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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR RAPID TRANSIT SYSTEM FOR PHASE 3 IN DAR ES SALAAM CITY

FINAL REPORT

October, 2016
EXECUTIVE SUMMARY

Introduction

The Government of Tanzania intends to establish, operate and manage the Bus Rapid Transit (BRT) system, which is the cost effective sustainable transportation system for Dar es Salaam City to ensure fast and orderly flow of traffic on urban streets and roads.

The BRT project follows the current land use plan that shows an extension of planned residential areas in the north-west direction along Ali Hassan Mwinyi road, in the south direction along Kilwa road and in Tabata area. The plan also shows an extension of unplanned residential areas in the west along Morogoro road and in the south-west corridor along Nyerere road. There is also an extension of industrial areas north along Ali Hassan Mwinyi road, Nyerere road and part of Mikocheni Area.

The BRT system is implemented in phases. Phase 1 traverse along the Morogoro Road, Kawawa North, Msimbazi Street, and Kivukoni front with a total length of 20.9 km. The BRT infrastructures under this phase have been completed with financing from the World Bank. Phase 2 will cover the Kilwa road and Kawawa South with a total length of 19.3 km while the proposed BRT Phase 3 covers Uhuru Street, Nyerere road, Bibi Titi na Azikiwe Street making a total length of 23.6 km. Initially, The Government of United Republic of Tanzania requested the African Development Bank (ADB) to support implementation of both phase 2 and 3.

According to the ADB’s initial environmental screening guidelines, projects involving major rehabilitation of urban roads, which are likely to result in significant displacement of people are classified as Category 1, and these require detailed environmental and social impact assessment. Similarly, according to the requirements of Tanzania’s Environmental Management Act No. 20 of 2004, the proposed project is under the list of projects requiring an Environmental Impact Assessment. In order to facilitate carrying out of Environmental and Social Impact Assessment, Da es Salaam Rapid Transit (DART) Agency commissioned M/s Kyong Dong Engineering Co. Ltd of Korea in joint venture with M/s AMBICON Engineering Ltd of Tanzania to carry out an Environmental and Social Impact Assessment, Detailed Engineering Design and preparation of Tender Documents for BRT phase 2 and 3.

The Environmental Impact Assessment (EIA) was 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 ADB 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 (2009), and Environmental Assessment and Management Guidelines in the Road Sector (2011)

Currently the World Bank has shown interest to finance Phase 3 of the Bus Rapid Transport facilities in Dar es Salaam City as one of the components of Dar es Salaam Urban Transport Improvement Project (DUTP). The BRT Phase 3 is designed to cover Nyerere road corridor from Gongolamboto to Kariakoo, part of Uhuru Street (from Buguruni Traffic light to Kariakoo), part of Mandela Road (from TAZARA Traffic light to Buguruni traffic light), Bibi Titi Road and Azikiwe Street with a total of 23.6 km where it connects with other inward routes joining Kisarawe Town.

The construction of 23.6km of BRT through a major urban center may give rise to significant adverse environmental and social impacts that are sensitive and unprecedented and as such the project has been classified as Category A under the World Bank Safeguard Policies. In this regard, the preparation of ESIA for Category A projects has to be carried out independently from the Feasibility and/or Design Consultant.

As it was agreed, the supervision for finalizing the Detailed Engineering Design, Environmental and Social Impact Assessment as well as supervision of the construction works for phase 3 will be done by TANROADS. For that reason, among others, TANROADS engaged an independent Consultant to review the Environmental and Social Impact Assessment report prepared for Phase 2 and 3 to focus on the proposed BRT Phase 3 and to be consistent with the National legislations and World Bank requirements.

The main objective of the BRT project is to ensure orderly flow of traffic in urban streets and roads by increasing the level of mobility and to meet the ever increasing travel demand of the city residents with ultimate aim of increasing comfort and quality of life and urban development. Apart from improving public urban transport in Dar es salaam City, BRT system intends to generate more jobs to residents by involving people to invest in the BRT system bus operation, fund management and fare collection companies.

The objective of the Environmental and Social Impact Assessment is therefore to identify and predict the impacts likely to be associated with the construction and use of the BRT system and propose mitigation measures. These interventions and mitigation measures are to be incorporated into tender documents for contractors’ dossiers during project implementation.

**Project Background and Description**

The proposed BRT Phase 3 project is envisaged to be constructed in Dar es Salaam City within Ilala and Tembeke Municipalities. The BRT Phase 3 is designed to cover Nyerere road corridor from Gongolamboto to Kariakoo, part of Uhuru Street (from
Buguruni traffic light to Kariakoo), part of Mandela Road (from TAZARA traffic light to Buguruni traffic light), Bibi Titi Road and Azikiwe Street with a total of 23.6 km where it connects with other inward routes joining Kisarawe Town.

