CHAPTER FIVE

5.0 STAKEHOLDERS CONSULTATION AND ANALYSIS

5.1 Stakeholders Consultation

Consultation of stakeholders is a very important component in the EIA process. It is one of the key factors that enhance environmental governance. Stakeholders are individuals, groups of individuals or institutions that have interest in the proposed project. This includes those positively and negatively affected by the project. Stakeholders' participation involves processes whereby all those with an interest in the outcome of a project actively participate in decisions on planning and management of the proposed development.

It is a Government policy that beneficiaries of and members of public living near new project sites (both public and private) are consulted to seek their views and opinions regarding the projects before they are implemented. To that end, this ESIA study was carried out in line with NEMC requirements, JICA guidelines for Environmental and Social considerations and in general good practice by the Proponent to remain compliant with the law. The Public consultation process involved visiting the areas along which the proposed distribution lines and substations will be constructed. The stakeholders were identified and consulted with the objective of describing the existing socio-economic conditions within the proposed project area of influence and the immediate surroundings.

Specific objectives was to Consult and gather recommendations from the local administration which involves Regional Commissioner, District Commissioners, Municipal Directors, Municipal Officers, Ward and Mtaa leaders and communities that have a stake in the project and provide an opportunity to all the stakeholders and communities in the areas where the proposed project is expected to pass to raise issues and concerns pertaining to the project, and allow the identification of alternatives and recommendations.

The study involved a participatory approach in the preparation of the ESIA study. This entailed seeking information/experience from stakeholders such as ward and Mtaa leaderships, local representatives and other institutions who have been involved in one way or another in the implementation of the project.

In order to get views in the ward and Mtaa level the team opted to use the Focus Group Discussion method which involves different people such as ward leaders, Mtaa leaders, youth representatives, women representatives and elders representatives. Open-ended questionnaires were also administered to households and small business enterprises neighbouring the site. Concerns, views and opinions from the respondents were received.

Consultation with stakeholders has been initiated and will be continued throughout the project life to ensure regular communication between the project proponent and PAPs. This allows for the provision of updates, changes, alteration, and new concerns where necessary from both the project proponent and PAPs such that both parties have a common perception as to what the project entails.

The team conducted FGD (Focus Group Discussion) in these wards which will be affected by the project and public meeting in some street. The meetings aimed at informing the community about the project and the associated impacts. FGD members were informed of the positive and adverse impacts

of the project include loss of land, possibilities of increase spread of HIV/AIDS especially during construction phase, as well as other Environmental and social impacts associated with the project. FGD members were also sensitized on their right to be compensated and applicable compensation norms if they will be affected. Further they were given an opportunity to ask questions, raise their concerns and provide information to the team on different issues concerning the project. Identified Issues of Concern during Meetings with Stakeholders are as follows:-

5.1.1 Consultation Meetings with Municipal Authorities

Consultation meetings with RAS office Ilala, Municipal authorities of Ilala and Kinondoni, DC'S office at Ilala and Kinondoni were held and the aim of the meetings were to discuss the project with officials and obtain relevant data and information from the respective offices.

Most of the consulted district councils and municipal officials agreed to the importance of the proposed development project to the regional and local communities' development. They had the following concerns:-

- ✓ TANESCO should now opt using the underground cables instead of overhead transmission lines.
- ✓ Another concern was the issue of compensation. If TANESCO project is going to affect people compensation procedures should be done in order to avoid misunderstanding with the community and communication should pass through Municipal offices, ward and Mtaa levels in order to make them aware of what is going on about the project.
- ✓ TANESCO should educate the community about the project in order to avoid conflict, there might be different challenges but if education will be clearly provided the project will be successful.

5.1.2 Consultation Meetings with TANROADS

During scoping exercise consultation meeting with Manager TANROADS Dar region was done and he had different opinion as follows:-

- ✓ TANESCO should have good plan with their project in order to avoid using road reserve. Using road reserve is not a proper plan so the company should prepare for compensation when implementing the project regardless the cost. Using underground cables is the best option nowadays so the company should opt using this method.
- ✓ Those who will be found in the road reserve are encroachers and are not entitled for compensation. But if TANESCO is going to use area which is out of the road reserve then compensation should be paid.
- ✓ TANESCO have a big challenge concerning theft of their properties and these thieves do cooperate with TANESCO staff so security should be increased in the transformers and other properties.
- ✓ TANESCO should protect the environment, the behavior of cutting trees during clearance of the line and leave trees is bad and it brings bad reputation to the company. After pruning trees cleaning should be done.

5.1.3 Consultation Meetings with DAWASA

Consultation meeting was conducted with Eng. Bunyese who had different views as follows:-

- ✓ Surveyor from TANESCO should observe what is inside the proposed route and it will be good to have a joint survey with DAWASA officers in order to observe what is in the proposed route and advice accordingly.
- ✓ He insisted that there must be cooperation between TANESCO and other stakeholders so as to eye mark other property inside road reserves which belongs to other companies.
- ✓ In order to make a project success they advice TANESCO to pass the distribution line (from Tegeta S/S on the way to Bagamoyo road project) on the left side of the road from the substation because they have another large water pipe project on the right side which is expected to start soon. But if that option will not be good for TANESCO then the company will have to wait until we are done with our water project.

5.1.4 Consultation Meetings with TTCL

During scoping exercise consultation meeting with TTCL was done and they had these concern:-

- ✓ The project is good in order to make it successful there must be cooperation between TTCL, DAWASA, TANROADS and respective municipals. He advised TANESCO to arrange a day so as to have site visit to conduct joint survey with all stakeholders as this will enable the company to have a good plan with the project after identifying all properties which belongs to other companies in the proposed route.

5.1.5 Consultation Meetings with Local Communities

Public participation process followed the guidelines as stipulated in the Environmental Management Act No. 20 of 2004, Part XIV regarding public participation in environmental decision-making. To facilitate an open and transparent process, interested and likely to be affected persons were identified all along the proposed route and later informed of the proposed project development and subsequent phases of the project. The positive impacts and negative impacts of the project and the corresponding mitigation measures were also described in details. Finally, at the end of the meeting, the communities were given an opportunity to ask questions, give comments, warnings, observations and opinions. These comments, observations, questions and opinions received from each person have been summarized and are addressed below. The meetings involved many people, among others, from 15 wards of 2 Municipals in Dar es Salaam region in which proposed project pass through. List of their names and signature is shown in **Appendix VI.**

Consultation meeting with local communities was conducted through focus group discussion meetings, public meeting and open ended questionnaires. These meetings involved local leaders, community members (representative of women, youth, and old people) and TANESCO team.

The consulted wards based on the proposed routes were:

- ✓ Mchikichini, Upanga East and Upanga West in Ilala Municipal Council,
- ✓ Makurumla, Kawe, Mzimuni, Kunduchi, Wazo, Msasani, Mabibo, Ubungo, Mikocheni and Makumbusho ward in Kinondoni Municipal Council.

Consultation in each ward commenced by stating the objective of the consultation meeting i.e. inform the FGD members about the project and what the proponent will do to address the potential impacts of the project.

Summary of the main issues raised during the consultation meetings and their responses

- ✓ How the project would be beneficial to the community.
  The ESIA team thanked the residents for their participation and responded to their questions informing them that the project has its benefits and drawbacks. Some of the benefits highlighted were:
  - Gains in the local and national economy thus leading to increase in revenue.
  - Access to reliable power.
  - Informal sector benefits.
  - Improved security in the area due to street lightning.
  - Direct and indirect skilled and non-skilled employment opportunities
- ✓ How safe would one be if he/she lives near the substation?
  - For safety issues, it is highly recommended that no one lives too close to the substation and this would be adhered to. In addition the following is done:
  - It will be built by experienced personnel.
  - Perimeter fencing, Security and lightning.
  - Entry to the substation is restricted, only authorized officers will be allowed
- ✓ Some of the drawbacks of the projects identified were:
  - Air and noise pollution during construction.
  - Oil spillage during construction.
  - Possibility of occurrence of accidents on the site during construction.
  - Presence of the substation may expose people to accidents and health hazards.
  - It was responded that In view of occupational health and safety concerns, the proponent will ensure health, safety and welfare of workers to prevent accidents in the course of employment and additionally provision of PPE would reduce the impacts of dust and minimize exposure to a variety of hazards respectively.
- ✓ Wanted to know whether the locals would be employed during the construction and operation phases of the project. The community expressed fear that local youths may be side lined in securing employment opportunities especially during the construction phase of the proposed project. “The contractor may decline to employ youths here and use his staff” the community asserted.
  - The team emphasized that locals will be given first priority in employment especially casual employment, the contractor will be advised to contract locals in the project area.
- ✓ Compensation of the properties to the affected people to be done before construction of the project and that proper valuation of properties and payment be made in time and should be adequate to enable PAPs get alternative housing.
  - It was responded that in deed compensation will be paid before construction starts according to Land Acts 1999.
  - The valuation process is vested to Chief Government Valuer and TANESCO being public company cannot pay beyond the Chief Government Valuer’s opinion
- ✓ Awareness on the valuation and compensation of the properties procedures to the affected people by the project. This is because most people are unaware of the procedures involved during valuation and compensation exercise.
  - TANESCO agreed that is the problem during the valuation exercise and promised to continue raising awareness during the detailed ESIA study. Further, TANESCO will ensure that engaged valuers conduct awareness meetings with PAPs before the valuation of properties starts.
- ✓ Wanted to know how will issues relating HIV/AIDS to the construction workers and community be dealt.

- It was responded that HIV/AIDS awareness within the community is very high but the project will continue to educate and sensitize workers and the community on how to avoid spread HIV/AIDS during the project implementation.
- Adverts and brochures will be erected and distributed to workers to warn and to remind people to take care for themselves. In addition condoms will be put at special areas for self-help.

The main issues that were raised by the community through questionnaires included the following:

- The project will enhance the reliability and security of electricity supply in the region in addition to increasing the region's power supply. This will help meet the increasing demand for power supply and minimize the frequency of power outages.
- The construction, operation and decommissioning of the proposed substation will create employment opportunities for both skilled and unskilled personnel.
- Some stakeholders especially the community was concerned about the possibility of occurrence of accidents such as electrocution and machine/vehicle misses during the construction and operation phase of the proposed project.
- Increase in reliability and security of power supply in the region will enhance efficiency and productivity of other sectors including health, education, water supply, livestock production and industry.
- With increased lighting in the area and presence of guards on the project site the security of the area will be enhanced.
- Electricity supply to hospitals and dispensaries in the project area would enhance delivery of services such as laboratory, surgical, immunization, among others.
- Improved health and education sector.

