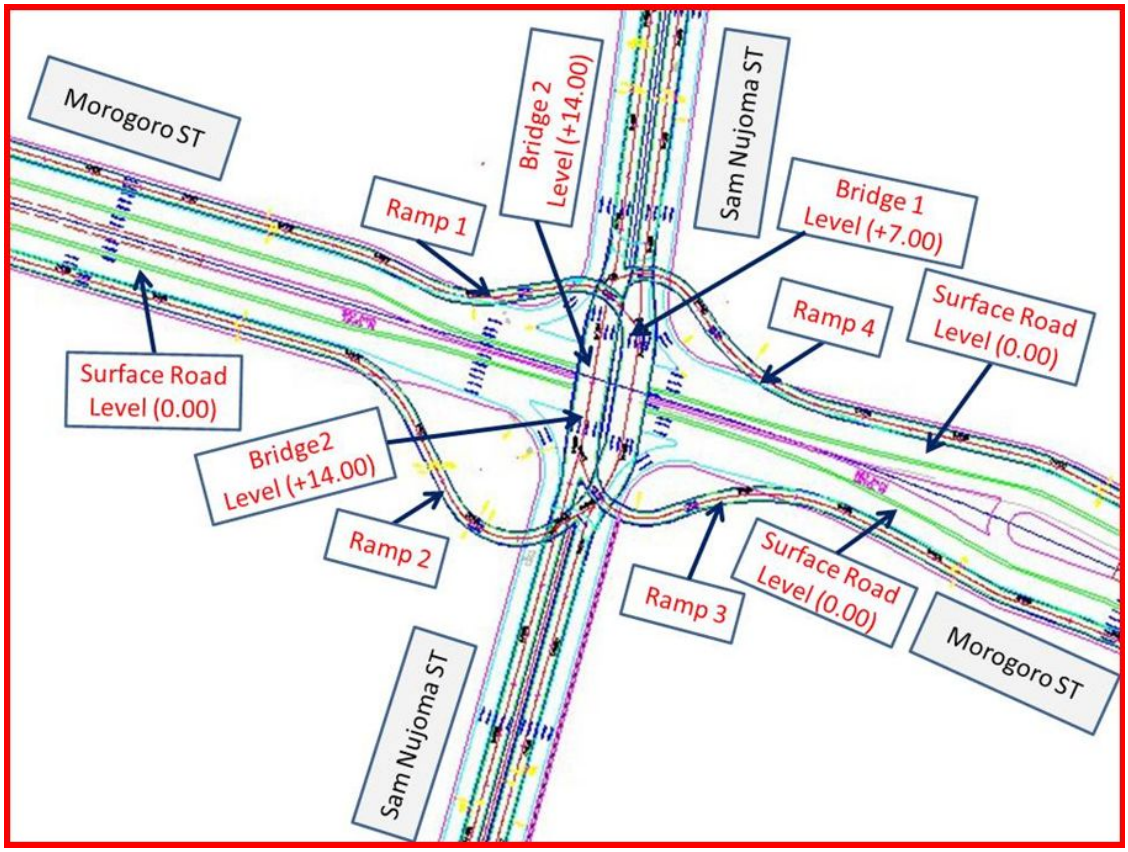

Figure 6-2: ***Proposed Design (Alternative I)***.

The advantages and disadvantages of Alternative I are as follows:

Advantage	**Disadvantages**
No traffic light	Construction costs are relatively high
Smooth flow of high traffic	High costs for land acquisition - More space is required
Undisturbed BRT traffic movement	Disruption of BRT infrastructure by construction of a tunnel
Relatively less construction period	Provision of traffic light

(iii) Alternative II

This involves a tunnel in the direction of Morogoro Road serving the Bus Rapid Transit (BRT) and the through traffic and a flyover in the direction of Sam Nujoma Road have been considered for design of Alternative no. 2. Directional movements are served at grade (level 0.0) where right and left turns for both roads are allowed. It could be noted that the minimum curve radius on the main bridge is 200 meter while for connecting ramps smaller curves were implemented due to right of way restrictions and availability of land. The flyover bridge (level +7) length is 817 meters and the tunnel (level -7) is 550 meters. The proposed alternative requires an area of 50,014 m^2. The construction costs are tuned to Tshs 27,018.80 millions while the construction period is 24 months. The proposed alternative is as presented in Figure 6-3 and Figure 6-4 below:

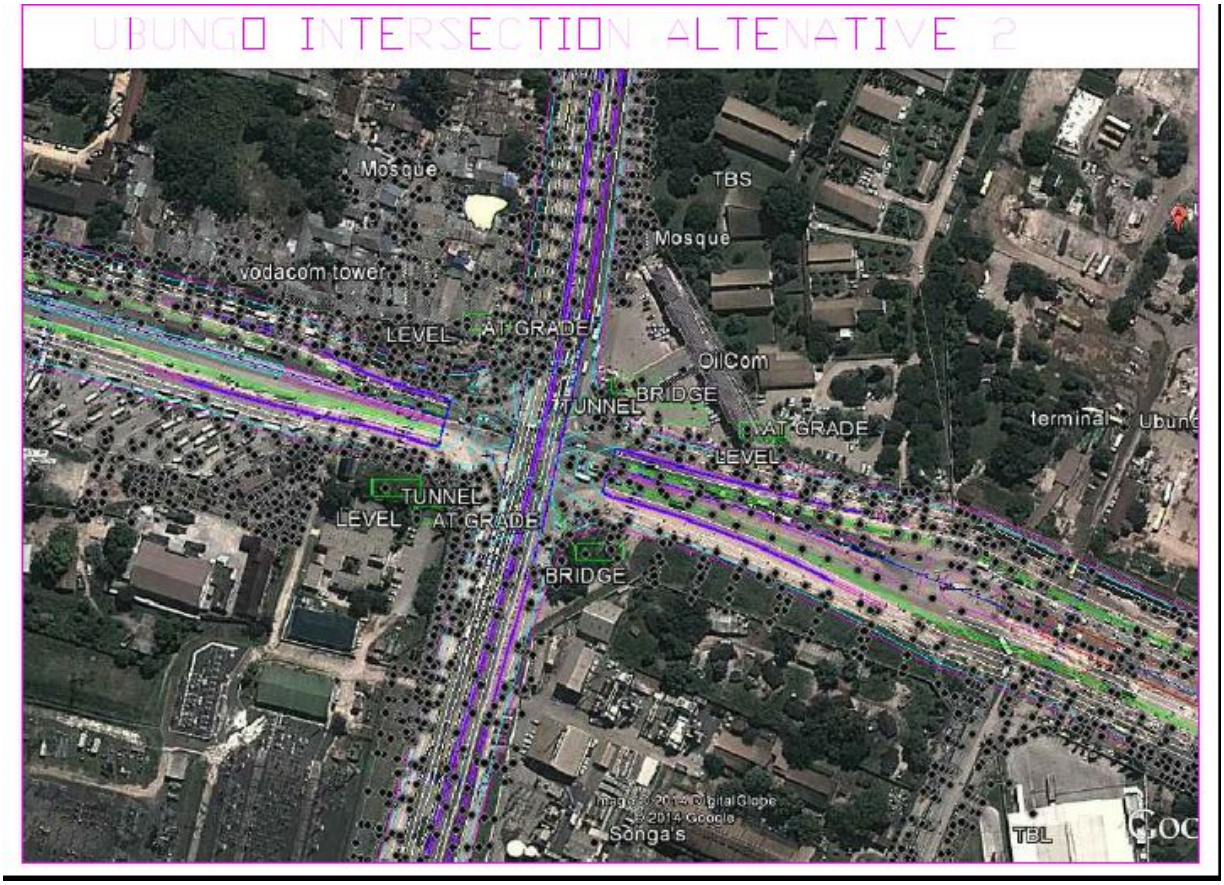

Figure 6-3: Proposed Design Superimposed on the Existing Features (Alternative II).

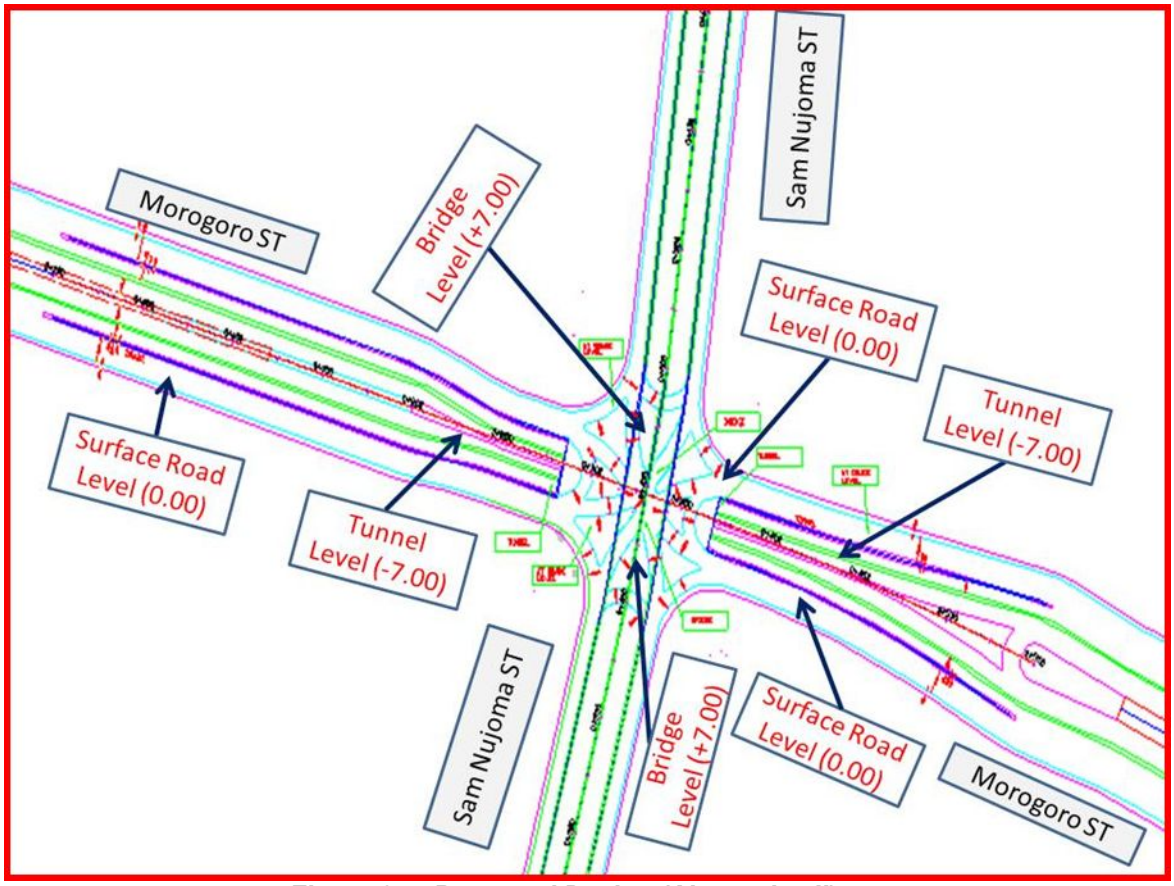

Figure 6-4: Proposed Design (Alternative II).

The advantages and disadvantages of Alternative II are as follows:

Advantage	**Disadvantages**
Construction costs are relatively low	Traffic lights will be provided
Less space is required for intersection improvement	Disruption of BRT by tunnel construction
	Smooth movement during high traffic is constrained
	Relatively high construction period

(iv) Alternative III

Elevated Round –About (Rotary) was considered for design of alternative No. 3. The Round-About serves the through traffic of Sam Nujoma road in addition to the all other turning movements between Morogoro and sam Nujoma Roads. It could be noted that

the minimum curve radius on the main bridge is 45 meter of the Rotary while for connecting ramps different curves were implemented due to right of way restrictions and availability of land. Eight connecting ramps were implemented to transfer the traffic volume to and from the Round-About. The main Round-About (level +7) length is 282 meters and the length of other connecting ramps range between 265 and 453 meters depending on the existing pavement level in Morogoro and Sam Nujoma Roads. The proposed alternative requires an area of 50,468 $m^{2.}$ The construction costs are tuned to Tshs 24,782.74 millions. The construction period is 15 months. The proposed alternative is as presented in Figure 6-5 and Figure 6-6 below:

Figure 6-5: Proposed Design Superimposed on the Existing Features (Alternative III).