The BRT system will comprise a two-lane, i.e. one-lane per direction, two way roads dedicated for buses only that allow buses to bypass peak hour congestion as well as achieve high speed to reach destinations faster. The proposed roads will comprise of bus lanes, mixed traffic lanes and non-motorized traffic (NMT) facilities. The corridors and non-motorised traffic facilities will include trunk and feeders; feeders include bicycle pedestrian paths, pedestrian overpasses and flyovers (if required) etc. Station terminals will include elements like access area, fare collection area, platforms circulation. Bus Deports will include elements like access area, maneuvers, fuelling washing, and maintenance, parking and necessary buildings such as for maintenance.

According to the set-up of the BRT project implementation, the Tanzania National Roads Agency (TANROADS) will be the executing Agency for the project that will procure and manage the BRT infrastructure contracts. The Chief Executive of TANROADS shall also designate a BRT Unit and the Manager of the Unit as Coordinator for the day-to-day management of the project during construction and maintenance. The DART Agency will be responsible for procurement of service bus operators (private), fare collection system and ITS systems as well as overseeing operations of the BRT system.

The road works will be undertaken by competent and experienced civil engineering works contractor, while supervision of the civil works will be undertaken by experienced engineering consulting firm, all to be procured competitively. The Consultant in collaboration with TANROADS will supervise and monitor implementation of the environmental and social management plans.

Policies, Legal and Administrative Framework

National policies, legislations, administrative structures, international treaties and conventions relevant to the environment in relation to the project road were reviewed. The Road Act No.13 of 2007 was equally reviewed to assess the extent of the project requirements. Other Acts for professional conduct were also considered to ensure that, their relevancy to the proposed project is taken into account. Administrative and Institutional Framework for environmental management comprise of , the Minister responsible for Environment, National Environmental Advisory Committee, Division of Environment, National Environment Management Council (NEMC), Sector Ministries, Regional Secretariat and Local Government Authorities as well as agencies implementing the projects.

Environmental and Social Baseline Conditions
The Physical Environment

The project area is characterized by developed residential buildings, industrial buildings and high concentrations of trade and other social services and manufacturing activities. Along the project road, there are various utility infrastructures some of which will be relocated.

The assessment of housing and settlements in the area shows that the majority of buildings are roofed with corrugated iron sheets while few buildings are covered with tiles and asbestos. The walls of the buildings are made of concrete blocks and a small proportion of households built from burnt bricks and stones. On the increase is the number of houses built with its walls covered with glasses. On the other hand, the houses of most households have tiled floors followed by those which have cement screed.

The project area experiences a modified type of equatorial climate. As in all other parts of Dar es Salaam region the climate of the project area is influenced by the monsoons, that is South-East Monsoons and North-East Monsoons. Also, the vicinity of the sea has a strong influence on both rainfall and temperature. The SE Monsoons are predominant in April to October when the overhead sun is in the northern hemisphere. The NE monsoons are predominant from November to March when the overhead sun is in the southern hemisphere. However, as an area with rainfall throughout the year, rainfall may occur even during the dry seasons. 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). The rainy seasons are also the most humid periods. It is generally hot and humid throughout the year with an average temperature of 29°C. The hottest season is from October/November to March during which temperatures can raise up to 35°C. Humidity is around 96% in the mornings and 67% in the afternoons. The project area is relatively cool between May and August, with temperature around 25°C.

Dar es Salaam city dwellers depend on different sources of energy such as electricity and gas, also stand-by generators are used during power outages especially in commercial areas. The main source of power for lighting, business and industry is electricity, which is generated, transmitted and supplied by a sole power utility, Tanzania Electric Supply Company Limited (TANESCO). Residents commonly use electricity, charcoal, gas for cooking and lighting. A large number of service outlets use charcoal and gas for cooking, some use kerosene stoves.

The solid wastes generated in the area include paper, food wastes, plastics and others depending on the requirement and services offered in the respective area. Municipal Councils play important roles in financing, planning and providing waste
collection and disposal services in the project area. Solid waste collection in the project area is carried out by both Municipalities and some private companies.

**Socio-economic Setting and Cultural Environment**

The third phase of BRT project will be implemented in Dar es Salaam City, specifically intercepting Ilala and TemaKe Municipalities which are two municipalities among the three municipalities in Dar es Salaam City; another Municipality is Kinondoni.

The 2012 Tanzania National Census reports that the population of TemaKe and Ilala municipalities were 1,368,881 and 1,220,611 people respectively. An ever increasing population in Dar es Salaam has resulted into a number of environmental issues including solid waste generation and transmission of diseases.