Disadvantages of the projects were identified as follows through questionnaires:

- Noise pollution during construction. The construction and decommissioning works of the substation will most likely be noisy due to the moving machines (mixers, tippers, drilling etc.) and incoming vehicles to deliver construction materials to site or take away debris.
- Exhaust emissions are likely to be generated by the motored equipment during the construction and decommissioning phase of the proposed substation. Motor vehicles that will be used to ferry construction materials, take away debris during decommissioning phase or those used for general operation activities (operation phase) will also have impacts on air quality.
- Dust emission is likely to occur during the site clearance, excavation and spreading of the topsoil during construction. They are also likely to occur during the decommissioning phase. Motor vehicles accessing the site may also lead to dust emissions.
- Motorized machinery on the proposed site may be containing moving parts which will require continuous oiling to minimise the usual corrosion or wear and tear. There is also a potential for oil spills and accidents during oil transportation, storage and operations of the transformers and batteries.
- Possibility of occurrence of accidents on the site during construction.
- Presence of the substation may expose people to accidents and health hazards.

Therefore, all these concerns is addressed in this EIA document that will include the preparation of Environmental and Social Management (ESMP) and Monitoring Plans (EMP).

Photo Documentation during ESIA study

Figure 5.1: Community members raising their concerns during ESIA study at Upanga West ward

Figure 5.2: Focus group Discussion with people living near the proposed 33kV Distribution line from Makumbusho to Msasani Line at Msasani ward.

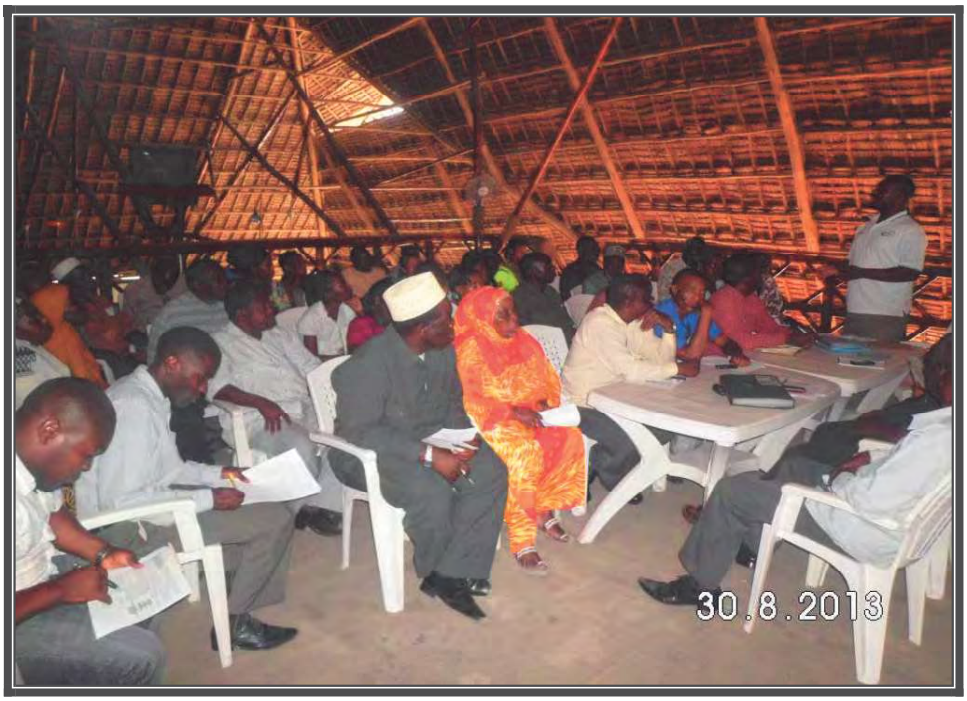


Figure 5.3: Environmental Expert explaining about the project to the people around proposed project in Mabibo ward

Figure 5.4: Sociologist Expert explaining about the project to the people around proposed project in Kunduchi ward

Figure 5.5: Household Questionnaires with people around proposed project in Mwananyamala ward

Figure 5.6: Household Questionnaires with people around proposed project in Kunduchi ward

CHAPTER SIX

6.0 POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND ALTERNATIVES

The project will comprise of the following phases: Survey and design, mobilization, construction, demobilization, operation and decommissioning. These phases will have some impacts on certain aspects of the biophysical and social-economic environment either positively or negatively and sometimes neutral.

A checklist was used to assess the effects of the project on the topics grouped into landform, water resources, ecological resources, aesthetic values, cultural environment, public health and safety and socio-economic factors. These impacts are substantiated during consultations. The impacts can be local, regional or international nature, thus boundaries need to be defined.

6.1 Project Boundaries

Determining the boundaries within which the EIA to be undertaken is an important step in the identification of impacts since this will also determine the extent in which the impacts will be experienced. Three types of boundaries that are considered in this scoping are: institutional, spatial and temporal boundaries.

6.1.1 Institutional boundaries

Institutional boundaries refer to those institutions and sectoral boundaries in which the project interacts with. These can be determined from political boundaries, Acts, regulations and institutional mandates. The proposed network enhancement/rehabilitation will bring energy in the Kinondoni and Ilala municipals. This proposed development touches the interest of many institutions and administrative structures in relation to several policies, laws and plans in Tanzania and outside Tanzania, including the development partners.

Administrative institutions such as Dar Es Salaam City Councils and Kinondoni and Ilala Municipal Councils form part of the institutional boundaries for this development. Other institutions that will be touched by the proposed development include the Ministry of Energy and Minerals, Vice President's Office (Division of Environment), NEMC, Ministry of Finance, Ministry of Water, Ministry of Health, TANESCO and several other government agencies; that support and promote energy development in Tanzania.

6.1.2 Spatial boundary

Though spatial boundaries are difficult to determine accurately, but it is crucial to decide whether impacts are likely to occur at local, regional, national or international level. The construction of the proposed power project will have far reaching implication: that could be felt locally, regionally and outside Tanzania, thus causing impact to as far as those areas. For example, the power line and installation of steel poles may create demand for goods and services that are obtained within the district, other districts in the country and the countries outside and also enhance energy services. In this report we consider the project area along the road reserve to the selected roads in the City and where the construction material will come from and pass by like our roads, railways or ports. Many investors may be attracted from different parts of the world just to hear better power services in the area. The impacts (positives and negatives) in the nearby areas include the rest of the Ilala, and nearby districts, where most of the labour force, some building materials, food and goods are likely to be obtained from

6.1.3 Temporal boundaries

Temporal boundaries refer to the lifespan and reversibility of impacts and project phase (Pre-construction, during construction, during operation and decommissioning phases). Some impacts may be short-lived, some could be persistent and might be different depending on the phases of the project. The full EIA should identify these impacts clearly and suggest the mitigation measure.

6.2 Possible Impacts Identification

Power project usually involves survey and design, mobilization, construction, demobilization operation and decommissioning. These phases are likely to have some impacts on certain aspects of the biophysical and social economic environment either positively or negatively and sometime neutral. Therefore, it is anticipated that there will be environmental and social impacts affecting various groups socially and economically. It is further anticipated that the communities will have to be protected from any negative impacts, while opportunities to be offered by the project need to be made visible to the communities. Those various groups likely to be affected by the project were closely involved in raising their concerns of the project which are addressed in the stakeholder's consultation chapters of this ESIA report.

The prediction of impacts is based on the entitlement matrix, knowledge of the expert on such project and their secondary and synergetic/ cumulative effects for the biophysical environment and local community. The assessment and valuation of impacts for different project components is characterized based on the following parameters:

- ✓ **A+/-:** significant positive/negative impact is expected
- ✓ **B+/-:** Positive/negative impact is expected to some extent.
- ✓ **C+/-:** Extent of positive/negative impact is unknown. (A further examination is needed, and impact could be clarified as the study progresses).
- ✓ **D:** No impact is expected

Table 6.1 below provides a list of foreseen environmental and social impacts of the rehabilitation of substation and construction of new lines and substations.

Category	No	Item	Degree of Potential Impacts in project phases			Potential Impacts
			Pre-Construction	Construction	Operation	
Pollution Control	1.	Air Quality	B-	B-	D	Pre-Construction and Construction: -Generation of Dust and Exhaust gas from construction machine and vehicles. Operation: -There will be no emissions of air pollutants from the operation.

	2.	Water Quality	D	D	D	Pre-Construction, Construction and Operation: -There will be no pollution of water during both phases since project area is far away from source of water.
	3.	Soil Erosion	B-	B-	D	Pre-Construction and Construction: -The construction works associated with the site preparation, vegetation clearance for RoW involve minor earthworks which include excavation of foundations (in substation, excavation of holes for steel poles and backfilling will lead to soil erosion and pollution. Operation: -There will be no soil erosion during this phase.
	4.	Waste	B-	B-	B-	Pre-Construction and Construction: -Generation of domestic and industrial waste from construction sites. Operation: - If Waste Oil in transformers is not properly handled, waste oil will be carried outside the site with storm water.
	5.	Soil Contamination	B-	B-	B-	Pre-Construction and Construction: -If waste Oil for construction machine and vehicle is not properly handled, waste oil will contaminate the soil and leach into underground water. Operation: -If Waste Oil in transformers is not properly handled, it will contaminate the soil and leach into underground water.
	6.	Noise &Vibration	B-	B-	B-	Pre-Construction and Construction: -Generation of noise and vibration due to movement of machine and vehicles. Operation: -There will be some noise pollution during the operation phase.
	7.	Land Subsidence	D	D	D	Pre-Construction/Construction/Operation: -There will be no extensive underground water use for the construction work that will cause land subsidence.
	8.	Odor	D	D	D	Pre-Construction/Construction/Operation: - There are no activities anticipated in this project that might cause odor complaints.
	9.	Sediment	D	D	D	Pre-Construction/Construction/Operation: - There are no activities anticipated in this project that might affect the quality of sediment(e.g. Contamination