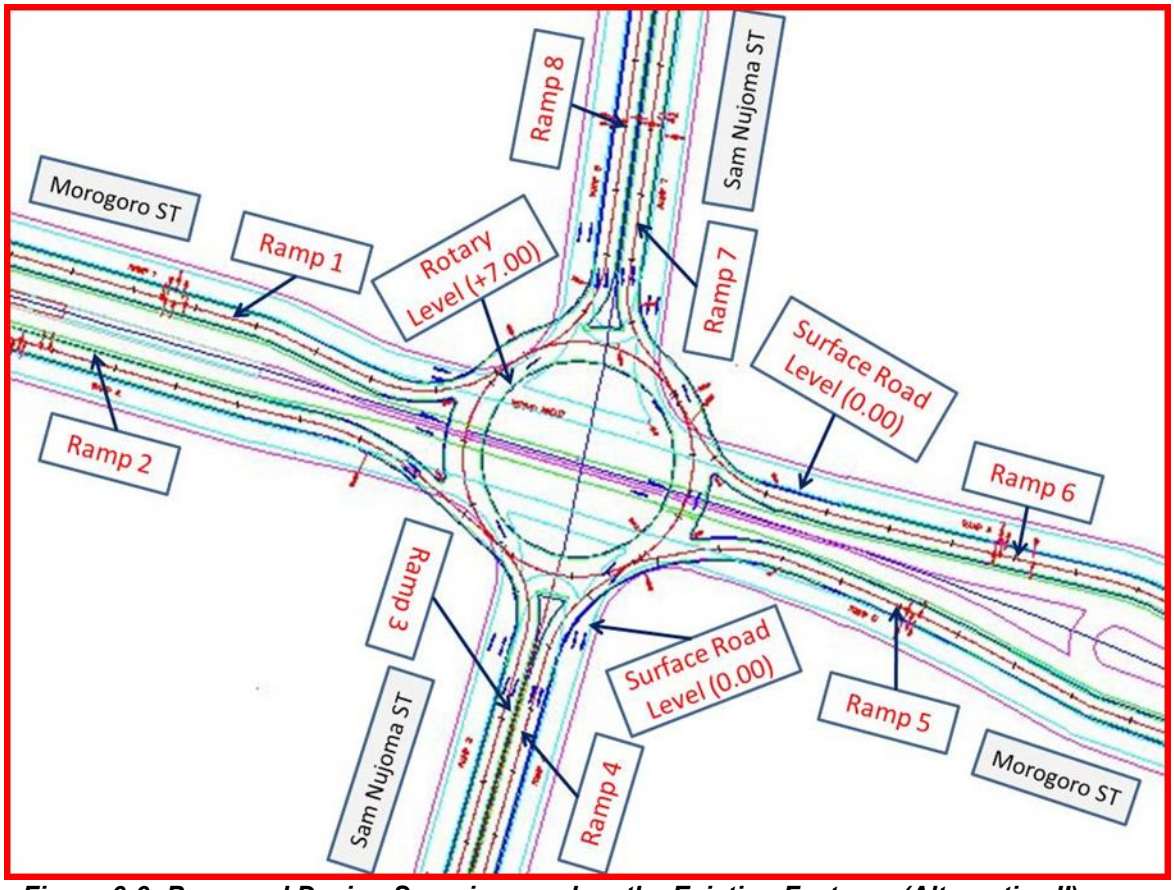

Figure 6-6: Proposed Design Superimposed on the Existing Features (Alternative II).

The advantages and disadvantages of Alternative III are as follows:

Advantage	**Disadvantages**
Construction costs are relatively low	High costs for land acquisition - More space is required
No traffic light	Smooth movement of high traffic is constrained by the provided round about
BRT infrastructure and traffic flow will not be disturbed.	
Construction period is relatively low	

(v) Adopted Alternative (Alternative IV)

After assessment and analysis of the advantages and disadvantages of various alternatives, alternative II was adopted for detailed design but modified whereby instead of having an underground tunnel, a three stack intersection have been designed. The Right of Way for adopted alternative is about 95 m at the Ubungo intersection and the width of the road is about 49 m excluding 8 m of either side of the center line which has been evaluated for compensation for accommodating the utility such as telephone cables, electrical cable, water pipes and gas pipes. The proposed alternative requires an area of 49,681$m^{2.}$ The construction costs are tuned to Tshs 36,076.75 millions. The construction period is 24 months. The adopted design is shown in Figure 6-7 below:

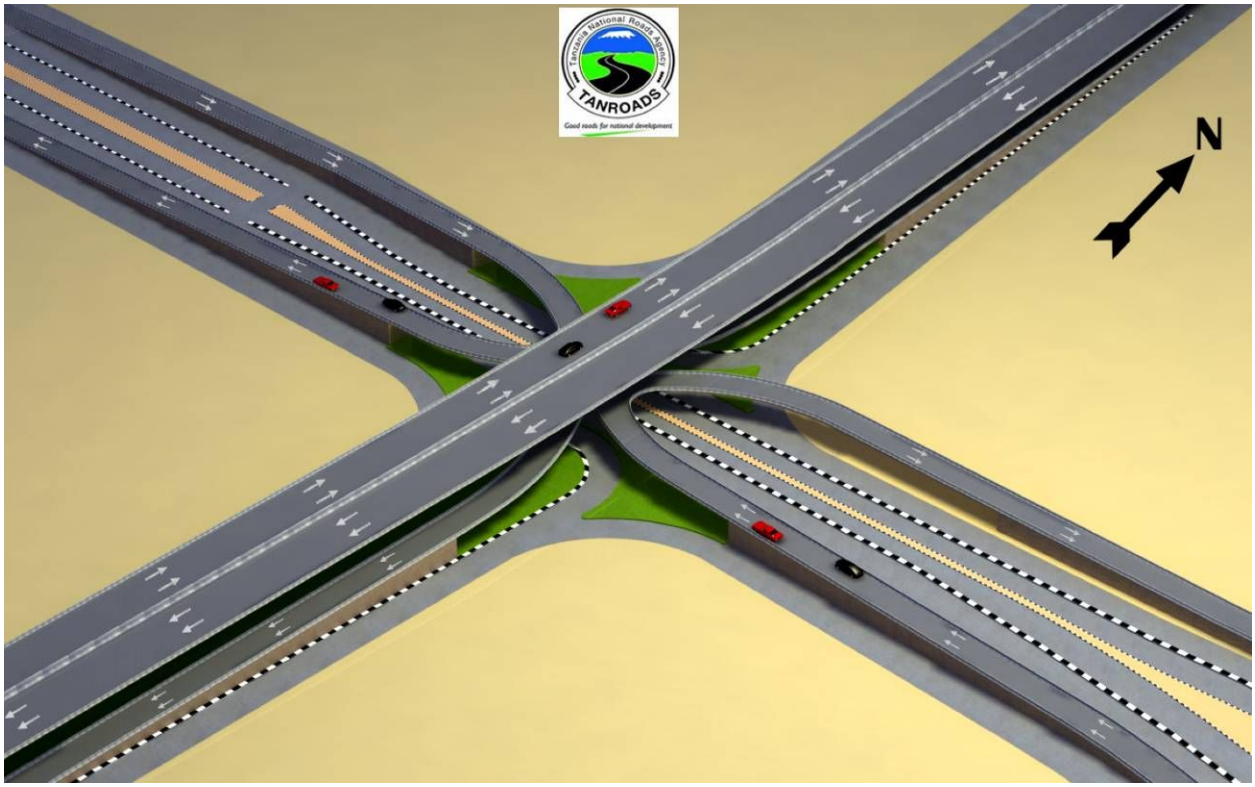

Figure 6-7: The adopted design (Alternative II with modification)

The advantages and disadvantages of Alternative IV is as follows:

Advantage	**Disadvantages**
Less space is required for intersection improvement	Construction costs are relatively high
Smooth movement of high traffic	Traffic lights will be provided

No disturbance for BRT infrastructure and traffic movement	Disruption of BRT by tunnel construction
	Relatively high construction period
	Relatively high construction period

7.0 IDENTIFICATION AND ASSESSMENT OF THE IMPACTS

7.1 Methodology for Identification and Analysis of Impacts

The site visits along the road alignment and stakeholder consultations were used to identify impacts. The purpose of the visit was to see the existing situation in the field in relation to road construction activities in each project phases (i.e. pre-construction, construction, operation, and demobilization phases). During the site visits consultation with stakeholders were held. Besides consultation, the EIA expert's judgments were used to compliment the stakeholders' views on the identification of impacts. Firstly, the activities which may cause impacts were identified (i.e. potential sources of impacts) and related impacts. This was done by using environmental check list, and then compiled a candidate list of key impacts in two groups (i.e. Negative or positive)

After identifying environmental impacts, their potential size and nature was predicated. The prediction of impacts specified the impact's causes and effects, and its secondary and synergistic consequences for the environment and local community was done. Finally, the impacts significance was determined, that is judgment about which impacts found in the study are considered important and therefore need to be mitigated.

7.2 Identification of Impacts

The impacts identified were arranged in two groups positive and negative impacts, the impact in each group described basing on the project implementation phases (i.e. pre-construction phase, construction phase, operation phase and decommission phase. The impacts identified are as follows:

(a) Positive Impacts

Pre-construction Phase

(i) Job Creation and Increased Income to Local Communities

There is employment during the pre-construction phase particularly during project design and mobilization. This impact is considered as direct and short-term impact.

Construction Phase

(i) Job Creation and Increased Income to Local Communities

During road construction, people will be employed for execution of construction activities. The employment will increase income to the local communities which will ultimately assist in the alleviation of poverty. Apart from opportunities for self-employment income generating activities and selling food and other merchandise to the construction workforce, most of the casual laborers and some skilled workforce will be absorbed within Kinondoni Municipality and other nearby Municipalities during construction phase. This impact is considered as direct and short-term impact.

Operation Phase

(i) Improved Accessibility to Markets Centres

This is one of the core purposes of road construction i.e. to stimulate economic growth. Throughout the world, roads are built to bring benefits to community life and economic activities, for example through improved access, lower transport costs, and better markets for local products and services. The improvement of Ubungo Intersection t would bring about a greater range of transport opportunities to business centres, agricultural and livestock producers and improve communication links that are vital for economic endeavour.

Increased access to small businesses and crop marketing literally means increased net incomes to the majority of the poor. This will have an impact to the enhanced capacity of the marginalized groups to afford education, health and decent houses. Furthermore, improved accessibility to market centres is a priority and a sound step towards poverty eradication in the project area as well as the adjoining areas.

All the people interviewed concerning improvement of Ubungo Intersection were anxiously waiting the flyover to be built at the intersection. They all saw the improvement of the intersection impacting on them very positively. The principal reasons are anchored on the social and economic benefits that will accrue from the road development. This is considered as direct and long term impact.

(ii) Improved Access to Services

There are several health related advantages that will accrue from the project. Improved transportation will enable easier purchase and delivery of drugs/medicines to health care facilities. The proposed project will thus facilitate patients to receive faster medical attention (especially emergency cases). Health workers will enjoy easier access to work than before.

Members of local communities will be able to get access more easily to social facilities such as schools and other amenities in commercial centres. This is considered as direct and long term impact.

(iii) Reduction of Accidents at the Intersection

Minor collisions occurring due to congestion in and around the Ubungo Intersection can be reduced, enhancing the transport safety. This is considered as indirect and long term impact.

(iv) Reduction in Travel Duration and Distance to Services

The improvement of the intersection will facilitate easy transport and transportation within Kinondoni Municipality and other suburban areas as well as increasing communication among the communities along the Morogoro road, Sam Nujoma and Nelson Mandela roads to Dar es Salaam city centre, hence reduced travel time and costs, hence increased socio-cultural interaction. This is considered as direct and long term impact.

(v) Promote Investment and Industrial Sector

The Ubungo Intersection connects three roads (Morogoro road, Sam Nujoma road and Mandela road). Morogoro Road gives access and exit from Dar es Salaam to up-country Cities and neighbouring countries. The Nelson Mandela Road has formed one of the logistic distribution networks to connect inland areas to Dar es Salaam port for transporting not only domestic goods but also goods to the landlocked countries. This project will reduce the transport cost of materials and products to the Dar es Salaam harbor, and in industrial areas which in turn contribute to activation of the wayside commercial activities. This is considered as indirect and long term impact.

(vi) Smoothing of Domestic and International Physical movement of people and goods

This project will reduce traffic congestion of Morogoro road, Sam Nujoma and Nelson Mandela roads which in turn reduces the time for road traffic of cargoes to the Dar es Salaam Harbour, city centre, industrial areas and inland countries. In consequence, physical flow to and from inland countries will become more active. This is considered as direct and long term impact.

(vii) Lower air pollution for reduced congestion

Construction of flyover at Ubungo will reduce traffic congestion, means air pollution caused by fumes from the cars which leads to increase of Greenhouse Gases (GHG) in the atmosphere thus contributingto climate change will be reduced as well.

(viii) Improved functioning of the BRT

The main objective of BRT system is to bring best quality, best capacity and efficiency of public transport. So presence of fly over will facilitate smooth flow of traffic and reduce traffic congestion and enhance effective and efficient operation of BRT system.

(ix) Improved control of mobile vendors

After improving the intersection the Kinondoni Municipality has to establish markets and enforcement of Municipal bylaws to avoid mobile vendors.

Demobilisation Phase

(i) Increase of Social Services

The campsites permanent structures may be converted to public services structure such as schools, dispensary if those camps located in an area where such service is needed, the issue of handling the permanent structures to the government must be negotiated right at the

beginning of the site identification for campsites. This is considered as direct and long term impact.

(b) Negative Impacts

Pre - construction Phase

(i) Land acquisition

During mobilisation there will be additional land acquisition with involuntary resettlement. Apart from area owned by utilities, approximately 24 households of 59 properties will be affected by the project implementation. It is estimated that each household has an average of 6.5 persons which translates into approximately 156 persons being affected by the construction of the Ubungo Intersection Flyover. However, no cultural assists will be affected.

Construction Phase

(i) Land Expropriation and Loss of Structures

The use of land for improvement of the intersection may entail the voluntary sale or compulsory acquisition (expropriation) of homes, property, businesses, and other productive resources. Involuntary displacement or resettlement would cause social disruption and economic loss for the affected individuals and their families. Apart from area occupied by utilities, approximately 24 households will have either houses or other type of properties affected. It is estimated that each household has an average of 6.5 persons which translates into approximately 156 persons being affected by the construction of the Ubungo Intersection Flyover.

Currently Ubungo Intersection is famous for vending businesses which are carried out within the road reserve. As a rule, it is illegal to conduct such commercial activities within the ROW; however, the authorities turn a blind eye because the vendors don't impede the flow of traffic. In order to secure the safety of street vendors during the construction period, it will be necessary to relocate them to other areas or suspend their activities. It will be necessary for the project personnel to explain the works to the vendors in advance with a view to securing safety and minimizing the impact of the works. The resettlement considered all project requirements as land concerned.

Some of individual properties and business vendors which will be affected as seen figure 7.1a to 7.1c below.

Figure 7.1c: Business Vendors

The land expropriation and loss of structures are considered as direct and long term impact.