Despite the government efforts to control the transmission of HIV/AIDS at different levels in the area, the disease still features among the top ten diseases. Moreover, reports from the Ilala Municipal Hospital shows that 50-60% of the patients admitted in the medical wards are on account of AIDS related complications.

The Dar es Salaam City Profile, 2004, indicates that GDP per capita for Dar es Salaam to be Tshs 584,086 with 35% of the population earning an average low income of Tshs 387,319 per annum (about Tshs 32,000 per month).

The status of health services in Dar es Salaam (including the project area) is with ratio of 18,637 persons under care of one physician. The quality of service is reflected in long queues at medical service centres, congestion in hospital wards and poor facilities in general. The ratio is one (1) physician to 5,333 patients in health centres.

**Public Consultation**

The community perception of the project is good and most of the people wish to see immediate implementation of the project, but they are worried of compensation rates of their high valuable land and other properties. They require fairness throughout the whole process. Below are some of their concerns during public consultation:

(i) The present sidewalks of the roads are used for commercial and settlement activities, therefore compensation is the most important issue among other impacts.

(ii) Any land or property should not be occupied by the BRT project unless compensation is fully completed.

(iii) In future, the government should consider other alternative transport systems such as railways which use lesser space than the roads which involve resettlement of people.

(iv) Compensation should be paid within six months from the date of property valuation, otherwise there will be increment.

(v) The residents gave warning on storm water/wastewater management, that the contractor
should know the soil condition and waste water management to address the storm water/wastewater problem.

(vi) They also requested a new approach of BRT roads design in order to accommodate motorcyclists.

(vii) It was requested that compensation is paid in United States Dollars (US$) to avoid devaluation of the Tanzania Shilling.

(viii) Valuation exercise should be open for everybody to access it before being paid and the breakdown for valuation should be shown to an affected person before receiving compensation.

(ix) The government always pays compensation late; don’t you think this is not right?

(x) Make sure the project is implemented, do not end with mere discussion without implementation. The project should be implemented as soon as possible.

(xi) Sufficient time should be given for PAPS who will be relocated.

(xii) During valuation of properties to be affected, the present market value of properties must be considered.

(xiii) The Developer should use good and transparent procedures for resettlement, and not use of forces.

(xiv) This project is good if will be well managed. The construction activities can start as early as possible provided the Contractor will be procured at early stages.

(xv) Why is the government still issuing building permits in the project area while they have a plan for BRT project?

(xvi) Kariakoo area has very high land value, the client should be fair in implementing compensation bearing in mind that the areas has a lot of multi-storey buildings

(xvii) They requested the developer to conduct survey as early as possible in order to let people free of worries.

**Major Significant Impacts**

Combining community concerns and consultants assessment of environmental and social impacts, the major significant impacts are:

(i) Displacement of people and properties including formal and informal traders currently on the right of way (ROW) due to land acquisition;

(ii) Relocation of infrastructure and disruption resulting from land take;

(iii) Vegetation clearance to pave way for project construction activities;

(iv) Disturbance, particularly land scarring at borrow sites or sources of construction materials (sand, aggregates, stones);

(v) Contamination of water from leakages (oil and grease) of fuels and lubricants from the construction equipment;

(vi) Poor air quality from dust and emissions around the construction site and material hauling routes;

(vii) Generation and poor disposal of solid and liquid wastes;

(viii) Soil erosion and silting of channels;
(ix) Impacts from workers’ camps establishment;
(x) Increased noise pollution;
(xi) Vibrations due to compaction and blasting on quarry sites;
(xii) Traffic interference during road construction;
(xiii) Increase in HIV/AIDS cases;
(xiv) Increased risks of accidents involving buses;
(xv) Increased flooding cases in areas with poor drainage systems and in low lands.

Alternatives Considered

The important aspect of the proposed project road is that it will follow the existing roads alignment. Other routes or spaces that may be considered as alternatives for the project are either very narrow in nature or the spaces are planned for other development activities. Since the proposed Dar es Salaam roads are gazetted as either regional or trunk roads and have been in use for many years then, consideration of alternatives leaves no other better option for the project routes. Instead supplementary or additional routes could be added to the proposed BRT system to ease the traffic in existing roads.

In order to ensure efficient operation of BRT system and for safety reasons three feasible design alternatives were considered: (i) Opening Median - provision of open space in the media, which means that BRT lane is divided with mixed traffic by a separator; (ii) Opening Separator – provision of open space in the outer separator, which means BRT lane is mixed with mixed traffic in case of emergency; and (iii) Opening Median at Station – provision of open space close by station, implying that BRT lane is divided with mixed traffic by a separator. For efficient operation of BRT system, the most recommended option is the first alternative, which has dedicated lanes while installation of median and separation are strongly recommended for safety reasons.