						by Heavy Metal)
Natural Environment	10.	Ecosystem	A-	A-	A-	Pre-Construction/Construction: -There are some Important Bird Areas that might be affected by the construction work. Operation: -There are other migratory birds in this area and the modification of transmission line might cause electrocution and collision.
	11.	Hydrology	D	D	D	Pre-Construction/Construction/Operation: There will be no extensive cutting and filling in the construction work that will cause impacts on surface water and underground water flow.
	12.	Topography and Geology	D	D	D	Pre-Construction/Construction/Operation: There will be no extensive cutting and filling in the construction work that will cause impacts on topography and geology nature of the project area.
	13.	Impact on Vegetation	B-	B-	B-	Pre-Construction and Construction: -Some clearance of vegetation cover will occur during both phases although impacts will be small since the project will pass in road reserves. Operation: - Low maintenance of the RoW will involve clearing of vegetation using mechanical methods. This will lead to permanent control of vegetation within RoW.
Social Environment	14.	Resettlement	A-	A-	D	Pre-Construction and Construction -There are number of Project Affected Families (PAFs) in which will be determined by RAP study. Operation: -There are no activities anticipated in this project that might cause resettlement
	15.	Poverty	A-	A-	D	Pre-Construction and Construction: -The poor who are affected by this project need to be included in the Resettlement Action Plan and HIV/AIDs Prevention Plan. Operation: -There are no activities anticipated in this project that

						might cause resettlement
	16.	Local economy such as Employment and improvement of livelihood	B+	B+	B+	Pre-Construction: -There would be little opportunities for employment and economic activities in this stage. Construction: -There will be employment opportunities and demand for construction materials during construction. Operation: -Business opportunities will be created with the newly delivered of stable electricity.
	17.	Cultural Heritage	C-	C-	D	Pre-Construction and Construction: There are no heritage sites along the proposed project area that are already confirmed by the relevant authorities. However, local archeological, historical, cultural, and religious heritage sites might be found during construction. Operation: -There will be no activities having impacts on local archeological, historical, cultural, and religious heritage sites.
	18.	Gender	B-	B-	D	Pre-Construction/Construction -Gender issues that might be caused in Resettlement and HIV/AIDS prevention activities will be addressed in the Resettlement Action Plan and HIV/AIDs prevention plan. Operation: There will be no activities having impacts on Gender issues.
	19.	Infectious Disease such as HIV/AIDS	B-	B-	D	Pre-Construction/Construction - HIV and STDs might be brought due to immigration of workers associated with the project. Operation: There will be no activities having impacts on infectious diseases
	20.	Accident and Safety Issues	B-	B-	B-	Pre-Construction/Construction -Without proper measures for construction, accidents on the public roads might happen.

						Operation: -The power lines might be cut by accident or natural disaster.
	21.	Water abstraction	B-	B-	D	Construction -Water for construction work will be necessary and taken from nearest water sources, boreholes or rivers. Pre-Construction/Operation: -Water will not be necessary for the operation

Note:

- ✓ **A+/-:** significant positive/negative impact is expected
- ✓ **B+/-:** Positive/negative impact is expected to some extent.
- ✓ **C+/-:** Extent of positive/negative impact is unknown. (A further examination is needed, and impact could be clarified as the study progresses).
- ✓ **D:** No impact is expected

6.3 PROJECT ALTERNATIVES

Project alternative refers to the considerations made in the course of developing the project that would achieve the same project objectives. Consideration of project alternatives is crucial in ensuring that the developer and decision–makers have a wider base from which they can choose the most appropriate option and more proactive sides of environmental assessment. This process serves to enhance the project design through an examination of the potential options instead of only focusing on the more defensive task of reducing adverse impacts of a single design. This calls for the comparison of feasible alternatives for the proposed project site, technology, and/or operational alternatives. Both the viability and economic considerations were born in mind when assessing the alternatives. Different project alternatives have varying characteristics, in this report, alternatives consideration was made on the location/demand and input options. Despite being a range of methods, which were used in evaluating different alternatives, this report relied on consultations with stakeholders and field visits to locations that were felt to provide close characteristics to the alternative proposed by this study. The following alternatives were considered but where found either to have high investment and operational costs, not meeting the project objectives or environmentally unfriendly as compared to the proposed ones.

6.3.1 No project alternative

The no project alternative entails retaining the current status quo without developing the project and therefore foregoing such investment. Based on the analysis of current situations of electricity, power demand and network reasonability in the City, that is to say Dar es Salaam City will not solve the problem of low power supply capacity of the existing power infrastructures. Also it will not improve power availability in Dar es Salaam City and failed to help the development of socio-economic activities, industries and big investment in Dar es Salaam region. Quality of life of residents who restricted on energy use will not improve. All will still spending lot money for fuel, maintenance and spares which could have been spend on other social benefits.

In fact this decision will not disturb the existing environment and will not take any land of the PAPs. However, it will deny the economic gains through employment, government revenues indirectly from development of socio-economic activities, industries and big investment around project regions and social development in the region. TANESCO will not gain the benefits accrued from solving the problem of low power supply capacity in Dar es Salaam City.

In other words the "Zero Option" is not in line with the Government policies of improving the investment development in order to achieve the requirements of National Strategy for Growth and Reduction of Poverty (NSGRP/MKUKUTA) as envisaged in the Tanzania's Development Vision (Vision 2025) which stresses on development and commitment to regional and other international initiatives for social and economic development.

6.3.2 Transmission and distribution lines Alternatives

The transmission and distribution lines can be constructed overhead lines and underground cables. However, the choice of the transmission and distribution lines depends on many factors including the costs and time factors. The major advantage of overhead lines is that cheap, less time consumption and does not require more knowledge especially during construction compared to other forms of power lines. The proposed project has only underground cables alternatives.

6.3.2.1 Underground cables

Underground cables are more expensive, time consumption and require more knowledge especially during laying down of the cables compared to overhead power lines. This option is ruled out due to investment costs and other viewpoint as explain above.

6.3.2.2 Distribution line from Ilala to Muhimbili

This alternative was disregarded after site visit to the area. The design of the line was observed to be more expensive considering the environmental factors of the area since the area is swampy limiting accessibility during construction and operation of the line. More over the line would pose risk to people around in case of emergency on the line. Therefore this option was replaced with an alternative line from City centre to Muhimbili.

6.4 Alternative Transmission Line Routes Selection

Currently there is only one route selection which based on construction costs and reduced anticipated environmental and social-economical impacts. The current design proposes the distribution line routes be located along existing roads reserves, that is TANROADS' and Municipal Councils' so as to minimize the environmental and social impacts i.e. resettlement of people along the proposed routes. All road reserves owners gives TANESCO permits to pass through it.

6.5 Alternative Locations for Substations

Currently there are no preliminary alternative locations for substations since upgrading of Ilala and Msasani substation will take place inside the existing Substations owned by TANESCO and others new substations will be constructed within located areas as per proposed designed and TANESCO have permit for both new constructed substation from plots owners. These existing locations of substations have been proposed in order to reduce social-economical impacts since and environmental impacts will be low.

CHAPTER SEVEN

7. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

7.1 General overview

The Environmental and Social Management Plan (ESMP) presents the implementation schedule of the proposed mitigation measures to both environmental and social impacts as well as planning for long-term monitoring activities. In order to be effective, Environmental Management Plan must be fully integrated within the overall project management efforts at all levels, which itself should be aimed at providing a high level of quality control, leading to a project which has been properly designed and functions effectively throughout its determined life span. The sited responsible institution should be ready to monitor indicators and fully supervise to fully minimize the impacts level.

Essentially, ESMP is an integral part of the environmental project management process. It checks the implementation and success of mitigation measures during construction and operation/ maintenance of the project. It is the monitoring system/tool that will reveal changes and trends brought about by the construction and operation of the project under development.

For the rehabilitation of substations and construction of new lines and substations in Dar es Salaam Project, the ESMP is given in Table 7.1. The ESMP also includes the associated environmental costs needed to implement the recommended mitigation measures. The recommended ESMP have been made to enable the project implementation to be more environmental friendly.

To facilitate smooth implementation of the project, all parties involved in the design and those to be involved in construction of the transmission line will have to take into consideration the mitigation measures recommended in this study.

The implementation steps will involve the contractor, the Resident engineer, TANESCO, and the local/nearby communities at large. An Environmental Control Officer (ECO) to be appointed by the consultant/contractor will ensure and monitor the implementation of the (ESMP).

Table 7.1 shows the environmental management plan and estimated costs. Estimated costs are only indicative and therefore, should the proposed development go on with the suggested changes, the developer (TANESCO) will have to work out actual costs and include them in the overall cost of the project. In accordance with EMA, (URT, 2004) NEMC will be responsible to ensure implementation and compliance of the proposed environmental management and monitoring plans.

Table 7.1: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

Phase	Potential Direct Impacts	Management/Mitigation Measures	Significance	Target Level/Standard	Responsibility	Estimated Costs (T.shs)
SITE SELECTION	Damage/Loss of valuable natural habitat, and contained biodiversity if any	✓ Proper route/site selection mainly along the road reserve limited ✓ The TANESCO shall ensure natural regeneration at all degraded areas and species enrichment.	Negative and short term	As minimum loss as possible	TANESCO	5,000,000 per year
	Loss of land/property and disruption of land use and economic activities	✓ Proper route/site selection mainly along the road reserve limited ✓ Reallocation of land to nucleated settlement if the need arises ✓ All the procedures of acquiring land from the former owner to be followed and TANESCO to have title deed for plot on substation	Negative and short term	Land and title deed have been acquired and no compensations needed.	TANESCO, Ilala and Kinondoni LGAs	Part of project costs
	Conflict with other users on the proposed project area.	✓ Conduct proper consultations and awareness. ✓ Meetings will be conducted regularly to discuss any arising issues.	Negative and short term	Conflicts as minimum as possible	TANESCO , Kinondoni and Ilala LGA	10,000,000 per year
DESIGN	Nuisance and Disturbance to on/offsite noise pollution receptors	✓ The contractor shall maintain machinery and vehicles in good running conditions by ensuring that any construction equipment to be used undergoes weekly preventive maintenance to minimize noise and air pollution and leakages. ✓ The TANESCO in collaboration with the contractor shall enforce vehicle road restrictions to avoid excess emissions from engine. ✓ The TANESCO shall consider the routine inspection of all machinery and construction equipments	Negative and short term	As minimum noise /emission as possible	TANESCO, Contractor.	Part of project costs
	Deteriorated of local air quality	Same as row above	Negative and short term	As minimum noise /emission as possible	TANESCO, Contractor.	Part of project costs
	Increased income to locals from employment opportunities and reliable and stable power	✓ The TANESCO to collaborate with the Kinondoni and Ilala LGA to allocate job fairly among suitable people available in the project area, service lines connected.	Positive and Long term	Less poverty	TANESCO, Kinondoni and Ilala LGA	50,000,000 per year