(ii) Interruption of Public Services

The Improvement of Ubungo Intersection will involve the relocation or protection of utility facilities such as water supply, sewer pipes, telephone, electric cable and gas pipes. This will create disturbance to public/customers of those facilities. The figures 7.2 - 7.4 below indicate some utilities to be affected during the implementation of this project. The relocation of utilities is considered direct and short term impact.

7.2: Electricity Booster Station and Power line to be affected

Figure 7.3: *Songas' Gas Infrastructures to be affected*

Figure 7.4: *DAWASA Infrastructures to be affected*

(iii) Increased Traffic Congestion and Accidents

During construction, the increased traffic movements will result into traffic congestion and disruption; Moreover, along materials stock routes, and specifically at road crossings. In construction phase there will be a labor accident including falls involving pedestrians and street vendors due to small working space, no pedestrian and bicycle lanes, on the other hand, Ubungo Flyover Bridge will be of its kind in Dar es Salaam city, traffic accidents may increase in Ubungo Intersection at the initial stage of operation due to change driving pattern. The impact is considered direct and short term.

(iv) Loss of vegetation

No trees found inside the ROW, but there are few trees found within the required areas for the project, these trees belong to TANESCO and SONGAS. In order to secure the required area to enable construction works, it will be necessary to cut down those trees.

Figure 6.5 show some of trees expected to be removed to acquire land for construction. This is short term and direct impact

Figure 6.5: Trees and vegetation cover expected to be removed at Ubungo

(v) Soil Erosion

Removal of soil cover due to site clearing as well as other earth works will make soil susceptible to water and wind erosion. This is short term and direct impact

(vi) Noise and Vibrations

Increased traffic movement across the project area is likely to cause considerable noise and vibrations. The noise and vibrations will be produced by construction equipment and trucks during transport, and delivery of construction materials to the project site. Noise and vibrations will also originate from the blasting of rocks. This is short term and direct impact

(vii) Air Pollution

Dust generated from land clearing, extraction, transportation, offloading, stockpiling and spreading of sand and gravel will have negative impact to the air quality. Another source of air pollution will be due to exhaust fumes from operating construction machinery, equipment and vehicles. In addition, there will be clouds of dusts due to movements of vehicles and construction machinery. This impact considered as direct short term.

(viii) Surface Water and Soil Pollution

Pollution of ground water and soil may occur due to accidental spillage of fuel, motor oils, and chemicals like paints. Deposition of concrete and fine sediments during construction may cause effects to the natural streams near the intersection. This is short term and direct impact

(ix) Road Safety Risks

The road construction activities will be associated with the following road safety risks;

- Interference of traffic flow during construction
- Injuries or death due to lack or poor separation of working areas and traffic area

(x) Occupation Health and Safety

The road construction activities will be associated with the following health risks:

- High generation of dust which exposes the laborers and the general public to bronchial and other respiratory track diseases

(xi) Sexual Transmitted Diseases

There will be increase immigrants and higher earnings of the construction workers which attract women in sexual relations. This is likely to increase transmission of communicable diseases such as HIV/AIDS if efforts to address the issue are not put in place at various levels

of decision-making especially at household and community levels. The impact is considered to be indirect and long term.

(xii) Water Borne Diseases

The extraction of construction materials will create pits which provide good environments for vectors and thus posing serious water borne diseases. Abandoned pits filled with water harbor disease vectors responsible for transmission of malaria and schistosomiasis. The impact is considered to be indirect and long term.

(xiii) Deterioration of Scenic and Visual Aesthetics

Dust produced by construction equipment, machinery, and vehicles will impair visibility making the construction site prone to traffic accidents. The dust will also cause discolouration of buildings and vegetation along the construction site. In addition, stockpiles of construction materials will impair scenic and visual quality.

Wastes from site office, mechanical workshop, pre-cast yard, and stores at the end of the construction phase are likely to cause scenic degradation and pollution and become an eye sore. The wastes likely be generated will include printer toner and cartridges, used lubricants (oil and grease), used batteries, storage facilities (pallets), packing (plastic bags, paper and timber boxes), wastes from pre-cast yard (concrete wastes, metal reinforcements. Improper disposal of the wastes will deteriorate aesthetic and visual quality of the campsite surroundings. The negative impact will be direct, reversible, moderate, and short term.

(xiv) Land Degradation and Landscape Modification

Construction of the flyover and approach roads construction will be associated with land cuttings, filling and land clearance lead to landscape modification and land degradation.

(xv) Surface Water Flow Modification

Construction of approach road embankments is likely to interfere with natural surface flow patterns, where by concentrating flow in one direction, resulting into channel modification.

(xvi) In-migration

The improvement of Ubungo Intersection is usually accompanied by in-migration of job seekers and businesses and speculators as well as expansion of business areas. The influx of the people in the project area may acerbate the vending problems in the project area. This impact is considered indirect and long term.

(xvii)Increase child labour

It has been evident that most development projects trigger engagement of children less than 18 years to work contrary to the national and international laws which prohibit child labour.

(xviii) Generation of liquid and solid waste

The liquid wastes that will be generated are waste water from camp sites, and used oils. Solid wastes will include cement bags, wood, plastic and metal containers such as drums, and tins, bottles etc.

(xix) Increase wastes from soil cutting and filling

During construction there will be waste materials generated from soil cutting, filling and leveling of road alignment, this include uprooted trees and surplus materials.

Land cutting and filling will be confined to the approach road corridor and road reserve areas only. Uprooted trees should be given to local communities for other use in lieu of burning.

Operation Phase

(i) Increase in Road Accident

The 2002 vulnerability assessment report shows that accidents in Tanzania account for 3.4% of the hazard occurrences in Tanzania (PMO, 2002). Most of the accidents occurred along the highways in Dar es Salaam, Morogoro, Coast Region and Tanga. The most accident-prone groups are the pedestrians and cyclists (Lerise et. al., 2004). The main causes for accidents are poor road conditions due to lack of maintenance such as unblock drains and culverts, not replacing road signs, encroachment by informal vendors which narrow the road, reckless driving, defective vehicles, drunkenness, poor road facilities for the pedestrian and cyclists and unqualified drivers. The impact is considered direct and long term

(ii) In-migration

The local people in the project area feared that Improvement of the road would attract immigration of people, especially business people. It would be easier for outsiders to travel back and forth to the centres and region than before. The impact is considered indirect and long term

(iii) Reduce Water Quality due to runoff

In the operation phase, the motor vehicle emissions and contaminants carried by the tires may participate and stay on the roads. Surface run-off formed during rain will carry the contaminants to the water sources. The impact is considered direct and long term

(iv) Livelihood impacts (e.g. informal and mobile vendors)

There will be loss of income due to losing business such as shops, restaurants, kiosks and bars. This will create disturbance to the families since there is no immediately alternative source of income.

(v) Pedestrian and cyclist safety

During construction pedestrian and cyclist will be in risks since there is no specific lane for them; they have to negotiate with cars and trucks as experienced in BRT construction.

Demobilisation phase

(i) Loss of Employment

During decommission phase people will lose their jobs and employment this situation will threatening the security of their lives and create a negative thought of losing a good relation with their family members. This financial burden will leads to stress.

This should be mitigated by signing a contract so people are aware that after a certain period the contract will expire and help them to do other arrangement. Secondly, is to provide certificate of performance which will be used as supporting documents in searching another job in different company. The impact is considered direct and long term

After identifying the impacts, the issues concerning potential cumulative, residual and trans-boundary impacts were assessed in all phases of this project. The project will involve a large number of vehicles movements that are also used by other developments and construction projects. This could have a potential negative cumulative impact in terms of temporary congestion or an increase risk of accidents, noise, vibration and air pollution. No residual or trans-boundary impacts as far as project concerned due to good mitigations measures for the identified adverse negative impacts

7.3 Analysis of Negative and Positive Environmental Impacts

7.3.1 Impact Boundaries

In the analysis of impacts boundaries it covers the institutions for managing impacts, the temporal (duration) of impacts, spatial of impacts etc.

(a) Institutional Boundaries

Institutionally, TANROADS is a government agency with mandates to develop and maintain trunk and regional roads in Tanzania Mainland. TANROADS converts policies set by Government into actions on the ground. The agency was established on 1st July, 2000 under the Executive Agencies Act, No.30 of 1997. It is a semi-Autonomous Government Executive Agency under the Ministry of Works and is responsible for the day to day management of the trunk and regional roads networks. Its primary function includes the maintenance and development of the primary road network to support the economic and social development of Tanzania.

environmental and social impacts which may arise from the proposed project implementation. From the central government line of administration, by virtue of its location, the project road is under the jurisdiction of the Regional Commissioner for the Dar es Salaam Region. However, since the project road is a Trunk road, it falls directly under the operations of the TANROADS. The road construction works will be handed by TANROADS HQ while TANROADS Region Office Dar es Salaam will handle the operation and maintenance of the road. The institutional boundaries are detailed in the Environmental Management Plan in Chapter 9.

(b) Temporal Boundaries

Under these boundaries the impacts are considered in terms of duration of impacts' surveillance. The temporal impacts can be either short term or long term. The short-term impacts are considered to be those which will be apparent only for a short period and as such will include mainly construction related impacts. The long-term impacts are considered to be those which will be apparent after construction has been completed (but may include also impacts which may become apparent during the construction phase). Short-term impacts include noise, dust and vehicle movements. Long-term impacts include revenue to the government, employment and benefit to the local communities in terms of accessibility to agricultural markets, industrial goods, transport, health services etc. The impacts temporal boundaries are detailed in Table 7-1 below.

(c) Spatial Boundaries

The spatial dimension encompasses the geographical spread of the impacts regardless of whether they are short term or long term. The spatial scale considers the receptor environmental component and can be local or broader. Two zones of impacts namely core impact zone and influence impact zone are considered. The core impact zone includes the area immediately bordering the project (local). In the case of this project local impacts will include the site of the construction (borrow areas, quarries and the actual intersection construction site) and the immediate surrounding areas. With regard to the actual route, the core impact area is the area immediately bordering the project area which is considered to be 500 m - 1000m from the intersection centreline. The influence impact zone includes the area beyond 500m – 1000m from the project alignment and covers the wider geographical areas of Kinondoni Municipality and the whole of Dar es Salaam Region. Under this boundary of impact, the impact may be direct or indirect, widespread etc. The impacts spatial and temporal boundaries are detailed in Table 7-1 below.

Table 7-1: Matrix of Impact Analysis in terms of Temporal and Spatial Boundaries

	Environmental and Social Impact	**Impacts Analysis**			
		Impact Duration (temporal Boundary)		**Impact Nature(Spatial boundary)**	
		Short term	Long term	Direct	Indirect
	Job creation and increased income to local communities	✓		✓	

	Environmental and Social Impact	Impacts Analysis			
		Impact Duration (temporal Boundary)		Impact Nature(Spatial boundary)	
		Short term	Long term	Direct	Indirect
Positive Impacts	Improved Accessibility to Markets Centres		✓	✓	
	Improved Access to Services		✓		✓
	Reduction of Accidents at the Intersection		✓		✓
	Reduction in Travel Duration and Distance to Services		✓	✓	
	Promote Investment and Industrial Sector		✓		✓
	Smoothing of Domestic and International Physical movement of people and goods		✓		✓
	Increase of Social Services		✓	✓	
Negative Impacts	Land acquisition		✓		✓
	Land Expropriation and Loss of Structures		✓		✓
	Interruption with public services	✓		✓	
	Increased Traffic Congestion and Accidents		✓		✓
	Loss of Vegetation		✓	✓	
	Surface Water and Soil Pollution		✓		✓
	Soil Erosion		✓		✓
	Noise and Vibrations	✓		✓	
	Air pollution	✓		✓	
	Occupation Health and Safety	✓		✓	

	Environmental and Social Impact	Impacts Analysis			
		Impact Duration (temporal Boundary)		Impact Nature(Spatial boundary)	
		Short term	Long term	Direct	Indirect
	Sexual Transmitted Diseases	✓		✓	
	Water Borne Diseases		✓	✓	
	Deterioration of Scenic and Visual Aesthetics		✓		
	Land Degradation and Landscape Modification	✓		✓	
	Surface Water Flow Modification		✓	✓	
	In-migration		✓		✓
	Increased child labour		✓		✓
	Generation of liquid and solid waste		✓		✓
	Increased wastes from the soil cutting and filling		✓	✓	
	Increase in Road Accident				
	In-migration	✓			✓
	Reduced water quality due to run-off	✓			✓
	Loss of employment		✓	✓	
	Livelihood impact		✓	✓	
	Pedestrian and cyclist safety		✓		✓

7.3.2 Impact Significance

The interaction between the intended project activities and the different environmental receptors are summarized in a simplified matrix presented in **Table 7-2** below. In this respect, likely interactions between the development actions and impact subjects are described in

terms of magnitude and importance on a common scale between –3 and –1 for negative impacts, 0 for no impacts, and between +1 and +3 for positive impacts. The ratings from -3 to -1 mean that project effect on resource is highly adverse impact for -3, adverse impact for -2 and mild adverse impact for -1. 0 means that the project effect on the resource has no any impact. The ratings from +1 to +3 means that the project effect on resource results in a measurable and noticeable improvement to baseline conditions as +1 stands for mild beneficial impact, +2 stands for beneficial impact and +3 stands for highly beneficial impact. Simple matrix, checklist and professional judgment methods were used in establishing potential impacts and significance. However, the methods have acceptable inherit uncertainties especially in predicting quantitatively impact levels.