In order to accommodate pedestrian flyovers, which require enough space of side walk due to ramps and stairs, the design has considered to install pedestrian flyovers in practicable areas with high pedestrian crossing traffic without demolishing buildings and private properties.

Recommendations and Plan for Mitigation of Impact

- Compensation will be considered in places where properties cannot be avoided or left intact;
- Roads alignment to follow existing roads to avoid relocating some of the properties;
- Structures outside the construction corridor but within the road reserve may be left intact during the initial stages but with time they will need to be removed to pave way for future expansion of the road when required;
o Water pipes located/crossing in the right of way (road reserve) may be moved slightly away from the road or provision of service duct may be considered;
o Protection of existing water channels feeding the Ocean must be considered;
o Borrow materials should be obtained from existing borrow areas such as those currently used for road construction or new ones opened on agreement with the respective communities;
o Ensure reinstatement of all borrow areas as close as possible to the original site condition once the use of the borrow pits is exhausted. This will be ensured by preparing the “borrow pits operation and rehabilitation plan” by works contractor. Extracted and stockpiled top soil shall be used for landscaping. Moreover, steep edges of these pits will be leveled and smoothened to avoid posing risks to neighboring community. Clearance and mobilization of the site shall be limited to the core area of the project. In this case, the diversions to accommodate traffic shall be established within the ROW i.e. within the road reserve not beyond 30 m from the ROW
o Carry out works during the dry season to prevent soil from being washed away by rain;
o Drainage structures shall be properly installed to avoid scouring;
o Adhering to specified cut and fill gradients and replanting embankments with flat growing grass that will reduce erosion and enhance soil stability especially on the embankments;
o Areas cleared for improving sight distances shall be replanted with grass to control erosion;
o Worker’s camp site/location shall be rented from individuals or local authorities and appropriateness shall be approved by the Client in order to minimize impact to the community;
o Water sprinkling to reduce the dust at construction site and near settlements;
o Sprinkle water twice a day or more when visual inspection indicates excessive dust and during heavy traffic;
o Use of Personal Protective Equipment (PPE) for workers for occupational Health and Safety;
o Construction machines/equipment shall be well maintained to ensure total fuel combustion. All vehicles shall be frequently checked and serviced during the whole construction period so that the level of exhaust emissions is reduced;
o Movement of vehicles should be kept to minimum necessary for completing the job;
o Where the noise levels is beyond 85 dB (A), ear muffs or plugs shall be provided to all those working within the construction equipment area including the operators;
o Equipment shall be well maintained or fitted with noise silencers such as mufflers.
o During construction at site, the contractor shall only work during the normal hours (especially activities involving noise) so that the residents living along the project road are not disturbed during sleeping and resting hours;
o Provide a noise monitoring meter at noise sites;
o Control the speed of road construction equipment in residential areas;
o Dispose the spoil materials into the numerous borrow pits located along the project road before they are restored;
o Sort wastes according to their type and quality. Decomposable waste can be buried on
sanitary landfills and recyclable materials can be sent to the recycling stations;

- Encourage and reward employees who show good practice of solid waste management;
- For general health of laborers in the work camps, a contractor to arrange for a central canteen as wastes can easily be managed and general hygiene easily monitored;
- Pit latrines in especially in camps shall be well located to avoid contaminating ground water facilities;
- Ablution units connected to septic tanks and soak-away pits would be expensive but a less polluting option;
- Workmen shall be provided with personal protective equipment (PPE);
- Dangerous places shall be well barricaded and no children shall be allowed to wonder around the construction sites;
- Avoid washing construction equipment at the intake or near the water source;
- Repair all construction equipment to avoid fuel and oil leakage;
- No refueling of construction equipment shall be carried out within 100 m of the water sources;
- Construction equipment service bays shall be provided with berms to avoid spills being washed away to the water sources;
- The contractor shall prepare and install warning signs along the projects roads requiring the vehicles to reduce the speed;
- Install speed humps at all settlements along the project roads;
- Prepare and install temporary traffic signs that are legible both during the day and at night indicating that the road works are in progress;
- Reinstatement of all borrow sites with top soil then re-vegetation with local species of flat growing grass type;
- Trees must be planted along the roads to help capturing air emissions (particularly carbon dioxide) generated by motor vehicles;
- Construction of toilets (e.g. septic tank system) at stations, depots and terminals to avoid contamination of available water systems and dangers to road users;
- Reinforce provision of waste bin in the buses in order to prevent improper garbage and solid waste disposal resulting from ‘take away’ habit along the roads;
- Design a proper program for ensuring cleanliness of roads e.g. regular cleaning of the water channels.