	Public health hazards, nuisance and loss of aesthetics	✓ The Contractor shall prepare and submit with tender a Waste Management Plan for proper handling and storage of materials; proper treatment of waste and sewerage. ✓ During earthworks, i.e. excavation, digging pits, etc. contractor shall ensure the top soil is pilled aside at one place, and used to fill the borrow pits and any bare land surfaces to allow regeneration of the indigenous plants of which their seed bank always stays with the top soil and make sure to reinstate all paved blocks ✓ During construction mobile/portable toilets shall be used by all workers ✓ At completion of each day, site shall be left clean and tidy; debris, scrap and spill materials removed. ✓ Domestic waste shall also be buried in pits or toilets to be dug at the site	Negative and short term	No haphazard disposal of domestic wastes	TANESCO	Part of project costs
	General public health and safety hazards	✓ Drivers of heavy equipments to use ear plugs – protection from exposure of excessive noise levels e.g. ear plugs; alternatively exposures shall be limited to 8 hour only ✓ Day time movement; drivers of vehicles shall be instructed to observe speed limits, particularly when passing through settlements and schools. Speed bumps could be constructed if necessary to limit the speed of moving vehicles to 50 km/hr. ✓ The contractor to employ drivers with authenticated class C licence and with a minimum of 3 years of driving after obtaining the class C licence ✓ The contractor to sensitize all drivers on the importance of observing traffic regulations ✓ All workers to be provided with safety gears ✓ Communities shall be sensitized on safety issues, how to protect themselves from	Negative and short term	Health and Safety Induction course including Personal Protective Equipment (PPE) to all workers.	Contractor, TANESCO and mtaa leaders	Part of project costs

		danger and accidents				
	Occupational health and safety hazards	As two rows above	Negative and short term	Health and Safety Induction course including personal protective equipment to all workers.	contractor	Part of project costs
	Public health / safety hazards	✓ TANESCO in collaboration with the Contractor to conduct awareness campaigns among workers and tenants to mitigate HIV/AIDS spread if the need arises.	Negative and short term	No or minimum HIV/AIDS victims	TANESCO, Kinondoni and Ilala LGA, contractor	5,000,000 per year
	Compromised Security	✓ TANESCO shall device a system of safeguarding the project items from theft and vandalism	Negative and short term	No vandalism cases	TANESCO	5,000,000 per year
MOBILIZATION AND CONSTRUCTION	Loss of vegetation cover / Land degradation for re-aligning various agricultural operations	✓ Close unnecessarily temporally cleared areas ✓ Route adjustment to avoid high valued features(habitats) ✓ Open minimal access roads	Negative and short term	As minimum vegetation clearance as possible	Contractor	Part of project cost
	Soils Damage/disturbance to surface and sub-surface organisms	✓ During construction, low-pressure equipments shall be used and sensitive soils (water logged, prone to erosion) shall be avoided.	Negative and short term	No degradation	Contractor	Part of project cost
	Impaired local air quality, disturbance/ nuisance to workers and offsite-receptors	As above	Negative and short term	As minimum noise /emission as possible	TANESCO. Contractor	Part of project cost
	Contamination/impaired quality of receiving body – land and water sources	✓ Both TANESCO and contractor shall undertake training and instruction to crew in proper handling and clean up of contaminating spills	Negative and short term	No haphazard disposal of solid waste/domestic waste	TANESCO, Contractor	Part of project costs
	Hazards to workers-injuries, accidents and electrocution	✓ Code of conduct at work place should be instituted to assure safe working environment. Proper underground depth	Negative and short term	As minimum as possible	TANESCO Contractor	Part of project cost

OPERATION	Increased incomes to local government authority	✓ The project will add to the government economy by generating tax revenue Kinondoni and Ilala LGA	Positive and Long term	Improved project implementation	Kinondoni and Ilala LGA	Part of project cost
	Improved household economy and livelihoods , Improved power security and Induced development	✓ Improved household economy ✓ Improved power security ✓ Induced development	Positive and Long term	Improved project implementation	Kinondoni and Ilala LGA	Part of project cost
DECOMISSIONING	Loss of employment and contaminations	✓ Awareness and SACCOS creation ✓ Removal of machines/plant and waste materials,	Negative and short term	As minimum as possible	TANESCO	Part of project cost

CHAPTER EIGHT

8. ENVIRONMENTAL AND SOCIAL MONITORING PLAN (EMP)

Table 8.1 shows the environmental and social monitoring plan (EMP), which includes monitoring indicators, frequency and estimated costs. Estimated costs are only indicative and therefore, should the proposed development go on with the suggested changes, the developer (TANESCO) will have to work out actual costs and include them in the overall cost of the project. In accordance with EMA, (URT, 2004) NEMC will be responsible to ensure compliance of all the agreed conditions for authorization.

Table 8.1: ENVIRONMENTALAND SOCIAL MONITORING PLAN (EMP)

Phase	Potential Direct Impact	Parameter to be Monitored	Monitoring frequency	Monitoring Area	Measurement unit	Target Level/Standard	Responsibility	Estimated costs (TShs)
SITE SELECTION	Damage/Loss valuable of natural habitat and contained biodiversity if any	Number of endemic species	Once before project initiation.	Project site	Numbers and names	IUCN list CITES list	TANESCO	5,000,000 per year
	Loss of land/property and disruption of land use and economic activities	Number of affected people	Once before initiation	Project site	Numbers	All that are affected, (If any)	TANESCO	5,000,000 per year
	Conflict with other project area users.	Number of conflicts	Once every 4 months	Project site	Number of conflicts	None	TANESCO, Kinondoni and Ilala LGA	5,000,000 per year
DESIGN	Nuisance and Disturbance to on/offsite noise pollution receptors	Noise levels	Once at the start of the project and during agricultural activities seasons.	Project site	dB g/l	<55 dB TBS	TANESCO Contractor	5,000,000 per year
	Increased income to locals from employment opportunities and reliable power	Sustainable economy	Once every year	Project site	Standard of living	Less poverty	TANESCO, Kinondoni and Ilala LGA	5,000,000 per year
	General public health and safety hazards	Number of accidents	Once every year	Health Centre records	Number of accidents involving project vehicles	No or minimum accidents	TANESCO	2,500,000 per year

	Occupational health and safety hazards	Induction courses PPE	Once every year	Health Centre Company records	Number of Patients and types of ailments	No or minimum incidences of occupational related diseases	TANESCO	2,500,000 per year
	Public health / safety hazards	Health status of communities and workers	Once every six months	Health Centre Company records	Number of HIV/AIDS cases	As minimum as possible	TANESCO, Kinondoni and Ilala LGA	5,000,000 per year
	Compromised Security	Theft incidences	Once before construction	Project area site	Numbers and names	No theft	TANESCO, Kinondoni and Ilala LGA	5,000,000 per year
MOBILIZATION/CONSTRUCTION	Loss of vegetation cover / Land degradation for re-aligning various agricultural operations	Ecological components	Once before construction	Project area site	Numbers and names	Endangered components / endemic components are protected	TANESCO	5,000,000 per year
	Impaired local air quality.	Vegetation growth	Once every year	River banks	Rate of growth	No vegetation growth	TANESCO	5,000,000 per year
	Contamination/impaired quality of receiving body – land and water sources	Water quality (oils)	Once every six months	project area	Mg/l ppm	TBS standard	NEMC and TANESCO	5,000,000 per year
	Contamination/impaired quality land and disruption of local species composition	Species diversity	Once after one year of commissioning	project area	Type of species	None	TANESCO and NEMC	2,000,000 per year
	Hazards to workers-injuries, accidents	Induction courses PPE	Once every year	Health Centre Company records	Number of Patients and types of ailments	No or minimum incidences of occupational related diseases	TANESCO and OSHA	2,000,000 per year
OPERATION	Increased incomes to local government authority	Number of times taxes are collected	Once every year	Project area	Increase of taxes	Less poverty	TANESCO Kinondoni and Ilala DC	5,000,000 per year
	Improved household economy and livelihoods Improved power security Induced development	Number of times taxes are collected	Once every year	Project area	Increase of taxes	Less poverty	TANESCO Kinondoni and Ilala LGA	5,000,000 per year

DECOMMISSIONING	Loss of employments and contaminations	Number of people deployed Air quality Wastes	Once after six months of decommissioning	Project Area	Numbers of employee Dust particles, fumes Tones of Conductors, Cables, Metal scrapers	Less number of job losers Air quality parameters within standards No waste remains on site	TANESCO NEMC Kinondoni and Ilala LGA	10,000,000 per year

CHAPTER NINE

9. COST BENEFIT ANALYSIS

9.1 Financial cost benefit analysis to the project

Cost-benefit analysis is normally done in the framework of feasibility study of an activity. The aim of cost-benefit analysis is to inform the project developer to make a decision on:

- ✓ Whether it makes economic sense to continue with the project;
- ✓ Whether the chosen option is cost effective alternative; and
- ✓ Whether the size of a project is appropriate.

In this project the costs includes:

- ✓ capital expenditures;
- ✓ operating and maintenance costs;
- ✓ staff costs;
- ✓ operation materials; and
- ✓ environment, health and other social costs.

Benefits include:

- ✓ Income generation to TANESCO and the Government as whole;
- ✓ Accurate operation schedule to avoid unnecessary costs;
- ✓ Protection of environment and health; and
- ✓ Provision of other social benefits.

The TANESCO and JICA have undertaken a feasibility study of the rehabilitation of substations and construction of new lines and substations in Dar es Salaam and confirmed that the project is economically viable.