Table 7-2: The Impact Significance Matrix for Improvement of Ubungo Intersection

S/N	Environmental parameters/Impacts	Activities					
		Mobilization Phase	Construction Phase			Operation Phase	
			Materials extraction and transport	Detour routes	Construction	Road usage	Maintenance
1.	Job creation and increased income to local communities	1	1	0	2	0	0
2.	Improved Accessibility to Markets Centres	0	0	0	1	3	1
3.	Improved Access to Services	0	0	0	1	3	1
4.	Reduction of Accidents at the Intersection	0	0	0	1	3	1
5.	Reduction in Travel Duration and Distance to Services	0	0	0	0	3	0
6.	Promote Investment and Industrial Sector	0	0	0	0	3	3
7.	Smoothing of Domestic and International Physical movement of people and goods	0	0	0	0	3	3
8.	Increase of Social Services	0	0	0	0	3	3
9.	Land acquisition	0	-1	-1	-2	0	0
10.	Land Expropriation and Loss of Structures	-1	0	0	-3	0	0
11.	Interruption of the Public services (Utilities)	-1	0	-1	-3	0	-1

S/N	Environmental parameters/Impacts	Activities					
		Mobilization Phase	Construction Phase			Operation Phase	
			Materials extraction and transport	Detour routes	Construction	Road usage	Maintenance
12.	Increased Traffic Congestion and Accidents	0	-1	-1	-3	-1	-1
13.	Loss of Vegetation	-1	-1	-1	-3	0	-1
14.	Surface Water and Soil Pollution	0	-1	0	-2	-1	-1
15.	Soil Erosion	0	-1	-1	-2	-1	-1
16.	Noise and Vibrations	0	-2	-1	-2	-1	-1
17.	Air pollution	0	-1	-1	-3	-2	-1
18.	Occupation Health and Safety	0	0	-2	-3	-3	-2
19.	Sexual Transmitted Diseases	0	-1	-1	-1	0	0
20.	Water Borne Diseases	0	0	0	-1	0	0
21.	Deterioration of Scenic and Visual Aesthetics	0	-1	-1	-1	0	0
22.	Land Degradation and Landscape Modification	0	-2	-2	-3	0	0
23.	Surface Water Flow Modification	0	0	-1	-2	0	0
24.	In-migration	-1	0	0	-1	-2	0
25.	Increased child labour	0	-1	0	-2	-1	-1
26.	Generation of liquid and solid waste	-1	-1	-1	-2	0	-1

S/N	Environmental parameters/Impacts	Activities					
		Mobilization Phase	Construction Phase			Operation Phase	
			Materials extraction and transport	Detour routes	Construction	Road usage	Maintenance
27.	Increased wastes from the cutting and filling	0	-1	-1	-3	0	0
28.	Increase in Road Accident	0	-1	-1	-2	-1	-1
29.	In-migration	0	0	0	-1	-1	-1
30.	Reduce water quality due to run-off	0	0	0	-2	-2	-1
31.	Land Modification due to material extraction sites	0	-2	0	-2	0	-1
32.	Loss of employment	0	0	0	0	-3	0
33.	Livelihood Impacts	0	0	-1	-3	-3	0
34.	Pedestrian and Cyclist Safety	0	-1	-1	-3	-3	-2

Key: Mild Adverse (-1); Adverse (-2); Highly Adverse (-3); Mild Beneficial (+1); Beneficial (+2); Highly Beneficial (+3); No impact (0)

8.0 IMPACT MITIGATION MEASURES

This report presents a number of cost-effective measures for minimizing or eliminating adverse impacts of the proposed road works identified in the previous chapter. The costs of implementing these measures shall wherever possible have been estimated and presented in the Environmental and Social Management Plan.

This section is devoted to describe measures or actions that will be implemented so as to minimize the potential negative impacts identified in the preceding sections. Since this formal ESIA has been undertaken at the Detailed Engineering Study Phase, as appropriate mitigation measures have been incorporated in the detailed design including incorporation in the specification, drawings and bills of quantities. Many of the mitigation measures put forward are nothing more than good engineering practice required as required by Standard Specification for Road Works (2000). Other mitigation measures are as indicated in Appendix IV on the Environmental and social protection clauses for contractors to be added in the specification.

The mitigation measures for the identified negative impacts are as follows:

(i) Land Acquisition

Social dislocation and displacement will occur due to acquisition of land for relocation of affected utilities. Approximately 24 households will have either houses or other type of properties affected. It is estimated that each household has an average of 6.5 persons which translates into approximately 156 persons being affected by the construction of the Ubungo Intersection Flyover.

(ii) Land expropriation and loss of structures

The proposed intersection improvement has been designed to follow the existing road alignment road to avoid excessive displacement of structures and properties. The valuation of properties to be affected has been evaluated for compensation. The valuation undertaken complied with Tanzania Land Law as well as World Bank requirements. The compensation and resettlement should be done before or during construction period.

Where construction materials such as gravel and stones are to be obtained from private owned lands, it will be the contractor's responsibility to arrange compensations to be paid to landowners regarding access to those materials.

(iii) Interruption with public services

The Government of Tanzania will incur the cost of relocating all utilities along the proposed intersection improvement. The utilities to be relocated include telephone lines, water supply and sewerage systems and electricity and gas pipes. The utility authorities have estimated the cost for relocating the utilities to be affected. The relocation of utilities will be done before the construction works starts.

The utilities authorities will be notified by the contractor earlier before the construction process starting in order to minimize the effect of long service interruption.

(iv) Increased Traffic Congestion and Accidents

The Contractor has to develop the Traffic Management Plan to control traffic. Furthermore, the contractor will provide road signs during construction. One of the option to reduce traffic congestion and accidents is to improve traffic management. This can be attained through the introduction of one way streets, turn prohibitions and reversible lanes, improving timing of the traffic signals, provision of pre trip traffic information, faster responses to traffic accidents and addressing special events and road works that cause traffic jams. The Traffic management Plan to be developed should consider the pedestrian, cyclist and disabled.

(v) Loss of Vegetation

In order to avoid loss of vegetation in the project area, close supervision of earthworks shall be observed in order to confine land clearance within the line as shown in the drawings. The drawings show the locations which clearing shall be restricted to the extent of works. The impact of loss of vegetation is considered as minimum.

The Contractor should stockpile topsoil for reinstating flora along the road or in the areas which have been cleared vegetation. Furthermore, the Contractor shall consider giving uprooted trees from the road corridor to people for other use like firewood's.

Unnecessary removal of the vegetation especially trees should be restricted and when it is not avoidable, they will replaced by original species soon after completion of construction works

(vi) Surface Water and Soil Pollution

The following measures have to be considered to avoid water and soil pollution.

- No refueling of plant or transfer of materials near watercourses,
- Construction of culverts at the crossing of watercourse and drainage systems to collect surface run-offs;
- Placement of enough sanitary facilities/toilets e.g., septic tanks and soak pits at the campsite depending on the number of staffs and laborers present;
- Immediate cleanup of local spillage to soil;
- Contractor will be required to carry out refueling only in areas and in a manner approved by Engineer which will not contaminate water or soil;
- Construct bunds with concrete pads for spillage containment in the filling stations/workshops;
- Implement good housekeeping within material storage compounds and vehicle maintenance yards;
- The drains provided with de-silting chamber to reduce siltation into the water bodies.

The concrete works will be isolated from watercourses. All construction equipment will be well serviced to ensure that there is no oil leakage.

- Fuel storage tank(s) at the campsite will be installed in a concrete containment.
- Fuelling stations, equipment service bays and pits will be concrete paved and provide with drains
- Refuelling at campsite will be done by a pumps
- Refuelling of construction equipment shall be closely supervised to avoid leaks or releases. Should a spill occur during refuelling, it will immediately be properly cleaned up.
- Liquids such as fuel, lubricants, and bituminous materials will be properly handled to avoid leakages to the ground/soil. Lubricating oils stored onsite shall be contained in barrels. The barrels will be stored in a secondary containment area to contain any spillage, or in temporary warehouse
- When filling machinery and equipment with oils, the oil shall be pumped from a tank within a temporary secondary containment area to contain any spillage.
- Chemicals such as paint, solvents, and concrete additives shall be stored in a locked utility shed or secured in a fenced area.
- Paint and solvents containers shall be tightly sealed and properly stored to prevent leaks or spills. Unused paints shall be disposed of in accordance with applicable regulations. Spray painting shall not be done on windy days, and drop cloths shall be used to collect and dispose of drips and over-spray associated with all painting activities.
- In the event of hydraulic fluid, oil and other petroleum products, they will immediately be cleaned up to prevent discharge of these fluids into the ground or storm water runoff. Absorbent materials such as polypropylene boom and pads saw dust will be kept on hand for cleanup of spilled liquids on pavement, water and soil.

(vii) Soil Erosion

Lined drainage channels at sensitive terrains shall be provided to control speed and volumes of storm-water. The discharge points must be carefully chosen to avoid erosion of human settlement land and creation of gullies. Nevertheless, all cuts in sloping grounds shall be refurbished firmly and provided with the vegetation cover to reduce the effect of soil erosion. For cleared land, it will be re-vegetated to slow down the movement of storm water. The specifications require the Contractor to control water during construction to minimize chances of erosion before the permanent works are completed. Accordingly, a pay item in this respect has been included in the bills to cover this temporary control of erosion.

The area of ground surface clearance will be minimized. Cleared surface will be stabilized by re-vegetating with natural vegetation. The contractor will avoid unnecessary disturbance of soil cover. In addition, the water flow speeds, especially for side drains will be controlled by constructing erosion checks.

(viii) Noise and Vibration

To the large extent the nuisance of noise and vibration will be mitigated adhering to the following measures as required by Standard Specification for Road Works 2000 and Special Specifications: In addition, the Contractor should adhere to the followings:

- Use machinery with noise reducers;
- Restriction of construction works at night;
- Workers should use working gears like ear masks, helmets or hardhats; and
- Maintenance of construction equipment and vehicles and properly fitted with exhaust mufflers.

(ix) Air Pollution

This impact will be mitigated through the following measures as required by Standard Specification for Road Works 2000 and Special Specifications: During construction the Contractor should undertake the followings:

- Use water to suppress dust on all working sections including areas of cutting and filling, haul roads, in the borrow areas and quarries, and any sections of existing road traveled by construction equipments or trucks;
- Selection of good machinery and vehicles, lubricants for regular service and lubrication of construction equipments to reduce fumes;

Cover sand and gravel during transportation, and provide workers with masks to prevent them from inhaling polluted air.

Switching off the machines and vehicles when not in use which will help to minimize the exhaust fumes.

(x) Occupational Health and Safety

In order to mitigate the occupational health and safety, the road design has taken into account of occupational health and safety concerns especially at human habitation crossings. Safety measures have been incorporated in the engineering designs to include for example details of signboards to notify the public about the potential dangers, markings, intersection layouts, access restrictions, bus stops, crossings, footpaths etc. The traffic management plans shall be developed by the Contractor and presented both in English and Swahili. In addition, the followings should be implemented:

- The contractor will ensure that the traffic flow is not interfered during the whole construction period. No total closure of the road will be allowed. The contractor shall provide diversions and deploy a person responsible for traffic safety.
- There should be clear separation of working area and traffic area by marking, fencing as well as speed restriction.

- The construction workers should use working gears like goggles or safety glasses, gumboots, gloves, pullover etc;

- Provision of adequate insurance cover to all construction workers.

- During construction the contractor shall ensure that the campsite is fenced and hygienically kept with adequate provision of facilities including waste disposal facilities, sewage, firefighting equipment and clean and safe water supply as required by Standard Specification for Road works (2000).

The construction works particularly roads there are several activities which may cause safety risks to the labourers at different phases. In order to avoid these occupational health and safety risks the contractor should conduct training for construction workers on occupational health and safety, also the contractor should ensure that the project employees are comply with OSHA act No 5 of 2003.

(xi) Sexual Transmitted Diseases

The contractor will be required to have a mechanism which will allow his employees to get information on HIV/AIDS alleviation programs.

To mitigate the impact, the contractor will have educational awareness campaign during the construction phase to prevent further spread of HIV/AIDS due to construction activities

(xii) Water Borne Diseases

A well-stocked First Aid kit (administered by medical personnel) shall be maintained at each work site, quarries and campsite. The medical personnel shall also be responsible for primary treatment of ailments and other minor medical cases as well as providing some health education to the workforce. During construction the contractor shall ensure that the campsite is fenced and hygienically kept with adequate provision of facilities including waste disposal facilities, sewage and clean and safe water supply as required by Standard Specification for Road Works (2000).

The stagnant water should be avoided by backfilling the potholes to discourage breeding site for disease vectors.

(xiii) Land Degradation and Landscape Modification

Any cleared topsoil shall be stockpiled to be used in re-vegetation scheme, wherever possible mature trees shall be retained. Cut and fills sections have to be designed so as to minimize net materials import. Obtaining sand from valleys and riversides must be well investigated to avoid accelerated land degradation and pollution of water sources and/or interfere with agricultural activities in farmland.

(xiv) Surface Water Flow Modification

Good design features have been adopted to ensure that the changes of the hydrological regimes are minimized. The drainage structures have been provided to control storm water. The design has considered all discharge points to avoid accelerated erosion downstream. The contractor will also allow continuous down stream flow of water during stream damming and minimize disrupting stream crossings during periods of expected rain, and complete such work as quickly as possible.

In addition, sand borrowing shall only be allowed during dry seasons and as much as possible, widening of river banks shall be avoided. Sand borrowing should be limited to sand accumulated in the river beds.

(xv) In-migration

The migration of people in the project area particularly vendors should be restricted. The Kinondoni Municipality should enforce regulations to avoid vending in the road reserve. This impact can be controlled by implementing the Dar es Salaam Master Plan. Also awareness raising for vendors and customers will assist to reduce immigration of vendors. The vendors have to shift to identified markets like Mwenge, Magomeni and Buguruni areas

(xvi) Increased Child Labour

In order to avoid child labor the recruitment and employment will be carried out in accordance with the national laws and policies on employment such as The Employment and Labour Act, 2004. The contractor will involve local authorities during employment of local people so as to ensure that those who qualify for construction works are above 18 year.