**Environmental and Social Management Plan**

TANROADS and its Contractors envisage working in close cooperation with the sub-Wards, Wards, Municipals, Regional and National level authorities to ensure that the BRT project is executed in a smooth manner. The structures for undertaking various responsibilities during road pre-construction, construction and operation phases have been presented as specified in the Environmental and Social Management Plan under section 8 of this ESIA. The costs of various mitigation measures have been
included in the total cost of the project in the Bills of Quantities as specified in the Standard Specifications for Road works. Estimated costs for compensation for peoples’ assets are about 17 billion Tanzanian Shillings, while the costs for relocation of utilities (water supply, electricity and telecommunication lines) is estimated to be over 6 billion Tanzanian shillings making the total compensation costs to 24 billion Tanzanian shillings as provided in the Resettlement Action Plan (RAP).

**Proposed Monitoring and Auditing**

The overall procurement, project supervision and monitoring of construction works fall under the Chief Executive of TANROADS. The authority is well organized with qualified and experienced professionals. TANROADS will assign a project Manager under the BRT unit to coordinate close follow up and timely response to correspondence forwarded from the Consultants and Contractor. The Authority will attend tripartite monthly progress meetings and conduct site visits to discuss and address issues related to progress of works. TANROADS shall also be responsible for monitoring the Result Based Logical Framework in consultation with appropriate institutions. The monitoring of environmental and social mitigation measures will lie with Environmental and Social Department of TANROADS and DART Agency and the National Environment Management Council (NEMC).

The Consultant in collaboration with TANROADS will supervise and monitor implementation of the environmental and social management plans. The budget for monitoring amounts to TZS 95,680,000 during pre-construction, construction and operation phases.

**Environmental Cost - Benefit Analysis**

Attempts have been made to assign dollar value on impacts such as displacement of people and relocation of infrastructure. But other impacts such as emissions, poor air quality, noise pollution, pollution of soils and ground water cannot easily be quantified in monetary terms. The fact that cost-benefit- analysis seeks to translate all relevant considerations into monetary terms makes the whole analysis complex. In cost – benefit analysis, both the costs of, say, putting a dripping pan under the leaking grader or a front-wheel loader to reduce ground water pollution and the benefits of doing so including saving the human lives and prevention of debilitating and painful cancer diseases from consuming carcinogenic substances, are presented in terms of dollars.

BRT roads construction will open up many opportunities to the City especially along the project roads and other neighboring centers, Regions and Nation at large. The BRT system will allow more vehicles to reach the city center within the short time, thus commercial activities will be performed within short times and more benefits will be gained. Roadwork activities will have offered some short-term employments to local community such as construction laborers, security personnel, Contractors, Engineers, Environmental Assessment teams, etc.
Many more benefits ranging from taxes on construction materials, availability of good infrastructure in the City, etc. will be realized. Overall, the BRT project will have great benefits economically and environmentally compared to current status of the City transport system. Therefore the benefits to be realized from the BRT project surpass the envisaged environmental and social costs within the lifetime of the project.

As a conclusion on the proposed BRT Phase 3 project, the environmental and social costs are relatively lower in value and are thus outweighed by the benefits to be realized from the project. The consideration of No-Project or Do-Nothing option has been dismissed as best alternative due to the need and desirability of the BRT system to solve transport problems in Dar es Salaam City. Therefore, the country at large stands to benefit significantly in terms of a thousand million dollars if the project is implemented.

**Decommissioning**

Decommissioning is the final phase in the life cycle of the project after design, construction, and operation for the design life. Most often, it is a process involving operations such as dismantling and demolition of structures, and management of resulting demolished materials. As long as people in Dar es Salaam are in continuous expansion and more development is coming, there will always be a need for even a better road between them. Therefore decommissioning of the proposed BRT project should be thought of in terms of upgrading the road from even the present status to the next higher stage.

**Conclusion and Recommendations**

The implementation of the proposed BRT 3 project will enhance mobility in the City of Dar es Salaam particularly along the project corridor and will improve accessibility to socio economic activities by reduction of travel time and transport costs. In general, the project has been well conceived and is technically feasible, socially and environmentally sustainable, and economically justified and viable.