9.2 Quantifiable and non-quantifiable benefits to communities

There will be direct and indirect benefits to the communities as follows:

- ✓ The project will employ about 100 people and almost all staff will be recruited locally apart from the international
- ✓ With stable power this will attract other social economic activities such as food vending, shops, etc.
- ✓ With stable power also will attract more Investment Resources thus to generate funds to the Tanzania
- ✓ This property is going to cater for the problems which are associated to the most rapid growing cities in the world and Dar es Salaam is one of them in reducing congestion in the present condition of the existing offices. Reduce disturbance that were caused by the congestion,
- ✓ Also intended to improve security to workers, to creates adequate parking, to create essential facilities for conferences, function and catering, strictly consider security, privacy and need for disabled and raise revenue.

9.3 Possible costs to communities

Construction of distribution lines will be along road reserves and transmission line on the existing way leave corridor which means no land acquisition, however few compensations will be paid for some of community members inside the road reserves and the transmission line corridor. Therefore no any

activities that will be disrupted. Other impacts are as elaborated above. However, TANESCO is committed to mitigate the negative social and environmental impacts.

9.4 Possible costs to government

The power rehabilitation project was initiated by TANESCO under the Ministry of Energy and Minerals. TANESCO managing the development of the project on behalf of the Government. All the funds needed to construct the infrastructure will be obtained as a grant from the Government of Japan through Japanese International Cooperation Agency (JICA)

9.5 Environmental costs and benefits analysis

Environmental cost benefit analysis is assessed in terms of the negative and positive impacts. Furthermore, the analysis is considering whether the impacts can be mitigated and the costs of mitigating the impacts are reasonable. One of the major significant negative environmental impacts is that of the interactions with other utility facilities (TTCL, DAWASA etc.). The project contractor has to work in coordination with other facilities provider so as to minimise disturbances.

CHAPTER TEN

10.0. DECOMISSIONING

10.1. Introduction

Section 102.-(1) of EMA (20) requires that upon expiry of a project or undertaking stipulated under the Second Schedule to this Act, the proponent or operator shall, at his own cost undertake safe decommissioning, site rehabilitation and ecosystem restoration before the closure of the project or undertaking. The main challenge will be to deal with the situation whereby beneficiaries have already improved their lifestyle and already adjusted to the use of the stable power suddenly these services are stopped. This action will impact negatively the already advantaged society socially, psychologically and economically. The only and possible mitigation measure is to inform the client and prepare them psychologically before effecting decommissioning. Another challenge is on how to dispose of the demolitions if the building has to be pulled down.

From the design, the life-time (economic) of the transmission line, distribution lines and substations is about 30 years but in practice even more than that. Once the lines are built can stay there for a good number of years, however when removed they should be handled in environmentally friendly ways.

10.2 Decommissioning Plan

At the end of the project span, there should be arranged decommissioning plan that caters for the project owner and respective community, authority organ or body responsible for environmental management, conservation and protection in the conservation area to ensure that the project does not continue to further generate negative impacts. However, the most discussed impacts come to an end after construction phase remaining with few impacts that also end in the operation phase. Such impacts expected to end in construction and operation phase include: Level of accidents, Diseases (HIV) and human health, Level of traffic, Use of local resources, Liquid waste generation, Vibration and noise, and Employment opportunities.

CHAPTER ELEVEN

11. CONCLUSION AND RECOMMENDATION

11.1 Conclusion

This EIA report presents the results of the environmental impact assessment study for the proposed power network rehabilitation, rehabilitation of substations and construction of new lines and substations in Dar es Salaam. The results of the study have shown that the project activities from construction up to operation stages will not have significant negative impact to the environment. Most of the impacts are minor but should not be ignored. Few impacts that are relatively can be mitigated as detailed in tables 7.1 and 8.1. Therefore, the project is considered to be environmentally viable provided that the recommended mitigation measures adhered and implemented during all phases.

11.2 Recommendation

The proposed ESMP will require the TANESCO to make a close supervision of the contractor to ensure that she/he abides to the environmental obligation during execution of the tasks assigned during construction. A contract document should state environmental responsibility of the contractor and should package the proposed supervision costs of the environmental supervisor.
The following are strongly recommended:

- ✓ Enhancement measures for all the identified positive impacts should be undertaken in order to ensure that the project yields maximum benefits
- ✓ After the completion of the construction phase, measures should be taken to restore/reinstate the degraded environment.
- ✓ The project management including contractor and his work team, should undertake seriously the implementation of the proposed mitigation measures and monitoring plan with the aim of minimizing the potential negative environmental impacts in the project area
- ✓ Site meeting should in all costs, table and discuss the environmental issues including implementation plan and achievement made so far to preserve the environment as suggested in the ESMP.

Finally, all relevant stakeholders and interested parties should be allowed to provide their views during all the project phases provided that they aim at improving the project and that they are informed accordingly during different levels of project implementation.

REFERENCES

- ✓ JICA PREPARATORY SURVEY TEAM-Yachiyo Engineering Co. Ltd and West Japan Engineering Consultants, Inc. (April, 2013). *Field Report Preparatory Survey On The Project For Rehabilitation Of Substations And Construction Of New Lines And Substations In Dar Es Salaam In The United Republic Of Tanzania-Part 1*
- ✓ JICA (April, 2004). *Japan International Cooperation Agency Guidelines for Environmental and Social considerations*
- ✓ United Republic of Tanzania (URT) (2004). *Environmental Management Act (EMA)*. Government Printers, Dar es Salaam.
- ✓ United Republic of Tanzania (URT) (2005). *Environmental Impact Assessment and Audit Regulations G.N. No 339*. Government Printers, Dar es Salaam

Appendix I: Approval Terms of Reference for Undertaking the ESIA Study

Environmental and Social Impact Assessment Study for the rehabilitation of substations and construction of new lines and substations in Dar es Salaam

1.0 Introduction

TANESCO is a Parastatal Company that is wholly owned by the government of Tanzania. The company's core business is generation, transmission, distribution and sale of electricity to the Tanzania mainland and bulk power to Zanzibar.

The Government of Tanzania through Tanzania Electric Supply Company (TANESCO) is planning to undertake rehabilitation of substations and construction of new lines and substations in Dar es Salaam City. Under the Japanese International Corporation Agency (JICA) funding, TANESCO has completed carrying out a conceptual detailed design study of the proposed transmission and distribution line routes and substations.

The overall objective of the project is to provide increased access to electricity with sustainable effects on poverty reduction by facilitating income generation and improved social services. The technical objective of the project is to stabilize the grid system, increase power supply, improve reliability of the power supplied in Dar es salaam city, as well as to increase the extent of TANESCO's distribution network in the city in order to be able to provide electricity to commercial business activities, water pumping, secondary schools, medical services, streetlights, residential houses, agro-processing activities etc. in the project area.

The proposed project has five (5) components which are:

- ✓ Reinforcement of Ilala substation and existing 132 kV transmission line from Ilala substation to Ubungo substation (7.5 km)
- ✓ Construction of new Jangwani Beach substation (33/11kV) and construction of distribution line (33kV) from Jangwani beach substation to Tegeta substation (6.5km)
- ✓ Construction of Muhimbili substation (33/11kV) and construction of distribution line (33kV) from Muhimbili to City Center substation (2km)
- ✓ Construction of Mwananyamala substation (33/11kV) and construction of distribution line (33kV) from Mwananyamala substation to Makumbusho substation (1.1km)
- ✓ Expansion of Msasani substation (33/11kV) and expansion of distribution line (33kV) from Msasani substation to Makumbusho substation (7.6km)

2.0 Project Area

The transmission line will be constructed from Ilala substation to Ubungo substation along the existing 132kV line II in Dar es salaam City crossing the two municipalities of Kinondoni and Ilala. Three new substations with respective distribution lines will be constructed in Kinondoni Municipal Council while the remaining two substations with their respective lines are located in Ilala Municipal Council.

The current design proposes the distribution line routes be located along existing roads reserves, that is TANROADS' and Municipal Councils' so as to minimize the environmental and social impacts i.e. resettlement of people along the proposed routes. The project areas are accessible by road.

3.0 Objective

The purpose of this Terms of Reference (ToR) is to provide guidance to the consultant or study team to carry out a comprehensive Environmental and Social Impact Assessment (ESIA) for the proposed project according to the financier guidelines (JICA), national laws and regulations (Environmental Management Act CAP 191 of 2004 and Environmental Impact Assessment and Audit Regulation of 2005).

The ESIA is intended to identify potential impacts of the project (physical, biological and social economic), justify optimal choices that would minimize or avoid potential negative impacts and design appropriate environmental and social management plan (ESMP) to address and mitigate impacts that cannot be avoided.

ESIA will also identify opportunities for environmental enhancement and sustainable development that could be implemented. The ESMP will describe in detail the mitigation measures to be implemented, including the estimated cost, schedule and organization needed to implement it. The monitoring process schedule and any social and environmental management capacity building and institutional strengthening that may be required for responsible institutions involved in the project.

The specific objectives of ESIA study are:-

- ✓ Review and documents the baseline data and information on both the natural environment i.e. physical, biological and man – made environment including social economic conditions of the proposed project areas;
- ✓ To identify, predict and evaluate potential positive and negative impacts of proposed transmission line power project including substations;
- ✓ To develop mitigation measures that aim at eliminating or minimizing the potential negative impact and promote the positive ones and recommended appropriate mitigating measures to be incorporate in the engineering designs;

4.0 Approach

In order to achieve the objectives outlined above and taking the matter as an urgent with NEMC decision, the ESIA study are envisaged to be pursued in the following three main stages:

Stage I: Project registration and submission of project brief to National Environment Management Council. The client in collaboration with consultant shall fill the registration forms; prepare project briefs of the project for carrying out ESIA study to be submitted to NEMC for approval.

Stage II: Carrying out Scoping Study and preparation of ToR: The Consultant shall carry out an environmental scoping exercise and should comply with existing environmental standards in the country i.e. Environmental Management Acts CAP 191 of 2004 and Environmental Assessment and Audit Regulation of 2005.

Stage III: Carrying out full ESIA study after NEMC approve scoping report and ToR for all project components, including infrastructural works, power line and substation.

5.0 Requirements

The ESIA and ESMP must comply with local standards in Tanzania i.e. Environmental Management Act Cap 191 of 2004 and its Environmental Impact Assessment and Audit regulation of 2005 and should meet financier's guideline, current internationally accepted standards of information gathering, reporting and analysis.

Environmental and Social Impact Assessment (ESIA) will be carried out in the proposed project area of probable project influence as already defined and delineated, covering both the construction and operation phases of the project and by using both qualitative and quantitative methods.