(xvii) Generation of liquid and solid waste

The solid wastes produced especially from the camp sites as well as at the construction sites should be separated and collected in a specific container/bag labelled either organic or inorganic wastes, the contractor shall link with municipal or private company collecting waste from this area, if possible contractor should disposed off properly in Pugu Kinyamwezi where municipal waste from DSM City are currently disposed off. The sewage will be collected into the soak away pit and thereafter collected by cesspit-emptier and be disposed off in City's Sewerage systems like in the available Waste Stabilisation Ponds. Other wastes like uprooted trees will be given to the local communities for firewood. The hazardous waste like used batteries will be recycled or collected and disposed off through incineration.

The liquid wastes such used oils and lubricants will be filled in the drums and containers for disposal to the authorised dumping places. Domestic effluents at the campsite will be treated using soak away pits and septic tanks.

(xviii) Increased Wastes from the Soil Cutting and Filling

Land cutting and filling will be confined to the approach road corridor and road reserve areas only in order to minimize waste. The waste generated will be avoided and reduced prior to reusing materials on-site in order to minimize the off-site waste disposal as far as practicable. Uprooted trees should be given to local communities for other use in lieu of burning.

(xix) Increased Road Accidents

The signboards will be appropriately posted to notify the public about the potential dangers. In addition, speed restraining humps will be installed near settlements. Also introduction of pedestrians and bicycles lanes as well as disables people

(xx) In-migration

The migration of people in the project area particularly vendors should be restricted in the avoided. The Kinondoni Municipality should enforce regulations to avoid vending in the road reserve. This impact can be controlled by implementing the Dar es Salaam Master Plan which matches with the population needs in the project area. Also awareness raising on alternative business will reduce the rate of in-migration in the project area for vending.

(xxi) Reduce Water Quality due to Run-off

The design for road section at the river crossing will be made in such a way that surface run off will be collected by storm sewer and be discharged into existing water drainages. In the project area the prominent surface water resources are two rivers which are Kibangu and Ng'ombe rivers. Both rivers are seasonal, Kibangu River cross Mandela road about 150m from the intersection, while Ng'ombe River crosses Sam Nujoma road about 100m from the intersection.

(xxii) Deterioration of Scenic and Visual Aesthetics

To mitigate the impact of loss of scenic and visual quality due to dust, the contractor shall regularly sprinkle water at road section under works in order to minimize deterioration of visual and scenic quality due to dust.

(xxiii) Loss of employment

This should be mitigated by signing a contract so people are aware that after a certain period the contract will expire and help them to do other arrangement. Secondly, is to provide certificate of performance which will be used as supporting documents in searching another job in different company.

(xxiv) Livelihood impacts (e.g. informal and mobile vendors)

This should be mitigated by providing Compensation and PAPs to be educated on alternative business

(xxv) Pedestrian and Cyclist Safety

Pedestrian and cyclist temporary lane should be provided and signals installed at crossing.

9.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The Environmental and Social Management Plan (ESMP) presents the implementation schedule of the proposed mitigation measures, roles of various authorities and associated costs for the implementation of the mitigation measures. For the proposed Ubungo Intersection Improvement, its ESMP has been summarized in the given **Table 9-1**. The engineering designs also include mitigation measures, as appropriate. The related costs are also included in the engineering costs. Additional measures provided in the ESMP will enable the road project to be implemented in a more environmentally friendly. TANROADS has the responsibility for implementation of mitigation measures, other key stakeholders are also required to be involved in the implementation of the mitigation measures, these include the Construction Contractor, the Resident Engineer, Local Governments of Dar es Salaam region, Environmental Authorities, Occupational Safety and Health Authority (OSHA), local communities, and NGOs/CBOs.

This ESMP and the environmental measures incorporated in the detailed engineering design is part of the Contract Documents.

An environmental supervisor or expert shall be appointed to assist the Resident Engineer, in order to make sure that the environmental measures recommended in this report are effectively complied with and timely adjusted whenever necessary. The expert will be familiar with the scientific measurement of environmental impacts and remedies. He/she will work on a part-time basis and may be selected, by the firm in-charge of supervision works, from the roster of national environmental experts. He will liaise with the relevant public agencies and will carry out the training scheme associated to his assignment.

ESMP format attempts to cover typical mitigation approaches to common low-risk activities with minimal temporary localized impacts. It is anticipated that this format provides the key elements of an Environmental and Social Management Plan (ESMP) to meet World Bank Environmental Assessment requirements under World Bank safeguard policies OP 4.01 and OP 4.12 as the one triggered in this project. Also environmental and social protection clauses for contracts and specifications provided as (appendix iii) to support implementation of mitigations.

During Pre-Construction and Mobilization, the Contractor will review the ESMP and develop Specific Environmental and Social Management for implementation of specific proposed mitigation measures.

Table 9-1: Environmental and Social Management Plan (ESMP) for the Improvement of Ubungo Intersection

Impact	Mitigation measure	Responsible Institution	Time Frame	Estimated Costs (TZS)
Land Expropriation and Loss of Structures	○ Realigning the bridge structure and approach roads to minimize land take and effects to the building structures ○ PAPs' compensations before project implementation phase	○ Design Engineer ○ TANROADS	Before construction phase –short term	Valuation Report
Interruption of public utilities	○ Realigning the bridge structure and approach roads to minimize the effects to the electricity facilities ○ Relocating utilities (Electricity,)	○ Design Engineer ○ Contractor ○ TANROADS ○ TANESCO	Before construction phase	Cost estimates from TANESCO
	○ Realigning the bridge structure and approach roads to minimize the effects to the telecommunication facilities. ○ Relocating utilities (Telephone)	○ Design Engineer ○ Contractor ○ TANROADS ○ TTCL	Before Construction phase – short term	Cost estimates from TTCL
	○ Realigning the bridge structure and approach roads to minimize the effects to the water supply and sewerage facilities ○ Relocating utilities (Water Supply and Sewerage facilities)	○ Design Engineer ○ Contractor ○ TANROADS ○ DAWASA ○ DAWASCO	Before construction phase	Cost estimates from DAWASA (Not yet done)
	○ Realigning the bridge structure and approach roads to minimize the effects to Gas pipeline ○ Relocating Gas pipeline	○ Design Engineer ○ Contractor ○ TANROADS ○ SONGAS ○ TPDC	Before construction phase	Cost estimates from TPDC
Increase Road Accidents during operation phase	○ Provide road signs ○ Installation of speed humps ○ Provision of enough designated people crossing points to avoid people crossing at any road point ○ Adequate lighting	○ Design Engineer ○ Contractor ○ TANROADS ○ Dar es Salaam City Council ○ Traffic Police	Long-term (Operation phase)	5,000,000.00
Loss of vegetation	○ Confine clearance to corridor of impact ○ Tree planting after construction	○ Contractor ○ TANROADS ○ Environmental Supervisor	Before and during construction phase	3,000,000.00
Water and soil pollution	○ No refueling of plant or transfer of materials near	○ Contractor	Short-term (Construction	3,000,000.00

Impact	Mitigation measure	Responsible Institution	Time Frame	Estimated Costs (TZS)
	watercourses ○ Installing spill kits at every refueling/transfer area ○ Establish and maintain proper and orderly material storage compounds and vehicle maintenance yards ○ Construct concrete pads with catch drains for spillage containment in the workshop for repair of vehicle and heavy equipments ○ Construct culverts and drainage channels at selected best discharge points	○ TANROADS ○ Environmental Supervisor	phase)	
Noise, Vibration and Air Pollution	○ Watering working road section (near human habitation and uninhabited sections to reduce occupational exposures and to improve traffic visibility) ○ Proper selection of construction machinery and vehicles ○ Regular services and lubrication ○ Use machinery with noise reducers ○ No working at night especially in areas with settlements ○ No quarry or borrow pit in neighbourhood of residences ○ Periodic water sprinkling on working sections.	○ Contractor ○ TANROADS ○ Environmental Supervisor ○ OSHA	Short-term (Construction phase)	30,000,000.00
Soil erosion	○ Avoid unnecessary ground clearance ○ Provide adequate drainage channels ○ Tree planting ○ Environmental awareness	○ Contractor ○ Design Engineer ○ TANROADS	Short-term	2,000,000.00
Road Safety Risks	○ Detailed engineering design should include road signals and signs ○ Provision of adequate insurance cover to all workers ○ Provide diversions and deploy a person responsible for traffic safety to avoid interference of traffic flow ○ Special arrangement with local traffic police for security	○ Design Engineer ○ TANROADS ○ Local Traffic Police ○ Ministry of labour ○ CRB	Long-term during (Construction & Operation phase)	5,000,000.00

Impact	Mitigation measure	Responsible Institution	Time Frame	Estimated Costs (TZS)
	purpose o Adequate lighting			
Occupational Health and Safety	o Establishing Occupational Health and Environment induction course o Provide working gear and camp management that is both hygienic and safe o Installing well-stocked First Aid Kit at every camp site and working site	o Contractor o TANROADS o Environmental Supervisor o OSHA	short-term (Construction and operation phase)	7,000,000.00
Transmitted Diseases	o Support HIV/AIDS campaigns o Provide working gear and camp management that is hygienic o Proper disposal of wastes	o Contractor o TANROADS o Environmental Supervisor o Local Government o Ministry of Health	short-term (Construction and operation phase)	3,000,000.00
Landscape Modification	o Stockpile topsoil o Design cut and fill to minimize material import and disposal of spoil material o Advance notice to the local government leaders for the arrangement of relocation and compensation if any	o Contractor o Design Engineer o TANROADS o NEMC o Local community	Construction and operation phases (long term)	5,000,000.00
Interference to local water drainage	o Provision of drainages to allow water flow in the natural streams o Efficient drainage system o Advance notice Dar es Salaam Water Supply and Sewerage Authority for piped water present in the carriage way o The Contractor shall seek Water Use Permit to draw water from existing sources o The contractor should think of use of alternative water sources e.g., drilling boreholes	o Contractor o Design Engineer o TANROADS o NEMC o MoW, o Local communities	Long -term (during Construction &Operation phase)	2,000,000.00
In-migration	o Implementation of DSM Master Plan o Enforce land use plan o Awareness creation	o Contractor o TANROADS o Local Government (All Municipalities in DSM City), Ministry of Lands	Long –term and During construction and Operation phase	2,000,000.00

Impact	Mitigation measure	Responsible Institution	Time Frame	Estimated Costs (TZS)
		○ NGOs		
Child labour	○ Recruitment and employment of casual labours before commencing of construction works ○ Employment will be given to people above 18 years and will be based on employment policy and regulations of Tanzania.	○ Contractor ○ TANROADS ○ Labour Authority	Short-term (Construction phase)	2,000,000.00
Solid waste generation	Proper disposal of debris and other wastes resulted from construction activities and dispose in the designated municipal dumping site	○ Contractor	Short-term (Construction phase)	4,000,000.00
Total Estimated costs for mitigation measures				**73,000,000.00**

10.0 ENVIRONMENTAL MONITORING AND AUDITING

10.1 Environmental Monitoring

The National EIA legislations require the developer to prepare and undertake monitoring plan and regular auditing. Monitoring is needed to check if and to what extent the impacts are mitigated, benefits enhanced and new problems addressed. Recommendations for monitoring have been included in the ESMP (Table 10-1). The Environmental Monitoring Plans assigns responsibilities for monitoring activities and different stakeholders such as contractor, TANROADS, Environmental Inspectors or Supervisors, Dar es Salaam City Councils, NEMC, sub-ward governments and the community should be involved in the process. However, the divisional/ward/subward environmental committees and city environmental committee will participate in the long-term daily monitoring of the project road. According to the structure of governance, these committees represent government machinery tool at local level. The contractor has to report to the ward/sub-ward governments before commencing the project activities for security purpose.

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

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

- **Pre construction stage**
  Monitoring of the parameters at this stage is meant to establish the baseline information of the target parameters in the project area.

- **Construction stage**
  Monitoring at this stage is meant to establish the pollution levels and impacts in the community around the project site that arise from the construction activities. It is also to verify the effectiveness of the mitigation measures and to allow contractor to take corrective action if necessary.

- **Operation stage**
  Monitoring at this stage is meant to check on the impacts that might arise as the result of normal use of the infrastructure.

- **Decommissioning**
  Decommissioning is not anticipated in the foreseeable future. However, if this will happen, may entail change of use (functional changes) or demolition triggered by change of land use.