It is important to bear in mind that on environmental ground, the proposed BRT corridors have been in existence for many years. Therefore the environment along the roads has been significantly altered and some of the impacts have already occurred. Disturbance due to installment of BRT system will be there especially for resettlement of those who have been occupying or carrying business in the right of way. Also some impacts will be noted in areas where the existing road is narrow such as most areas along Uhuru road. It is recommended that the project be allowed to go to a next stage and later be implemented provided that the proposed mitigation measures are appropriately implemented.
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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR IMPROVEMENT OF UMBUNGO INTERSECTION

FINAL REPORT

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EXECUTIVE SUMMARY

Project: Improvement of Ubungo Intersection

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

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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. Temereke 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 Msimba 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 29°C. The hottest season is from October to March while it is relatively cool between May and August with temperature around 25°C. 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:

<table>
<thead>
<tr>
<th>Stakeholder Group</th>
<th>Members</th>
</tr>
</thead>
</table>


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.

<table>
<thead>
<tr>
<th>S/NO</th>
<th>Environmental issues</th>
<th>Responses by the Consultant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Deterioration of Air quality due to exhaust fumes from machinery and equipment and dust from construction activities.</td>
<td>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,</td>
</tr>
<tr>
<td></td>
<td>Noise and vibrations will be generated due to increase in traffic movements and construction activities</td>
<td>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</td>
</tr>
<tr>
<td><strong>Improvement of Ubungo Intersection</strong></td>
<td><strong>ESIA Report</strong></td>
<td></td>
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<tr>
<td>--------------------------------------</td>
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<tr>
<td><strong>Soil and ground water pollution caused by improper handling of oil spills, effluents, bitumen, used oils and other chemicals.</strong></td>
<td><strong>Ensure daily environmental and safety management best practices to minimise and prevent spills of hazardous materials, soil pollution and improve waste management system.</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Economic issues</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>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).</strong></td>
<td><strong>This is the main objective of the project</strong></td>
</tr>
<tr>
<td><strong>Flyover Bridge at Ubungo will lead to expansion of commercial activities in the project area.</strong></td>
<td><strong>It will increase official business opportunities resulting more earning and improve life standards.</strong></td>
</tr>
<tr>
<td><strong>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.</strong></td>
<td><strong>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.</strong></td>
</tr>
<tr>
<td><strong>Loss of business: As the vendors will be removed from the project area, they will lose business and thus affect their daily earnings.</strong></td>
<td><strong>The authorities especially Kinondoni Municipality will assist affected people to acquire new areas for settlement and business.</strong></td>
</tr>
<tr>
<td><strong>Revenue collection (TANESCO) will be reduced as a result of relocation of power pole and lines</strong></td>
<td><strong>During the shifting of poles and wires, the Contractor will try as much as possible to avoid any unnecessary delays.</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Health and Safety issues</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The health problems may increase due to exposure to polluted air, unnecessarily long periods spent on roads such as mental stress, tiredness, and headache.</strong></td>
<td><strong>The Contractor will provide working gears to the workers and practise working shifts</strong></td>
</tr>
<tr>
<td><strong>There will be a lot of inconveniences due to traffic congestion at the intersection as experienced from BRT project.</strong></td>
<td><strong>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</strong></td>
</tr>
</tbody>
</table>
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.
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.
o 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.

o 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.

o 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.

o 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

o 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

o Transmitted Diseases

The road construction activities will be associated with the following 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

o 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:

<table>
<thead>
<tr>
<th>Impact</th>
<th>Mitigation measure</th>
<th>Responsible Institution</th>
<th>Time Frame</th>
<th>Estimated Costs (TZS)</th>
</tr>
</thead>
</table>
| Land Expropriation and Loss of Structures   | o Realigning the bridge structure and approach roads to minimize land take and effects to the building structures  
       | o PAPs’ compensations before project implementation phase                          | o Design Engineer               | Before construction phase – short term | Valuation Report            |
|                                             |                                                                                    | o TANROADS                     |                             |                             |
|                                             |                                                                                    | o Contractor                   |                             |                             |
|                                             |                                                                                    | o TANESCO                      |                             |                             |
| Interruption of public utilities           | o Realigning the bridge structure and approach roads to minimize the effects to the electricity facilities  
       | o Relocating utilities (Electricity,)                                             | o Design Engineer               | Before construction phase   | Cost estimates from TANESCO |
|                                             |                                                                                    | o Contractor                   |                             |                             |
|                                             |                                                                                    | o TANROADS                     |                             |                             |
|                                             |                                                                                    | o TANESCO                      |                             |                             |
|                                             |                                                                                    | o Design Engineer               | Before construction phase – short term | Cost estimates from TTCL    |
|                                             |                                                                                    | o Contractor                   |                             |                             |
|                                             |                                                                                    | o TANROADS                     |                             |                             |
|                                             |                                                                                    | o TTCL                         |                             |                             |
|                                             | o Realigning the bridge structure and approach roads to minimize the effects to the telecommunication facilities.  
       | o Relocating utilities (Telephone)                                                | o Design Engineer               | Before construction phase   | Cost estimates from DAWASA (Not yet done) |
|                                             |                                                                                    | o Contractor                   |                             |                             |
|                                             |                                                                                    | o TANROADS                     |                             |                             |
|                                             |                                                                                    | o DAWASA                       |                             |                             |
|                                             |                                                                                    | o DAWASCO                      |                             |                             |
|                                             | o Realigning the bridge structure and approach roads to minimize the effects to the water supply and sewerage facilities  
<pre><code>   | o Relocating utilities (Water Supply and Sewerage facilities)                     | o Design Engineer               | Before construction phase   | Cost estimates from TPDC    |
</code></pre>
<p>|                                             |                                                                                    | o Contractor                   |                             |                             |
|                                             |                                                                                    | o TANROADS                     |                             |                             |
|                                             |                                                                                    | o SONGAS                       |                             |                             |
|                                             |                                                                                    | o TPDC                         |                             |                             |
| Increase Road Accidents during operation phase | o Provide road signs                                                                  | o Design Engineer               | Long-term (Operation phase) | 5,000,000.00                |
|                                             | o Installation of speed humps                                                      | o Contractor                   |                             |                             |
|                                             | o Provision of enough designated people crossing points to avoid people crossing at any road point | o TANROADS                     |                             |                             |
|                                             |                                                                                    | o Dar es Salaam City           |                             |                             |</p>
<table>
<thead>
<tr>
<th>Impact</th>
<th>Mitigation measure</th>
<th>Responsible Institution</th>
<th>Time Frame</th>
<th>Estimated Costs (TZS)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>o Adequate lighting</td>
<td>Council</td>
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<td></td>
<td>o Traffic Police</td>
<td>TANROADS</td>
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<td>Environmental Supervisor</td>
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<td></td>
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<td></td>
<td>Before and during construction phase</td>
<td>3,000,000.00</td>
</tr>
<tr>
<td>Loss of vegetation</td>
<td>o Confine clearance to corridor of impact</td>
<td>Contractor</td>
<td></td>
<td></td>
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<tr>
<td>Water and soil pollution</td>
<td>o Tree planting after construction</td>
<td>TANROADS</td>
<td></td>
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<td></td>
<td></td>
<td>Environmental Supervisor</td>
<td></td>
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<tr>
<td></td>
<td>o Contractor</td>
<td></td>
<td>Short-term (Construction phase)</td>
<td>3,000,000.00</td>
</tr>
<tr>
<td></td>