6.0. Environmental and Social Impact Assessment

For the Environmental and Social Impact Assessment the consultant(s) will:

- ✓ Describe the proposed project by providing a synthetic description of the project relevant components and presenting plans, maps, figures and tables.
- ✓ Identify and describe the policy, legal and administrative (institutional) framework relevant to the project.
- ✓ Define and justify the project study area for the assessment of environmental and social impacts.
- ✓ Describe and analyse the physical, biological and human (social) environment conditions in the study area before project implementation. This analysis shall include the interrelations between environmental and social components and the importance that the society and local populations attach to these components, in order to identify the environmental and social components of high value or presenting a particular interest.
- ✓ Describe and analyse potential environmental impacts i.e. negative and positive and propose / recommend mitigation measures to minimize or avoid the impacts.
- ✓ Present and analyse alternatives to the proposed project, including the "without project" option, by identifying and comparing the alternatives on the basis of technology, location, design, economic, construction technique, maintainability, environmental and social criteria, capital, and operating cost, institutional and monitoring requirement.
- ✓ Conduct resource evaluation or cost benefit analysis of the project

7.0 Environmental and Social Management Plan (ESMP)

Define appropriate mitigation/enhancement measures to prevent, minimise, mitigate, or compensate for adverse impacts or to enhance the project environmental and social benefits, including responsibilities and associated costs. The ESMP should include (but not limited to) the following:

- ✓ Recommendation of feasible and cost-effective measures to prevent or reduce significant negative impacts to acceptable levels
- ✓ Estimate of the magnitude of impacts and costs of mitigation measures.
- ✓ Consideration for compensation to affected parties for impacts that cannot be mitigated

- ✓ Set of *best practices* measures to be followed in order to avoid some of the impacts during construction and operation phases of the project
- ✓ Identification of institutional needs to implement environmental and social assessment recommendations including a review of the authority and capability of relevant institutions. Recommend steps to strengthen or expand these institutions to ensure that effective environmental management and monitoring will occur.
- ✓ Description of detailed arrangements required for monitoring implementation of mitigating measures and the impacts of the project during construction and operation.
- ✓ Proposed work programs, budget estimates, schedules, responsibilities for implementation, and other necessary support services to implement the ESMP.
- ✓ As appropriate, prepare an environmental hazard plan including an analysis of the risk of accident, the identification of appropriate security measures and the development of a preliminary contingency plan.

8.0 Public Participation

Carry out consultations with primary and secondary stakeholders in order to obtain their views on and preoccupations about the project. These consultations shall occur during the preparation of the ESIA report to identify key environmental and social issues and impacts, and after completion of the draft ESIA Report to obtain comments from stakeholders on the proposed mitigation/enhancement measures.

The consultant will prepare a thorough consultation program and a record (with evidence of picture, adverts and signatures) of meetings, communications and comments to be part of ESIA study and presented to the environmental authority (NEMC).

9.0 Reporting

The ESIA Report shall be presented in a clear and concise manner and focus on relevant and significant environmental and social issues that assist in understanding the project and its impacts. The scope and level of details of the Report shall be proportional to the project's potential impacts.

The ESIA Report shall describe the scientific approach adopted to carry out the studies. In particular, the models, methods and criteria used in the studies shall be presented and explained. The Report shall also include maps and drawings at the appropriate scale and refer to all consulted documents.

ESIA Report shall contain items and arrangement according to the Environmental Impact Assessment and Audit Regulations, 2005. In addition, all relevant consults should have signatures against their names.

I. **Draft final report** 1 soft and 15 hard copies to be submitted to NEMC for review, comments and further actions regarding this draft report. The consultant shall produce Report in English with non technical executive summary in English and Kiswahili languages.

II. **Final report** 1 soft and 5 hard copies amended in response to opinions / comments given by TAC meeting will be submitted to NEMC as final ESIA report. The consultant shall produce report in English with separate bound non technical executive summary in both English and Kiswahili languages.

10.0 ESIA Study Team

The study team will involve consultant and experts with demonstrable practical experience in conducting EIA studies for linear projects.

The study team shall in briefly comprise of at least the following key personnel with the specializations listed below:

- ✓ Team Leader – Environmental Expert – Registered with NEMC as EIA expert
- ✓ Sociologist – Economic expert
- ✓ Ecologist
- ✓ Environmental Engineer
- ✓ Mapping / GIS expert
- ✓ Surveyors
- ✓ Other experts including but not limited to: Waste management expert, Transmission and Distribution line expert, RAP expert etc.

11.0 Time Frame

It is anticipated that the duration of the study commencing from the date of approval of these terms of references by NEMC to the date of submission of final ESIA report for the proposed project will be two (2) month calendar

Appendix II: Screening Decision from NEMC for undertaking Scoping Exercise

NATIONAL ENVIRONMENT MANAGEMENT COUNCIL (NEMC)

BARAZA LA TAIFA LA HIFADHI NA USIMAMIZI WA MAZINGIRA

Tel: Dir: +255 22 277 4852
Tel: +255 22 277 4889
Mob: +255 713 - 608930
Fax: +255 22 277 4901
E-mail:nemc@nemctan.org

Regent Estate Plot No. 29/30,
P.O.Box 63154,
DAR ES SALAAM
TANZANIA

In reply please quote:
NEMC/656/1/Vol.I/9
Ref:.....

Date: 21/11/2013

Managing Director,
Tanzania Electric Supply Company Limited (TANESCO),
P.O. BOX 9024,
DAR ES SALAAM

RE: APPROVAL OF TERMS OF REFERENCE FOR UNDERTAKING AN EIA STUDY ON THE PROPOSED REHABILITATION OF SUBSTATIONS AND CONSTRUCTION OF NEW LINES AND SUBSTATIONS IN DAR ES SALAAM

Reference is made to the subject matter above.

We acknowledge receipt of your letter referenced SMR/MEnv/EIA/19 of 21st October, 2013 submitted with Scoping report and Terms of Reference for undertaking an EIA study for the aforementioned project.

The scoping report and Terms of Reference were reviewed and found to be generally adequate and therefore can be used to guide the Environmental Impact Assessment (EIA) study for the named project. In this regard, you will be required to submit to NEMC 15 copies of the EIS accompanied by a Non Technical Executive Summary in Kiswahili and English versions as required by Regulation 19(2) of EIA and Audit Regulations, 2005. Also, you will be required to ensure that:

- All applicable legal and policy frameworks and their respective requirements are addressed in the EIA report;
- All identified key stakeholders including TANROADS, Municipal and local Authorities are exhaustively consulted and their views and concerns addressed
- The land requirements, components and operations of the substations along with anticipated impacts and mitigation measures are explained in the EIS.

Upon submission of the EIS, you will be required to pay to the Council charges for the review of the EIS and approval processes amounting to Tshs. **5,244,000/=**. The funds can be paid by cheque/cash or deposited in the NEMC Account with the following details:

Bank/Branch: NMB/Bank House.
A/C Name: National Environment Management Council
A/C No: 2011100084
Swift Code: NMIBTZTZ

RECEIVED 27 NOV 2013

RECEIVED 25 NOV 2013

TANZANIA ELECTRIC SUPPLY COMPANY LIMITED RECEIVED BY: 27 NOV 2013 MAIL ROOM HEAD OFFICE

All correspondence should be addressed to the Director - General

Attached herewith, please find the budget breakdown for your reference.

Should there be any clarification required on this matter, please contact us through mobile numbers 0754611333 or 0784302464.

Yours Sincerely,

Eng. K. P. Luteganya
For: Director General.

Appendix III: Road reserve permits and other permits from responsible authorities

✓ TANROADS PERMIT

TANZANIA NATIONAL ROADS AGENCY

Tanzania National Roads Agency
TANROADS
Good roads for national development

P.O Box 4838
Mabibo External
Mandela Road
Dar es Salaam

Date: 4th July 2013
Our Ref: RM/TNR/DSM/R.80.415/VoL.V/57

Managing Director,
Tanzania Electric Supply Company Limited
P.O. Box 9024,
DAR ES SALAAM - Fax 2452026

RE: REHABILITATION OF SUBSTATIONS AND CONSTRUCTION OF NEW DISTRIBUTION LINES AND SUB STATIONS IN DAR ES SALAAM FUNDED BY THE GOVERNMENT OF JAPAN THROUGH JICA

Sub: Request for Construction of 33kV line along New and Old Bagamoyo Road Reserve

PERMIT No. TRD/DSM/2013/2014/T/P/01

Reference is made to your letter dated 1st July 2013 with reference SMD/MPD/JICA regarding the above captioned subject.

After going through your submssion, we have accepted your request to construct 33Kv Power Line along New and Old Bagamoyo road basing on the following conditions:-

1. The work shall be executed in a accordance with submitted DWG No. DL-R-01 showing the Route Map from Tegeta S/S to Jangwani Beach S/S.
2. The 33kV power line shall be constructed within 1.5m from the Road Reserve Marker Posts along New Bagamoyo road and 1.5m from the plot boundaries of Old Bagamoyo road (Africana to TPDF Riffle Range Ground section).
3. Where the power line will cross the road, you are strictly required to maintain the minimum allowable clearance height of 7m from the ground.
4. The Agency reserves the right to carry out any appropriate changes to the part of the developments within the road reserve without any compensation.
5. Carrying the works contrary to this permit shall be considered as an encroachment to the road resrve and the Agency shall take legal actions as per Highway Ordinance Cap. 167.

Tel: + 255 22 2450185/2450046 Fax: + 255 22 2450626, E-Mail: rmo@dsm.tanroads.org

TANROADS is an Executive Agency of the Ministry of Works, Tanzania, established under the Executive Agencies Act, 1997

6. A normal supervision fee of **Tshs 2,900,000.00** shall be charged and paid before the commencement of the works as detailed in the attached sheet.

7. When you are ready to to start the works, please inform this office so that arrangements can be made for supervision and close monitoring of your work with regard to compliance to the above conditions.