Table 10-1: The Monitoring Plan for Improvement of Ubungo Intersection

Item	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Tanzania Temporary Standards	Responsibility for monitoring	Annual costs estimates (TZS)
Pre construction stage								
Air quality	Visible suspended Particles/dust	Periodic qualitative description monthly or as needed	Around construction site		Visual Observation, and interviews with pedestrians		Resident Engineer/ supervision consultant, Contractor	
Water pollution	Turbidity	Thrice before the actual construction starts	All tributaries of rivers used for domestic purposes and shallow wells along the road	NTU	Sampling and Analysis	30	Contractor Environmental Supervisor	400,000.00
	pH			-	pH meter	6.5-9.2		200,000.00
Resettlement	Payment	Once before the construction starts	Around construction site	-	Complaints records	-	TANROADS. Ministry of Lands and World Bank, Local Governments	10,000,000.00
Construction stage								
Air quality	Visible suspended Particles	Continuous	Around construction site	-	Visual Observation	-	Resident Engineer	
Noise and Vibration	Noise level and vibration caused by construction works	Weekly or as needed	Around construction site especially at Health	Noise level (dB).	Noise level instrument, interview with persons concerned and	Not more that prescribed noise standards (70dB) in	Supervision consultant and construction contractor	

Item	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Tanzania Temporary Standards	Responsibility for monitoring	Annual costs estimates (TZS)
			occupation centre		Hospital and pedestrians	Tanzania -		
Loss of vegetation	Species planted	Once a year	Around construction site	-	Visual Observation and meetings with contractor	-	Contractor Environmental Supervisor	
Dust-control	Visible suspended Particles	Regularly during the dry season before starting the construction process	Around construction site		Inquiries and observation	Minimum dust emission	Environmental supervisor Contractor	Included in the contract lamp sum
Water pollution	Turbidity	Every month	All tributaries of rivers used for domestic purposes and shallow wells along the road	NTU	Sampling and analysis	30	Resident Engineer Environmental Supervisor	400,000.00
	pH			-	pH meter	6.5-9.2		200,000.00
Soil erosion	Visible Erosion	Daily for quarries and borrow pits and at least weekly else where	project area – borrow pits and quarries	Level of erosions – visible erosion	Site inspection	_	Resident Engineer Environmental Supervisor	-
Interference to local hydrology	Water levels of local hydrology	Once in a month during rain season in the construction period. It should also be done during or immediately	It should include all rivers and tributaries that could cause flooding	Flooding levels in meters	Elevation measurements	-	District Hydrologists TANROADS Environmental Supervisor	-

Item	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Tanzania Temporary Standards	Responsibility for monitoring	Annual costs estimates (TZS)
		following heavy rains especially to ensure that silt control measures are functioning.						
Increase of Child labour	Percentage of Children employed in construction and extraction sites	Three times a year	Project site and extraction sites e.g., in quarries and borrow pits	Nil	Records, inquiries and observation	-	Contractor TANROADS	-
Solid waste generation	Amount of solid waste generated	Three times a year	Camp and work sites	Weight of solid waste generated and transferred to disposal site	Quantity analysis	-	TANROADS Environmental Supervisor	-
Health of construction workers	Registered sick workers (Injury/illness) Proper use of Personal Protective Equipments (PPE) and general safe practices	Monthly incident reports to the client	Contractor medical assistant Regional medical officer Work sites including borrow pits and quarries	number of safety incidents Number of cases/injuries Number of workers using Personal Protective Equipments (PPE)	Medical records, and site inspection	-	Contractor TANROADS OSHA	-

Item	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Tanzania Temporary Standards	Responsibility for monitoring	Annual costs estimates (TZS)
Poor camp environment	Surrounding of Camp site, water and sanitary facilities	Every month	Camp site	-	Visual Observation	-	Environmental Supervisor TANROADS	-
Operation Stage								
Soil erosion	Erosion	Once in three month after construction period	Around construction site	Level of erosions	Site inspection	-	Environmental Supervisor Contractor TANROADS	-
Safety of human beings	Road accidents reports, road signs and signals at appropriate distance, Safety training for workers, community consultations	Three times a year	Around construction site	Number of incidences of road accidents, Number and types road signs	Zero accident and sufficient number of road signs	-	Traffic police of Dar es Salaam region TANROADS-Dar es Salaam Regional Office	-
Increased noise	Noise Level	Twice a year	Around construction	dBA	Measurements		Environmental Supervisor	

10.2 Environmental Audit

It is important that environmental Audit determine the long term effects of adopted mitigation measures. As per operative ESIA documents in Tanzania, environmental audits would be a responsibility of the developer (TANROADS) and the National Environment Management Council (NEMC).

10.3 Personnel and Training

The environmental experts at the regional levels will be encouraged at the costs of their employers to participate on how environmental and social aspects are considered during the project implementation. The main objective is to strengthen their capacity building in planning, designing and implementing ESMP. The environmental experts of supervision team would ensure that the proposed plan is implemented by the contractor in order to avoid or minimise the environmental and social impacts that might occur during the road construction process.

10.4 Institutional arrangements and Reporting Procedures

TANROADS, assisted by environment specialists, will be responsible for reviewing civil works contracts in accordance with the ESIA report; coordinating the implementation of the ESMP among the contractors, local environmental authorities (e.g., District Councils and sub-ward Development Committees; monitoring the implementation of the ESMP and the civil work contractors in collaboration with NEMC and Ministry of works; and, preparing annual environmental progress reports.

The purpose of environmental and social monitoring is to quantitatively measure the environmental effects of the road project. The environmental monitoring program will operate through the pre-construction, construction, and operation phases. It will consist of a number of activities, each with a specific purpose, key indicators, and significance criteria.

The monitoring of mitigation measures during design and construction will be carried out by an Environmental/Social Specialist designated by the developer (TANROADS) He/she will conduct mitigation monitoring as part of the regular works inspections. The responsibility for mitigation monitoring during the operation phase will lie with the Environmental Section in TANROADS.

TANROADS will provide Ministry of Works, World Bank and NEMC with reports on environmental compliance during implementation as part of their annual progress reports and annual environmental monitoring reports. Depending on the implementation status of environmentally sensitive areas of the project (e.g. some water points, tributaries of the rivers located in the project site), NEMC will perform annual environmental reviews in which environmental concerns raised by the project will be reviewed alongside project implementation.

11.0 RESOURCE EVALUATION

The economic analysis for the proposed Improvement of Ubungo Intersection has been prepared as part of this consultancy. The analysis was performed using the Highway Design and Management Model (HDM4 version 2.4). The model is an analytical framework based on the concept of pavement life cycle analysis. The model analyses the project road with different investment and maintenance options, taking into account the associated costs and benefits projected annually over the analysis period, with a view to determining the economic and engineering viability of the project.

The model assumes that once a road is constructed and opened to traffic, its pavement deteriorates as a consequence of several factors, most notably traffic loading, environmental weathering and effect of inadequate drainage systems.

The rate of pavement deterioration is directly affected by the standards of maintenance applied to repair defects on the pavement surface such as cracking, ravelling, potholes, etc., or to preserve the structural integrity of the pavement (for example, surface treatments, overlays etc.), thereby permitting the road to carry traffic in accordance with its design function. The overall long-term condition of road pavements directly depends on the maintenance or improvement standards applied to the road. When a maintenance standard is defined, it imposes a limit to the level of deterioration that a pavement is permitted to attain. Consequently, in addition to the capital costs of road construction, the total costs that are incurred by road agencies will depend on the standards of maintenance and improvement applied to road networks.

The impacts of the road condition, as well the road design standards, on road users are measured in terms of road user costs, and other social and environmental effects. Road user costs comprise:

- Vehicle operation costs (fuel, tyres, oil, spare parts consumption; vehicle depreciation and utilization, etc.
- Cost of travel time - for both passengers and cargo, and
- Cost to the economy of road accidents (that is, loss of life, injury to road users, damage to vehicles and roadside objects).

The environmental benefits comprise less vehicle emissions result reduction in air pollution (less global warming), and less traffic noise and other welfare benefits to the population served by the roads. Although the social and environmental effects are often difficult to quantity in monetary terms, they can be incorporated within the HDM-4 economic analyses if quantified exogenously.

Road User Costs in HDM-4 are calculated by predicting physical quantities of resource consumption and then multiplying these quantities by the corresponding user specified unit costs. It is necessary to ensure that the vehicle resource quantities predicted are in keeping with the range of values observed in the area of application.

Economic benefits from road investments are then determined by comparing the total cost streams for various road works and construction alternatives against a base case (without project or do minimum) alternative, usually representing the minimum standard of routine maintenance. HDM-4 is designed to make comparative cost estimates and economic analyses of different investment options. It estimates the costs for a large number of alternatives year by-year for a user-defined analysis period. All future costs are discounted to the specified base year. In order to make these comparisons, detailed specifications of investment programmes, design standards, and maintenance alternatives are needed, together with unit costs, projected traffic volumes, and environmental conditions.

From the economic analysis the most feasible alternative is the Double Surfaced Treatment Standard. The construction of flyover at Ubungo Intersection is economically viable, with an Economic Internal Rate of Return of over 12.5%. The underlying factor bringing this positive finding is that, the access time can be reduced from the wayside area of Morogoro road, Sam Nujoma road and Mandela road, where many relatively low-income groups live to the city centre and Kariakoo area where the Dar es Salaam's largest market located. This is expected to contribute to activation and stabilization of the economic activities of the low-income group, and consequently to the eradication of poverty.

12.0 DEMOBILIZATION PLAN

As far as the project is concerned the decommissioning phase deals with the demobilization of the campsites. After the construction the campsites may be reverted to public services, if agreed to in negotiations between the contractor and local owners. The utilization of these camps will depend on the needs of the local government in that specific area. Campsites that are not accepted for use by local owners shall be restored by demolition and removal of all structures and re-vegetation of cleared soil.

13.0 CONCLUSIONS AND RECOMMENDATIONS

The ESIA study results show although some limited negative environmental implications of the project, the road improvement will have high socio-economic benefits to the people along the project area in Dar es Salaam and adjoining regions as well. The associated negative impacts, to a large extent will be minimized through good engineering design and envisaged construction practices. Specific mitigation measures have been suggested in this report to offset the inherent adverse impacts especially. In implementing these mitigation measures there would an increase of environmental soundness of the project road. The total cost for implementing Environmental Management Plan including the monitoring plan is tuned to Tshs 84,200,000.00 where as cost for compensation of affected properties is Tshs 10,560,997,472.00 and the cost for relocation utilities is Tshs 24,185,961,263.00 excluding water supply utilities. The cost for relocating electricity utilities is Tshs 23,184,743,174.00, Gas pipe is Tshs 330,777,625.00 while Telecommunication cables is Tshs 670,440,464.00

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

APPENDICES

APPENDIX I

TERMS OF REFERENCE FOR UNDERTAKING ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR IMPROVEMENT OF UBUNGO INTERSECTION

1.0 PROJECT BACKGROUND

Dar es Salaam is the largest City in Tanzania. It is also the country's richest city and a regionally important economic centre. Dar es Salaam is actually an administrative region within Tanzania, and consists of three local government areas or administrative districts: Kinondoni to the North, Ilala in the centre of the region, and Temeke to the South. The Dar-es-Salaam Region is estimated to have a population of 4,364, 541 as per 2012 census. Located on a harbour on the Indian Ocean, it is the main port for Tanzania, handling exports of minerals and crops. In addition it is the hub of Tanzanian's national transport system as major highways and all railways originate in or near the city.

Due to the major development and population growth in the city, currently, the traffic congestion has become one of major issue for citizen in Dar es Salaam. Nowadays it is approximated that more than 120,000 private vehicles move on the city's roads daily, and the traffic jams are becoming even more acute as they can also be noticed during weekends. The Centre for Economic Prosperity (CEP) recent study indicates that a motor vehicle often spends up to two hours to cover a 16- kilometer trip, a distance which could have spent only 15 minutes, if there was no traffic congestion.

During the colourful ceremony for foundation stone laying for the Phase 1 Construction of Dar es Salaam Bus Rapid Transit (BRT) infrastructure held on 19th September 2012 at Jangwani area, his Excellency Dr. Jakaya Mrisho Kikwete, the President of the United Republic of Tanzania was briefed about the current design at the Ubungo junction that; the design provides for at grade traffic crossing which is controlled by traffic lights. In order to give priority to BRT buses, the right turn is not allowed at the junction, instead the right turning vehicles have to turn first to the left and then make a "U" turn to the junction. This arrangement was noted to inconvenience significantly the mixed traffic movement and will create traffic congestion at the junction.

Following the briefing; the President supported the idea of constructing Grade Interchange at the junction and directed that, the World Bank should be requested immediately for financial support. In order to avoid disruption of the BRT operation in future, it is important for the construction of the Grade Separated Intersection to be done concurrently with the ongoing construction of the road.

In fulfillment of the above mentioned President's directive to improve the current design of the Ubungo Intersection and to explore and assess alternative options, the Government wishes to undertake economic evaluation study, preliminary design, detailed engineering design and preparation of tender document for a grade separated intersection at Ubungo.

On 20th January 2014, TANROADS engaged Hamza Associates of Egypt in association with Advanced Engineering Solutions LTD of Tanzania to carry out the Economic Evaluation, Preliminary Design, Detailed Engineering Design and Preparation of Tender Documents and development of Resettlement Action Plan for the Ubungo Intersection.

In order to implement the proposed project in a sustainable manner, TANROADS is now intending to engage an individual Consultant to undertake Environmental and Social Impact Assessment (ESIA) for the project. The Environmental Impact Assessment will be conducted in accordance with the requirements of the Environmental Management Act No. 20 of 2004 and Environmental Impact Assessment and Audit Regulations (2005) and applicable World Bank Safeguard policies. Other important legal provisions, which provide guidance on environmental issues pertaining to road sector should be consulted such as the Road Act (2007), Environmental Code of Practice for Road Works (2008), and Environmental Assessment and Management Guidelines in the Road Sector (2004).

2.0 OBJECTIVE OF THE ASSIGNMENT

The main objective of the consultancy services is to undertake Environmental and Social Impact Assessment (ESIA) and development of Environmental and Social Management Plan (ESMP) for the improvement of Ubungo Intersection. The ESIA will address environmental and social impacts which may arise from construction and operation activities and provide mitigation plan to prevent or minimize adverse impacts. Ultimately, ESMP will be developed of which its recommendations will be used by the design Consultant in the finalisation of design for improvement of the intersection.

3.0 SCOPE OF CONSULTANCY SERVICES

The Consultant shall carry out environmental and social impact assessment of the intersection. The consultant shall review all available and relevant documents like the design reports for the project, maps, previous studies if any and conduct detailed environmental and social impact assessment study, field investigations and other the related works herein described as well as any other related work required to attain the stated objectives.