<td>o TANROADS</td>
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<tr>
<td></td>
<td>o Environmental Supervisor</td>
<td></td>
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</tr>
<tr>
<td>Noise, Vibration and Air Pollu</td>
<td>o Watering working road section</td>
<td>Contractor</td>
<td>Short-term (Construction phase)</td>
<td>30,000,000.00</td>
</tr>
<tr>
<td></td>
<td>(near human habitation and uninhabited sections to reduce occupational exposures and to improve traffic visibility)</td>
<td>TANROADS</td>
<td></td>
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<tr>
<td></td>
<td>o Proper selection of construction machinery and vehicles</td>
<td>Environmental Supervisor</td>
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<td></td>
<td>o Regular services and lubrication</td>
<td>OSHA</td>
<td></td>
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<tr>
<td></td>
<td>o Use machinery with noise reducers</td>
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<td></td>
<td>o No working at night especially in areas with settlements</td>
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<td></td>
<td>o No quarry or borrow pit in neighbourhood of residences</td>
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<tr>
<td></td>
<td>o Periodic water sprinkling on working sections.</td>
<td></td>
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</tr>
<tr>
<td>Soil erosion</td>
<td>o Avoid unnecessary ground clearance</td>
<td>Contractor</td>
<td>Short-term</td>
<td>2,000,000.00</td>
</tr>
<tr>
<td></td>
<td>o Provide adequate drainage channels</td>
<td>Design Engineer</td>
<td></td>
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<td></td>
<td>TANROADS</td>
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<td></td>
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<tr>
<td>Impact</td>
<td>Mitigation measure</td>
<td>Responsible Institution</td>
<td>Time Frame</td>
<td>Estimated Costs (TZS)</td>
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<td>--------------------------------------------</td>
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<tr>
<td>Road Safety Risks</td>
<td>o Tree planting</td>
<td></td>
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<td></td>
<td>o Environmental awareness</td>
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<tr>
<td></td>
<td>o Detailed engineering design should include road signals and signs</td>
<td>o Design Engineer</td>
<td>Long-term during (Construction &amp; Operation phase)</td>
<td>5,000,000.00</td>
</tr>
<tr>
<td></td>
<td>o Provision of adequate insurance cover to all workers</td>
<td>o TANROADS</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>o Provide diversions and deploy a person responsible for traffic safety to avoid interference of traffic flow</td>
<td>o Local Traffic Police</td>
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<tr>
<td></td>
<td>o Special arrangement with local traffic police for security purpose</td>
<td>o Ministry of labour</td>
<td></td>
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<td></td>
<td>o Adequate lighting</td>
<td>o CRB</td>
<td></td>
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</tr>
<tr>
<td>Occupational Health and Safety</td>
<td>o Establishing Occupational Health and Environment induction course</td>
<td>o Contractor</td>
<td>short-term (Construction and operation phase)</td>
<td>7,000,000.00</td>
</tr>
<tr>
<td></td>
<td>o Provide working gear and camp management that is both hygienic and safe</td>
<td>o TANROADS</td>
<td></td>
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<tr>
<td></td>
<td>o Installing well-stocked First Aid Kit at every camp site and working site</td>
<td>o Environmental Supervisor</td>
<td></td>
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<tr>
<td></td>
<td>o Proper disposal of wastes</td>
<td>o OSHA</td>
<td></td>
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</tr>
<tr>
<td>Transmitted Diseases</td>
<td>o Support HIV/AIDS campaigns</td>
<td>o Contractor</td>
<td>short-term (Construction and operation phase)</td>
<td>3,000,000.00</td>
</tr>
<tr>
<td></td>
<td>o Provide working gear and camp management that is hygienic</td>
<td>o TANROADS</td>
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<tr>
<td></td>
<td>o Proper disposal of wastes</td>
<td>o Environmental Supervisor</td>
<td></td>
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<tr>
<td>Landscape Modification</td>
<td>o Stockpile topsoil</td>
<td>o Contractor</td>
<td>Construction and operation phases (long term)</td>
<td>5,000,000.00</td>
</tr>
<tr>
<td></td>
<td>o Design cut and fill to minimize material import and disposal of spoil material</td>
<td>o Design Engineer</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>o Advance notice to the local government leaders for the arrangement of relocation and compensation if any</td>
<td>o TANROADS</td>
<td></td>
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<tr>
<td></td>
<td>o Local community</td>
<td>o NEMC</td>
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<tr>
<td></td>
<td></td>
<td>o Local community</td>
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<tr>
<td>Interference to local water drainage</td>
<td>o Provision of drainages to allow water flow in the natural streams</td>
<td>o Contractor</td>
<td>Long -term (during Construction &amp; Operation phase)</td>
<td>2,000,000.00</td>
</tr>
<tr>
<td></td>
<td>o Efficient drainage system</td>
<td>o Design Engineer</td>
<td></td>
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<tr>
<td></td>
<td>o Advance notice Dar es Salaam Water Supply and Sewerage Authority for piped water present in the carriage way</td>
<td>o TANROADS</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>o The Contractor shall seek Water Use Permit to draw</td>
<td>o NEMC</td>
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<td>o MoW,</td>
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<td></td>
<td></td>
<td>o Local communities</td>
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<td>Responsible Institution</td>
<td>Time Frame</td>
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<td></td>
<td>water from existing sources</td>
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<td></td>
<td>o The contractor should think of use of alternative water sources e.g., drilling boreholes</td>
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<tr>
<td>In-migration</td>
<td>o Implementation of DSM Master Plan</td>
<td>DSM</td>
<td>Long-term and During construction and Operation phase</td>
<td>2,000,000.00</td>
</tr>
<tr>
<td></td>
<td>o Enforce land use plan</td>
<td>TANROADS</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>o Awareness creation</td>
<td>Local Government (All Municipalities in DSM City), Ministry of Lands NGOs</td>
<td></td>
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</tr>
<tr>
<td>Child labour</td>
<td>o Recruitment and employment of casual labours before commencing of construction works</td>
<td>Contractor, TANROADS, Labour Authority</td>
<td>Short-term (Construction phase)</td>
<td>2,000,000.00</td>
</tr>
<tr>
<td></td>
<td>o Employment will be given to people above 18 years and will be based on employment policy and regulations of Tanzania.</td>
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<tr>
<td>Solid waste generation</td>
<td>Proper disposal of debris and other wastes resulted from construction activities and dispose in the designated municipal dumping site</td>
<td>Contractor</td>
<td>Short-term (Construction phase)</td>
<td>4,000,000.00</td>
</tr>
</tbody>
</table>

**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 outweigh 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 84,200,000.00 whereas 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.