8. Acknowledge recept of this letter.

Ndyamukama J
Regional Manager
DAR ES SALAAM

Tel: + 255 22 2450185/2450046 **Fax**: + 255 22 2450626, **E-Mail**: rmo@dsm.tanroads.org

TANROADS is an Executive Agency of the Ministry of Works, Tanzania, established under the Executive Agencies Act, 1997

✓ ILALA MUNICIPAL PERMIT

HALMASHAURI YA MANISPAA YA ILALA

BARUA ZOTE ZIPELEKWE KWA MKURUGENZI WA MANISPAA

S.L.P. Na. 20950
Simu Na. 2128800
2128805
Fax Na. 2121486

Kumb. IMC/HT.9/

Ofisi ya Mkurugenzi
Manispaa ya Ilala

Tarehe: 04/07/2013

Mkurugenzi wa TANNESCO,
UBUNGO HEAD OFFICE,
S.L.P. 9024,
DAR ES SALAAM.

YAH: **KIBALI CHA KUPITISHA MIUNDOMBINU YA UMEME BARABARA YA MAGORE HADI HOSPITALI YA MUHIMBILI**

Tafadhali husika na kichwa cha habari hapo juu na pia rejea barua yako ya tarehe 24/04/2013 yenye Kumb. Na.SMD/MPD/983/JICA.

Ofisi ya Mkurugenzi wa Manispaa ya Ilala imepokea barua kutoka ofisi yako ya kuomba kibali cha kupitisha miundombinu ya umeme na kukarabati kituo kidogo cha umeme.

Baada ya kupitia barua yako, napenda kukufahamisha kwamba kibali kimetolewa cha kuwaruhusu kazi hiyo kufanyika, Pamoja na kibali hiki tafadhali zingatia masharti yafuatayo:

i. Unatakiwa kuwasiliana na Kitengo cha Maliasili na Idara ya Ujenzi Manispaa ya Ilala kabla ya kuanza utekelezaji.
ii. Kuzingatia sheria za usalama barabarani na kutunza utulivu katika maeneo yatakayotumiwa kwa shughuli hiyo.
iii. Mnatakiwa kulipia gharama za posho ya usimamizi kwa watumishi wa Halmashauri watakaoshiriki katika zoezi hilo.
iv. Unatakiwa kurudishia miundombinu itakayoathirika wakati wa utekelezaji wa kazi hiyo kwenye hali yake ya kawaida mara ukamilishapo kazi zako.

Nakutakia kazi njema.

Archi A.J. Mcha
Kny: **Mkurugenzi wa Manispaa,**
Halmashauri ya Manispaa ya Ilala.

Nakala: Mkurugenzi wa Manispaa ya Ilala – aione kwenye jalada

✓ KINONDONI MUNICIPAL PERMIT

KINONDONI MUNICIPAL COUNCIL

ALL CORRESPONDENCES TO BE ADDRESSED TO THE MUNICIPAL DIRECTOR

Tel: 2170173
Fax: 2172951

In reply please quote:

Ref: KMC/MEK/T.20/14/52

MUNICIPAL DIRECTOR
KINONDONI MUNICIPAL COUNCIL
P. O. BOX 31902
DAR ES SALAAM

Date: 13/05/2013

TANZANIA ELECTRIC SUPPLY COMPANY LIMITED ,
BOX 9024,
DAR ES SALAAM.

REF: REHABILITION OF SUBSTATIONS AND CONSTRUCTION OF NEW 33KV DISTRIBUTION LINES AND SUBSTATIONS IN DAR ES SALAAM FUNDED BY THE GOVERNMENT OF JAPAN THROUGH JICA.

Please refer to the heading above.

We have received your request for permit of construction of 33Kv line along the road reserve and tree cutting along the lines corridor.

Following the joint site visit with your surveyor, the following were observed to be addressed:-

- Surveying along the road reserve which will help to mark all structure which are within the road reserve.
- To save of demolition notes to all structures which are within the road reserve.
- To demolish all structures which are within road reserve.

We notify you that in order to succeed all the above activities some cost will be involved of which the council budget is Limited for these activities.

Yours Faithfully,

Engr. I Mafita.
For. **MUNICIPAL DIRECTOR**
KINONDONI

✓ MUHIMBILI NATIONAL HOSPITAL PERMITS

MUHIMBILI NATIONAL HOSPITAL

Cables: "MUHIMBILI"
Telephones: 255-22-2151367-9
FAX: 255-22-2150534
Website: www.mnh.or.tz
Email: info@mnh.or.tz
In reply please quote:
Ref: MNH/E2/II/II/69

Postal Address:
P.O. Box 65000
DAR ES SALAAM
Tanzania

TANZANIA ELECTRIC SUPPLY CO LTD
REGIONAL OFFICE
02 OCT 2012
ILALA
DAR ES SALAAM

1st October 2012

Regional Manager,
Tanzania Electrical Supply Company Ltd.,
Ilala,
P.O. Box 9024,
DAR ES SALAAM

Re: REQUEST FOR A SPACE/PLOT TO ESTABLISH A 15MVA, 33/11KV SUB-STATION

Reference is made to your letter No. RM/IL/GEN/38 of 24th September 2012 regarding the above captioned subject matter.

I wish to inform you that we have noted your effort to ensure reliability of the power supply to the Hospital. The Hospital has in principal accepted your request and will provide the space as per your request so that to enable you to establish the above named sub-station and hence to introduce a power line which will be dedicated to Muhimbili National Hospital only.

Thank you for your continued cooperation.

Yours,

Dr. M. A. Njelekela
EXECUTIVE DIRECTOR

/ajh.

All correspondence to be addressed to the Executive Director

MUHIMBILI NATIONAL HOSPITAL

Cables: "MUHIMBILI"
Telephones: +255-22-2151367-9
FAX: +255-22-2150534
Web: www.mnh.or.tz

Postal Address:
P.O. Box 65000
DAR ES SALAAM
Tanzania

Ref: MNH/E2/11/II/85

24th October, 2013

Regional Manager,
TANESCO – Ilala,
P.O. BOX 9024,
DAR ES SALAAM.

REF: REHABILITATION OF SUBSTATIONS AND CONSTRUCTION OF NEW 33KV LINE AND SUBSTATIONS IN DAR ES SALAAM CITY FUNDED BY THE GOVERNMENT OF JAPAN THROUGH JICA.

Subject: Request for a temporary stock yard space and access to the proposed 15MVA, 33/11KV Substation at Muhimbili compound (playgroung area)

Reference is made to your letter with reference No. RM/IL/GEN/38 dated on 15th October 2013 regarding the above captioned subject.

I have a pleasure to confirm that the space for a temporary stock yard will be provided to you as per your request. However, the request for access road on the play ground should be channed through Muhimbili Universty for Health and Allied Sciencies who is the owner of the area.

Regards,

Dr. Marina A. Njelekela
EXECUTIVE DIRECTOR

All correspondences to be addressed to the Executive Director

✓ **TPDF PERMIT**

Katika Kujibu Tafadhali
Nakili:MMJ/2153-1 (CPD)

JESHI LA ULINZI LA WANANCHI WA TANZANIA

Simu ya Upepo: "N G O M E"
Simu ya Mdomo: DSM 2150556/62
Telefax: 2153429

Makao Makuu ya Jeshi,
Sanduku la Posta 9203,
DAR ES SALAAM

Desemba, 20

Mkurugenzi Mtendaji,
Shirika la Umeme Tanzania,
Sanduku la Posta 9024,
DAR ES SALAAM, Tanzania.

Kupatiwa Kiwanja Kujenga Kituo cha Kupozea Umeme

Rejea barua DMD (D&CS/SMD/MAJESHI ya tarehe 28 Septemba, 2011.

Makao Makuu ya Jeshi (MMJ) yanakiri kupokea barua iliyorejewa hapo juu. MMJ yanapongeza hatua zinazochukuliwa na shirika katika kutoa huduma kwa jamii.

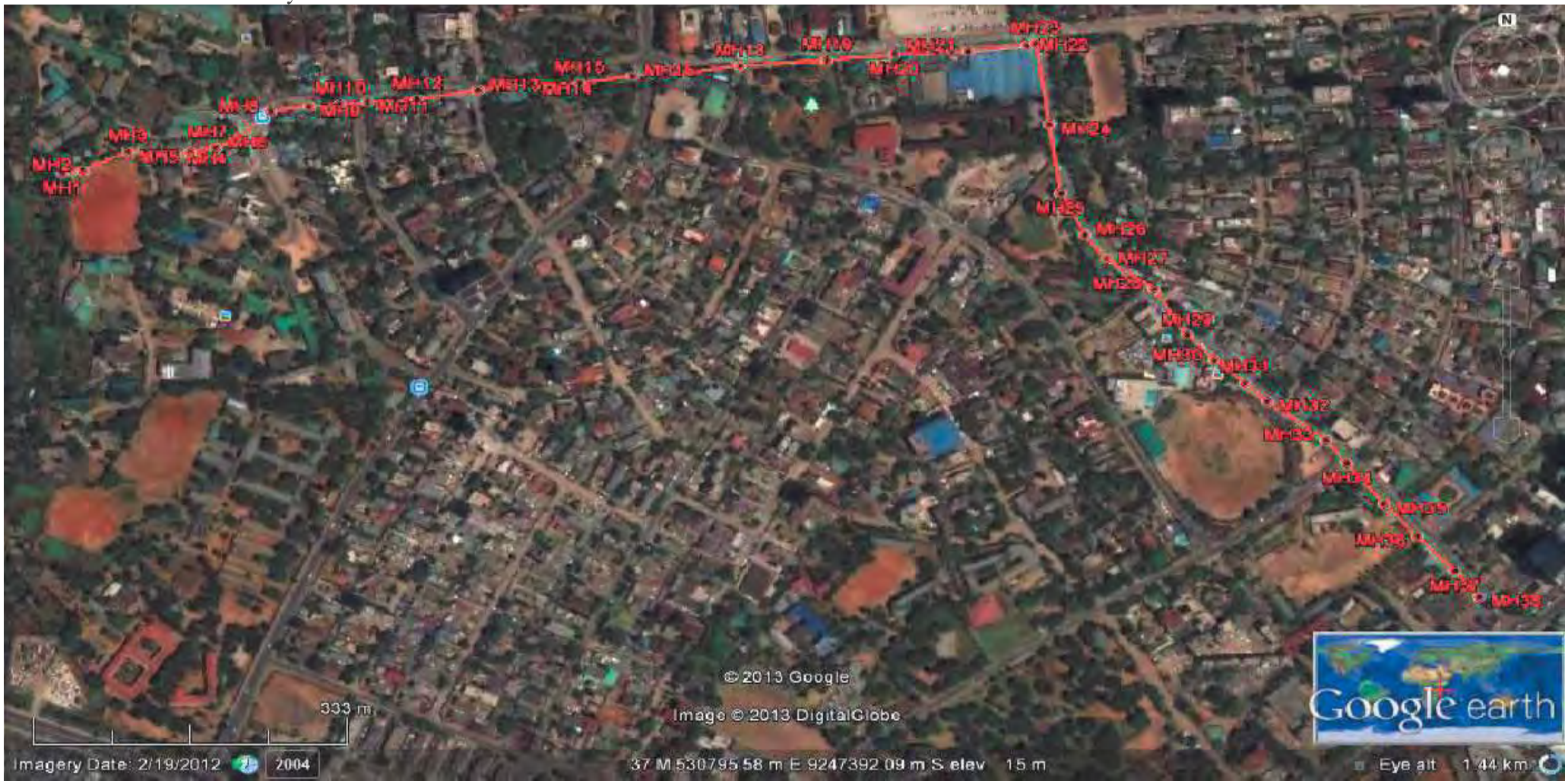
MMJ yanatoa kibali kutumia kiwanja A2 kama kilivyoainishwa kwenye mchoro mlioambatisha. MMJ yametoa eneo hilo litumike kwa kazi hiyo bila kubadilisha umiliki wa ardhi ambao utaendelea kuwa wa Jeshi. MMJ yanawatakia kazi njema katika kutoa huduma hii muhimu kwa jamii.