The consultancy serves will be carried out in accordance with this ToRs that is in accordance with the requirements of the applicable national legislations as well as World Bank requirements. In this regard, the Environmental and Social Impact Assessment (ESIA) and development of ESMP will be undertaken in line with the requirements of:

(i) The Environmental Management Act Cap 191,and

(ii) World Bank Safeguard Policies, including Operational Policy 4.01 “Environmental Assessment”

(iii) Any relevant local by-laws

As per Environmental Impact Assessment and Audit Regulation of 2005, before undertaking the Environmental Impact Assessment, the Consultant shall prepare a Project Brief and register a project with the National Environmental Management Council (NEMC). This is then followed by undertaking scoping exercise and preparing the scoping report as per requirement of the regulations.

In undertaking Environmental and social Impact assessment, the Consultant shall perform all impact analysis related to services as described therein with due care and diligence to attain the objective of the assessment. Among others, the Consultant will perform the following tasks:

Task (I) Brief on Project Background

The Consultant shall provide description or profile of the developer, background to the project proposal and its justification, need and purpose of undertaking the study, ESIA study methodologies and approaches applied and structure of the report.

Task (II): Description of the Proposed Project

The Consultant shall describe project components and activities to be implemented in each phases of project life i.e. pre construction or mobilization, construction, operation and post-construction (demobilization). This part is meant to give a general idea of what the project will entail. To avoid unnecessary details, focus on the project activities based on project phases i.e. mobilization or pre-construction phase, construction phase, operation phase and demobilization phase. The description shall include the following information:

Background information

Background information shall include: Title of the proposed project and developer; Project justification and objectives; Funds and source of funding or financier(s); Project location including maps of appropriate scale; Project design , size, and capacity; Area of influence of the project works; Project life span and Project components; Land size required; linkages with related projects (e.g. BRT, DMDP local roads component).

Project activities

Description of project activities shall be based on phases of project life cycle i.e. mobilization or pre-construction, construction, operation and maintenance, demobilization and decommissioning phases:

a) ***Mobilization or Pre-construction activities*;**

Describe activities pertaining to land acquisition; construction camp and site workshop; project design and land dispossession; utilities relocation, consultation, etc.

b) ***Construction activities;***

Describe all associated activities during construction work such as extraction construction materials and water indicating its types and sources; blasting; cut and fill; land clearance; soil and gravel compaction and leveling, demolition of structures along the project reserve; types, sources and amount of liquid and solid waste generation and including their disposal; dust; occupational and community health and safety; etc.

c) ***Operation and maintenance activities;***

Identify and describe all the associated activities to be conducted during project operation and maintenance such as project health and safety measures, operation and management of project facilities along the project such as public toilets, etc.

d) ***Demobilization Activities***

Identify and elaborate on the activities to be conducted during demobilization or decommissioning of the project including movement and demolition of construction facilities, restoration of borrow pits, termination of the temporary workers' employment, waste management, etc.

Project Requirements

Identify all types, sources and quantities of construction materials, equipments and chemicals required by the project. Source and quantities of water, energy, manpower (Staffing and support) and other facilities and services required in each phase of project life etc

Task (III): Provide Baseline Condition or Description of the Physical, Biological, and Socio-Economic and Cultural Environment

In order to forecast the impacts, it will be necessary to determine the initial reference or baseline state. It is therefore, required to describe the existing environment that would be directly and/or indirectly affected by the construction of the proposed project. The 'environment' to be affected must be based on the project definition of the term that would include physical, biological socio-economic, cultural and historical factors. Only those environmental factors that are necessary to understand the impacts of the planned development should be considered. Assemble, evaluate, and present baseline data on the relevant environmental and social characteristics of the study area. Include information on any changes anticipated before the project commences (for example status of the BRT project).

(a) **Physical environment:** This shall cover geology; topography; soils; climate and meteorology; ambient air quality; surface and groundwater hydrology; existing sources of air emissions; existing water pollution discharges; receiving water quality; traffic data, utilities, etc

(b) **Biological environment**: This will cover the description of flora and fauna of project site and potential area of influence of the project.

(c) **Socio-economic and socio-cultural environment.** This will cover population; land use; planned development activities; community structure; employment; livelihood means, distribution of income, goods and services; recreation; public health; Gender issues and HIV/AIDS, cultural / historic properties; tribal peoples; and customs, aspirations, and attitudes to the project; road users (motorized and non-motorized) and road safety issues; other issues identified in the project Resettlement Action Plan; etc.

The consultant shall indicate sources of data and methodologies used to acquire data. The consultant should coordinate closely with the design consultancy, which has carried out traffic studies, a socioeconomic baseline, and environmental screening.The relevant international and national standards of noise levels, water and air quality etc. must be applied when comparing between the existing and anticipated impact of project.

Task (IV): Describe the Policy, Legal and Institutional Framework

Describe the policy, legal, institutional framework as well as regulations, strategies, standards, international conventions and treaties that are of relevance to the environmental management and the proposed undertaking in particular. They should be those, which relate to but not limited

to environmental quality, health and safety, transportation, urban planning, land and land use.etc. A description of the World Bank environmental and social safeguard policies to be triggered by the project should be provided. The objective of this section is to show compliance of the developer with the existing policies, laws administrative/institutional conditions both at national and international levels.

The following, but not limited to, are the relevant policies and legislation to be cited in relation to the proposed project undertakings.

Relevant Legislation and Policies for the Proposed Project	
Legislations	**Policies**
Environmental Management Act, Cap 191	National Environmental Policy (1997)
Environmental Impact Assessment and Audit Regulations (2005);	National Water Policy (2002);
Road Act (2007)	Women and Gender Development Policy (2000)
Forestry Act No. 14 (2002);	National Transport Policy (2003)
Environmental Code for Road Works (2008);	Construction Industry Policy (2002)
Environmental Assessment and Management Guidelines in the Road Sector (2004);	National Forestry Policy (1998)
Land Act No. 2/04 (2004) amendment of the Land Act (1999);	National Tourism Policy (1998)
The Land (Assessment of the Value of Land for Compensation) Regulations, 2001	National Mineral Policy (2009)
HIV and AIDS (prevention and Control) Act No. 28/08 (2008)	National Energy Policy (2003)
Local Government Laws (Miscellaneous Amendments) Act (1999);	National Human Settlements Development Policy (2000)
The Land Use Planning Act No 6 of 2007	National Land Policy 1995 (revised in 1997)
Town and Country Planning Ordinance , Cap 378 (1961);	National Policy on HIV/AIDS, 2001
Wildlife Conservation Act (2009);	Road Safety Policy, 2009
Mining Act (2010)	Agriculture and Livestock Policy (1997)
Water Resources Management Act 2009	
Mining Act , 2010;	
Mining (Environmental Management and Protection) Regulation (1999)	
Energy and Water Utilities Authority (EWURA) Act (2001)	
Occupational Health and Safety Act (2003	
Explosives Act, CAP,45 R. E 2002	

Occupational Health and Safety Act, 2003	
The Employment and Labour Relations Act, 2004	

Furthermore, the consultant shall clearly describe the linkage between the functions of the relevant institutional or administrative frameworks in Tanzania and the proposed project undertakings. The Consultant should assess the capacity of the project implementing entity(ies) on the management of environmental and social issues under the project (including TANROADS, Kinondoni Municipal Council, and relevant Ward/Mtaa officals). The Consultant should assess the institutional arrangements for the implementation of the ESMP including, the involvement of different stakeholders and their roles and responsibilities.

Task (V): Stakeholder Consultations and Public Involvement.

The Consultant shall identify and consult all the relevant stakeholders at national, regional and local levels. These include the Government Agencies, local NGOs, affected groups and other interested parties in order to obtain their views regarding the proposed project works. Indicate who they are, where they are, why they are important in this project, which issues are critical to them and how they will be involved in the ESIA study. Particular attention shall be paid to the disadvantaged groups (e.g. children, the elderly and women) that may be affected by the proposed project.

The consultant shall describe methodology applied during stakeholder consultations and public participation such as consultative meetings, household, focus groups interviews and other most appropriate methods to establish public views on the proposed project. Meetings with local authorities and the public shall be held to obtain their views on the project and its implication to the environment and social aspects.

Consultant shall propose public consultation programme during the ESIA studies and the most appropriate methods to establish public views should be used. The consultation process should be open and transparent to ensure that the views of interested and affected parties are incorporated in the project design. A summary of issues and response in table form indicating sections which address them should be prepared.

There should be evidence in the Environmental and Social Impact Assessment (ESIA) to the effect that there were stakeholders' consultations at all levels. Photographs, minutes of the meetings, names and signatures of consulted people could be necessary in this regard.

Among others, the consultations should ensure the involvement of the following:

1. Vice President's Office - Division of Environment;
2. Ministry of Works;
3. Ministry of Water
4. Ministry of Energy and Minerals;
5. Local Governments in the project area;
6. Tanzania National Roads Agency(TANROADS);
7. National Environment Management Council;
8. Utility Companies;
9. Local Communities; and
10. Regional Authorities.

International/Regional Organizations

1. World Bank; and
2. Other organizations supporting some projects in the areas influenced by the project proposal.

At least one consultation with affected groups should occur once a draft ESIA is available (a summary of the ESIA will be available to affected groups prior to the meeting). The draft ESIA should also be available in a public place accessible to those being consulted.

Task (VI): Analysis of Alternatives to the Proposed Project

The Consultant shall describe different project alternatives that were examined in the course of designing the proposed project and identify other alternatives, which would achieve the same objectives. Including the 'No action' alternative to demonstrate environmental and social conditions without the project, consideration of alternatives should extend to sitting, design, technology, construction techniques, phasing and schedule, and operating and maintenance procedures alternatives.

Compare alternatives in terms of potential environmental and social impacts (including resettlement); capital and operating costs; suitability under local conditions; and institutional, training, and monitoring requirements. When describing the impacts, indicate which are irreversible or unavoidable and which can be mitigated. To the extent possible, quantify the costs and benefits of each alternative, incorporating the estimated costs of any associated mitigating measures.

Various environmental and social criteria should be developed to select the best project alternatives.

Task (VII): Impact Identification and Assessment

The Consultant shall identify, analyze and assess environmental and social impacts (positive and negative) of the proposed project works on natural resources, human beings, the built environment and the ecosystems based on the phases of project life cycle i.e. mobilization or pre-construction phase, construction phase, operation phase and decommissioning and demobilization phase. Aspect of climate change should be considered in impact identification throughout the project cycle. Methods applied in impact identification and the criteria used in evaluating the levels of impacts significance of the proposed project works must be specified.

The impacts analysis should focus on both positive and negative impacts and be able to state whether the impacts are positive or negative; direct or indirect; short term or long term; reversible or irreversible.

The ESIA study should clearly identify and analyze cumulative, residue and trans-boundary impacts. Wherever possible, describe impacts quantitatively, in terms of environmental components affected (area, number), environmental and social costs and benefits. Assign economic values when feasible. Characterize the extent and quality of available data, explaining significant information deficiencies and any uncertainties associated with the predicted impacts.

The Consultant should take into consideration existing by-laws, national and international environmental standards, legislation, treaties, and conventions that may affect the significance

of identified impacts. The Consultant shall use the most up to date data and methods of analyzing and assessing environmental and social impacts. Uncertainties concerning any impact shall be indicated.

The Consultant shall conduct a review of gender issues in the project area, the study shall include the project section influence to the lives of men, the elderly, women, children, and disabled so as to come up with a quantifiable analysis of the benefits which will accrue to them during and after the project construction. Much of this information can be obtained from the socioeconomic study conducted as part of the project design.

Special attention should be given to:

- Land acquisition and social impacts, such as street vendors and other informal land users, which should be summarized from the project Resettlement Action Plan
- Road safety, including motorised and non-motorised users
- Utilities relocation
- Linkages with construction and operation of the Bus Rapid Transit line
- Impacts of flooding, both potential flood impacts on the proposed project and impacts on flooding in the project area during the construction and operation phases

Task **(VIII): Propose Impact Mitigation Measures**

The Consultant shall suggest cost-effective measures for minimizing or eliminating adverse impacts of the proposed project works. Measures for enhancing positive or beneficial impacts should also be recommended. The costs of implementing these measures shall wherever possible be estimated and presented.

The Consultant shall review the ongoing measures on HIV/AIDS awareness creation within the project area and propose for the mitigation measures. The proposal shall include a plan of action which will identify responsible key implementers, time frame and expected output.

The consultant should coordinated with the design consultancy to ensure that proposed mitigation measures and cost estimates are included in the Bills of Quantities (BOQ) for the project and should also include cost of supervision for the implementation of mitigation measures. Also measures to address emergencies should be covered.

Task (IX): Resource Evaluation or Cost Benefit Analysis.

The Consultant shall review the economic study undertaken during the Preliminary engineering design to ascertain the economic viability taking into account the environmental and social issues. The Economic Internal Rate of Return (IRR) and Net Present Value (NPV) of the project at recommended discount rate of 12% should be calculated and interpretation of the results be provided.

Task (X): Development of Environmental and Social Management Plan (ESMP)

The Environmental and Social Management Plan focuses on three generic areas: implementation of mitigation measures, institutional strengthening and training, and monitoring. The Consultant shall prepare Environmental and Social Management Plan which will include

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

Identify institutional needs to implement environmental assessment recommendations. Review the authority and capability of institutions at local, regional, and national levels and recommend how to strengthen the capacity to implement the environmental and social management and monitoring plans. The recommendations may cover such diverse topics as new laws and regulations, new agencies or agency functions, inter-sectoral arrangements, management procedures and training, staffing, operation and maintenance training, budgeting, and financial support.

ESMP should specify impact mitigation plan and environmental monitoring plan requirement, and include procedures for reporting on the occurrence of all accidents and incidents on site. The costs, responsibility and timeframe for mitigating each impact and monitoring of each environmental parameter should be provided. Impact Mitigation plan and monitoring plan should be based on the project phases i.e. mobilization or Pre-construction, Construction, Operation, Demobilization and Decommissioning phase.

The consultant should prepare an outline of the contents of the ESMP for inclusion in the project's Operational Manual should, as well as environmental/social protection clauses for contracts and specifications. These can be included as annexes to the ESMP.

Task (XI): Reporting

Notwithstanding the above requirements, the contents and the structure of the Environmental and Social Impact Assessment Report should be in accordance with the Environmental and Impact Assessment and Audit Regulations and World Bank OP 4.01.

The ESIA should be concise and limited to significant environmental and social Issues. The main text should focus on actions supported by summaries of the data collected and citations for any references used in interpreting data. Detailed or un-interpreted data are not appropriate in the main text and should be presented in appendices or a separate volume. Unpublished documents used in the ESIA may not be readily available and should also be assembled in appendices.

4.0 DELIVERABLES AND DURATION OF THE CONSULTANCY SERVICES

The Consultant shall commence provision of services within **one (1) week** of the Effective Date of the contract. The Effective Date shall be the date of signature of consultancy contract agreement and completed within **two (2)** calendar months from the date of the commencement of services. .

The Consultant shall prepare and submit the following reports. All reports shall be in English language and prepared on metric size paper: -

a) **5 hard copies of the Project Brief and Registration Form:** This will cover the description of the project which will enable the environmental authority to make a decision on the level of Environmental and Social Impact Assessment to be conducted.

b) 5 Copies of Scoping Report

The Scoping Report including the refined Terms of Reference will be submitted in 3rd Week after the Effective Date of the Consultancy Services.

c) **20 Copies of Draft ESIA Report:** This will also cover both Environmental and Social Impact Assessment (ESIA). This report shall be submitted in the 6th Week after the Effective Date of the Consultancy Services. In addition electronic copies on CD in PDF and editable format shall be submitted. The report shall summarize the outputs in terms of findings, analyses' results, and recommendations, and shall contain all supporting materials.

d) **20 Hard copies of the Final Report**: This will also cover Environmental and Social Impact Assessment (ESIA) This report shall **constitute** fully publicized documents. These reports should be submitted in the 8th week after the Effective Date of the Consultancy Services. In addition an electronic copy on CD in PDF and editable format shall be submitted. The report should incorporate all revisions, deemed necessary arising from comments received from the draft final reports.

5.0 KEY MILESTONE

The Milestone for each road project is as indicated below:

Deliverables	**Milestone (Weeks)**
Signing the Contract (Effective Date)	W
Project Brief and EIA Registration Form	W+1
Scoping Report	W+3
Draft Report	W+5
Final Report	W+7

6.0 SPECIFIC RESPONSIBILITIES OF THE CONSULTANT

The Consultant shall be responsible for arranging for all necessary office and living accommodation, transport, equipment, supplies, secretarial services, and such other services, necessary for the proper implementation of the services.

7.0 OBLIGATIONS OF THE CLIENT

The Client shall provide the Consultant with copies of the data and reports as available and considered relevant to the execution of the Consultant's services.

The Client shall facilitate liaison with other institutions in order to introduce the Consultant to them. The Consultant shall be fully responsible for collection of data and information from the agencies, and shall be responsible for any costs thereof.

8.0 QUALIFICATION OF ESIA EXPERT.

The ESIA Expert shall be **Registered Environmental Expert** (Team Leader) in undertaking Environmental and Social Impact Assessment. The Consultant will be responsible for the total assignment but may engage sub-contracted resources to carry out some of the tasks, as appropriate. It is expected that the following competencies and resources will be required. The consultant may, however, propose a different resource utilization to maximize task effectiveness, with appropriate rationale.

The Consultant should have the following qualifications:

- A holder of a degree in environment management, environmental engineering, environmental education environmental science or related environmental disciplines.. A postgraduate qualification in above professional is an added advantage;
- He/She must have a cumulative experience of 10 years in undertaking environmental impact assessment;
- He/She must have done an ESIA on at least three (3) projects of a similar nature within the past eight (8) years;
- He/She must have experience with major road infrastructure works, and experience in urban areas will be an advantage;
- He/she must be registered as an EIA Expert;
- Fluency in written and spoken English.

APPENDIX II: List of Stakeholders consulted

Improvement of Ubungo Intersection ESIA Report

APPENDIX II: List of Stakeholders consulted

LIST OF STAKEHOLDERS CONSULTED – UBUNGO INTERSECTION

S/No.	Name of Person Consulted	Institution/office Name	Addresses/Contacts	Signature
01	Eng. Tenga Eliamia L	TANROADS DSM	0713/0754-650115 tenga_eliamia@yahoo.co.uk	
02	Eng. Nyaki Julius	"	0754955973	
03	Eng. Ismail Ihafute	Ukimondeu Inc	0715412879	
04	Eng Athanasius Kisinda	KMC	0713242633	
05	David A. Sigalla	KMC	0715731co	
06	Eng A. O. Wanda	KMC	0713680880	
07	Eng Natty	Kmc		
08	ER Mmbaga	Kmc	0655-409594	
09	John Lazimah	TANESCO	0754-522834	
10	Yusuph Kitivo	TANESCo	0754-694129	
11	EKAHITOSA M. BUSHAIJA	TANESCO	0783 471208	
12	ZAKARIA MULALAMA	TANESCO	0788 215635	
13	FRED V. KAMEGA	TANESCO	0767547055	
14	JOSEPH B MASIMILITIKO	TBS	0713 476094	
15	Julius John	WEPMO	0715 377380	

APPENDIX III: REFERENCES

1. United Republic of Tanzania (2004), Dar es Salaam City Profile
2. United Republic of Tanzania (1997), National Environmental Policy.
3. United Republic of Tanzania (2002), Forest Act No.12
4. United Republic of Tanzania (2004), Environmental Management Act No.20.
5. United republic of Tanzania (2005), Environmental Impact Assessment and Auditing Regulation.
6. United Republic of Tanzania Ministry of Works (2000), Standard Specification for Road Works.
7. World Bank Safeguard policies including operational policy 4.01 “Environmental Assessment”

APPENDIX IV: Environmental and Social Protection Clauses for Inclusion in the Technical Specifications of Contracts

1. General

i. The Contractor and his employees shall adhere to the mitigation measures set down and take all other measures required by the Engineer to prevent harm, and to minimize the impact of his operations on the environment.

ii. The Contractor shall not be permitted to unnecessarily strip clear the right of way. The Contractor shall only clear the minimum width required for the intended works.

iii. Remedial actions which cannot be effectively carried out during construction should be carried out on completion of each Section of the road (earthworks, pavement and drainage) and before issuance of the Taking over Certificate:

iv. To prevent dust pollution during dry periods, the Contractor shall carry out regular watering of earth and gravel haul roads and shall cover material haulage trucks with tarpaulins to prevent spillage.

v. Where noise is likely to pose a risk to the surrounding community, the contractor shall inform the site manager and shall develop a public notification and noise management plan for approval by the participating university and Regional Facilitation Unit (RFU)

2. Transport

i. The Contractor shall use selected routes to the project site, as agreed with the Engineer, and appropriately sized vehicles suitable to the class of road, and shall restrict loads to prevent damage to roads and bridges used for transportation purposes. The Contractor shall be held responsible for any damage caused to the roads and bridges due to the transportation of excessive loads, and shall be required to repair such damage to the approval of the Engineer
ii. The Contractor shall not use any vehicles, either on or off road with grossly excessive, exhaust or noise emissions. In any built up areas, noise mufflers shall be installed and maintained in good condition on all motorized equipment under the control of the Contractor.
iii. Adequate traffic control measures shall be maintained by the Contractor throughout the duration of the Contract and such measures shall be subject to prior approval of the Engineer.

iv. In cases where construction activities result in the disruption of area transportation services, including temporary loss of roadway, blockage due to deliveries and site related activities, the contractor shall provide the participating university and Regional Facilitation Unit (RFU) with a traffic management plan including a description of the anticipated service disruptions, community information plan, and traffic control strategy to be implemented so as to minimize the impact to the surrounding community. This plan shall consider time of day for planned disruptions, and shall include consideration for access to essential services such as medical, disaster evacuation, and other critical services. The plan shall be approved by the participating university and RFU.

3. Workforce

i. The Contractor shall whenever possible locally recruit the majority of the workforce and shall provide appropriate training as necessary.
ii. The Contractor shall install and maintain a temporary septic tank system for any residential labor camp and without causing pollution of nearby watercourses.

iii. The Contractor shall establish a method and system for storing and disposing of all solid wastes generated by the labor camp and/or base camp.
iv. The Contractor shall not allow the use of fuel wood for cooking or heating in any labor camp or base camp and provide alternate facilities using other fuels.
v. The Contractor shall ensure that site offices, depots, asphalt plants and workshops are located in appropriate areas as approved by the Engineer and not within 500 meters of existing residential settlements and not within 1,000 meters for asphalt plants.
vi. The Contractor shall ensure that site offices, depots and particularly storage areas for diesel fuel and bitumen and asphalt plants are not located within 500 meters of watercourses, and are operated so that no pollutants enter watercourses, either overland or through groundwater seepage, especially during periods of rain. This will require lubricants to be recycled and a ditch to be constructed around the area with an approved settling pond/oil trap at the outlet.
vii. The contractor shall not use fuel wood as a means of heating during the processing or preparation of any materials forming part of the Works.

4. Earthworks

i. Earthworks shall be properly controlled, especially during the rainy season.
ii. The Contractor shall maintain stable cut and fill slopes at all times and cause the least possible disturbance to areas outside the prescribed limits of the work.
iii. The Contractor shall complete cut and fill operations to final cross-sections at any one location as soon as possible and preferably in one continuous operation to avoid partially completed earthworks, especially during the rainy season.
iv. In order to protect any cut or fill slopes from erosion, in accordance with the drawings, cut off drains and toe-drains shall be provided at the top and bottom of slopes and be planted with grass or other plant cover. Cut off drains should be provided above high cuts to minimize water runoff and slope erosion.
v. Any excavated cut or unsuitable material shall be disposed of in designated tipping areas as agreed to by the Engineer.
vi. Tips should not be located where they can cause future slides, interfere with any other properties, or cause soil from the dump to be washed into any watercourse. Drains may need to be dug within and around the tips, as directed by the Engineer.

5. Disposal of Construction and Vehicle Waste

i. Debris generated due to the dismantling of the existing structures shall be suitably reused, to the extent feasible, in the proposed construction (e.g. as fill materials for embankments). The disposal of remaining debris shall be carried out only at sites identified and approved by the project engineer. The contractor should ensure that these sites (a) are not located within designated forest areas; (b) do not impact natural drainage courses; and (c) do not impact endangered/rare flora. Under no circumstances shall the contractor dispose of any material in environmentally sensitive areas.
ii. In the event any debris or silt from the sites is deposited on adjacent land, the Contractor shall immediately remove such, debris or silt and restore the affected area to its original state to the satisfaction of the Supervisor/Engineer.
iii. Bentonite slurry or similar debris generated from pile driving or other construction activities shall be disposed of to avoid overflow into the surface water bodies or form mud puddles in the area.
iv. All arrangements for transportation during construction including provision, maintenance, dismantling and clearing debris, where necessary, will be considered incidental to the work and should be planned and implemented by the contractor as approved and directed by the Engineer.
v. Vehicle/machinery and equipment operations, maintenance and refueling shall be carried out to avoid spillage of fuels and lubricants and ground contamination. An “oil interceptor” will be provided for wash down and refueling areas. Fuel storage shall be located in proper bunded areas.
vi. All spills and collected petroleum products shall be disposed of in accordance with standard environmental procedures/guidelines. Fuel storage and refilling areas shall be located at least 300m from all cross drainage structures and important water bodies or as directed by the Engineer.

6. Use and Management of Potentially Hazardous Materials

i. Any use hazardous materials excluding pesticides, oils, fuels and petroleum products shall conform to the proper use recommendations of the product. Waste hazardous materials and their containers shall be disposed of in a manner approved by the relevant agency. A site management plan will be developed by the contractor if the operation involves the use of these materials to include estimated quantities to be consumed in the process, storage plans, spill control plans, and waste disposal practices to be followed. This plan is subject to the approval of the participating university and RFU.

ii. Asbestos

While asbestos materials have not been identified in structures targeted for repair or reconstruction under this project, the following asbestos management procedures shall be implemented should they be discovered during the construction process. The contractor shall contact the Solid Waste Management Unit to develop an asbestos management plan. Site management shall consist of stabilizing friable asbestos and the provision of worker protection to prevent contamination with asbestos fibers. Respiratory protection together with measures to prevent the contamination of clothing and inadvertent transport of asbestos fiber off-site shall be provided to exposed workers. The asbestos management plan shall be developed by the contractor in consultation with the Solid Waste Management Unit to include as a minimum:

- Description of the issue and extent of contamination

- Site safety measures
- Stabilization techniques to be employed
- Storage and transport plan
- Approved disposal procedure
- Worker awareness and training

This plan shall be approved by the participating university and RFU.

iii. Use of preservatives and paint substances

All paints and preservatives shall be used only with the approval of the contracting officer. Information shall be provided to the contracting officer that describes the essential components of the materials to be used so that an informed determination can be made as to the potential for environmental effects and suitability can be made. Storage, use, and disposal of excess paints and preservatives shall be managed in conformance with the manufacturers' recommendations and as approved by the contracting officer. The contractor shall provide the contracting officer with a list of materials and estimated quantities to be used, storage, spill control and waste disposal plans to be observed during the execution of the contract. This plan is subject to the approval of the participating university and RFU.

7. Site Security

i. The contractor shall be responsible for maintaining security over the construction site including the protection of stored materials and equipment. In the event of severe weather, the contractor shall secure the construction site and associated equipment in such a manner as to protect the site and adjacent areas from consequential damages. This includes the management of onsite wastes, construction and sanitary, additional strengthening of erosion control and soil stabilization systems and other conditions resulting from contractor activities that may increase the potential for damages.