Copy to: PRE
Land Surveyor
DM - Mbezi
Retain original

(L. E. Mndeme, ndc)
Meja Jenerali
Kny:Mkuu wa Majeshi ya Ulinzi

Appendix IV: Google maps show project areas which lines will pass through road reserves

✓ Muhimbili to New City Centre 33kV distribution line

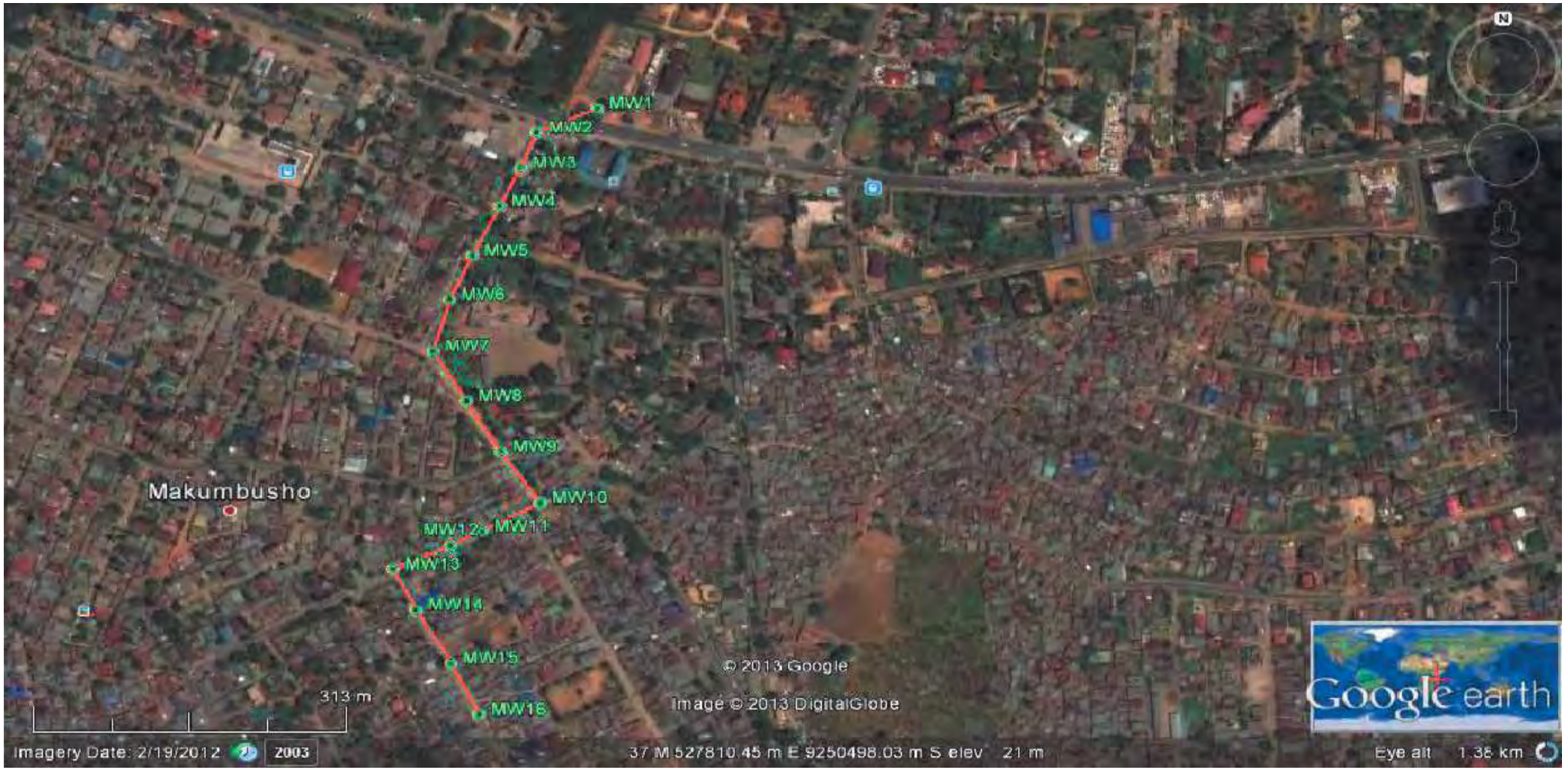


✓ Tegeta to Jangwani Beach S/S 33kV distribution line

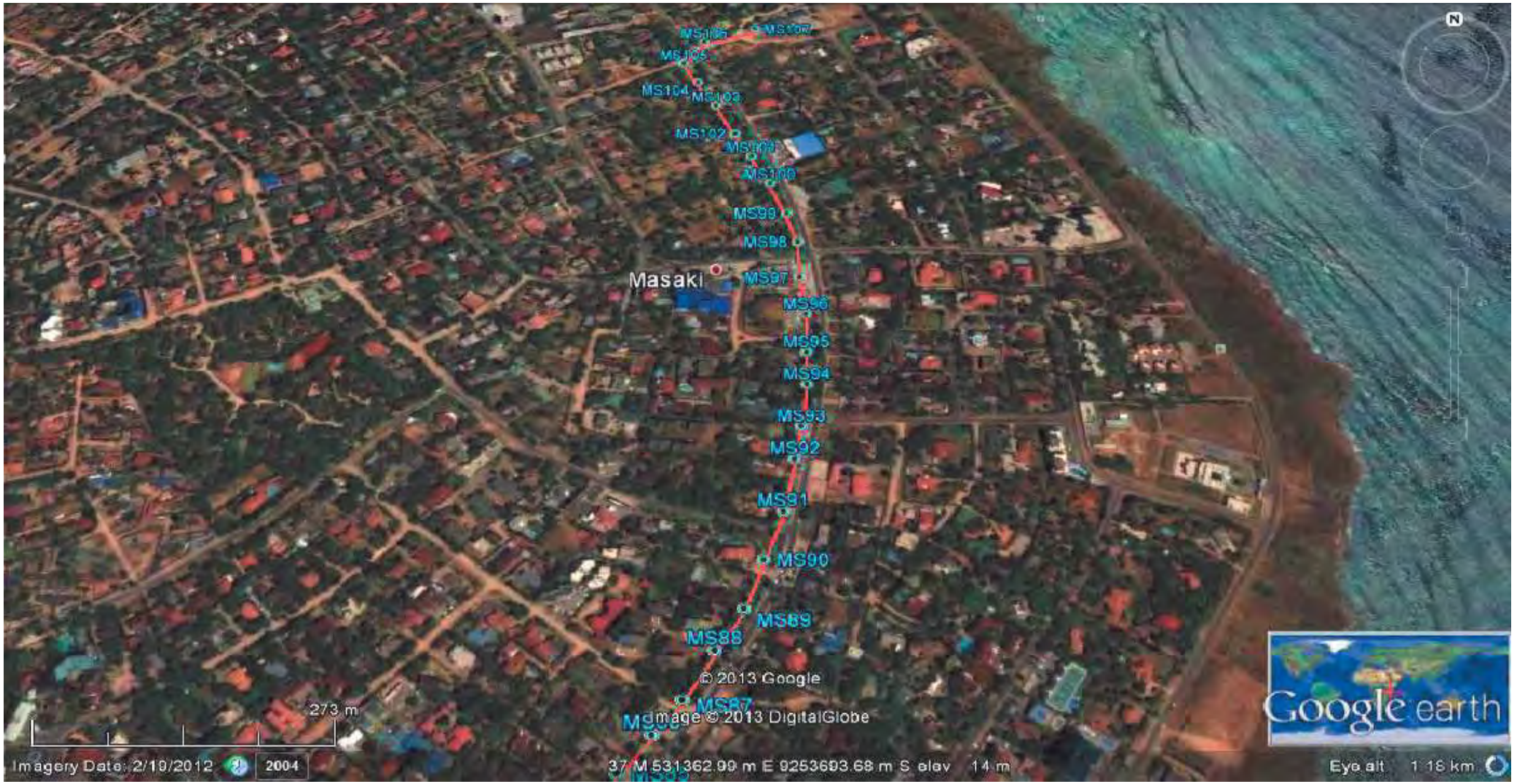

TG63
TG65
TG68
TG70
TG71
TG72
TG74
TG76
TG77
TG78
TG79
TG80
TG81
Click to look around
© 2013 Google
Image © 2013 DigitalGlobe
253 m
Google earth
Imagery Date: 6/11/2010
2003
37 M 523109.53 m E 9259590.48 m S elev 25 m
Eye alt 1.15 km


TG81
TG82
TG83
TG84
TG85
TG86
TG87
TG88
TG89
TG90
TG91
TG92
TG93
TG94
TG95
TG96
TG97
TG98
TG99
TG100
TG101
TG102
N
© 2013 Google
Image © 2013 DigitalGlobe
253 m
Google earth
Imagery Date: 6/11/2010
2003
37 M 524015.01 m E 9259094.01 m S elev 15 m
Eye alt 1.12 km

✓ Makumbusho to Mwananyamala S/S 33kV distribution line



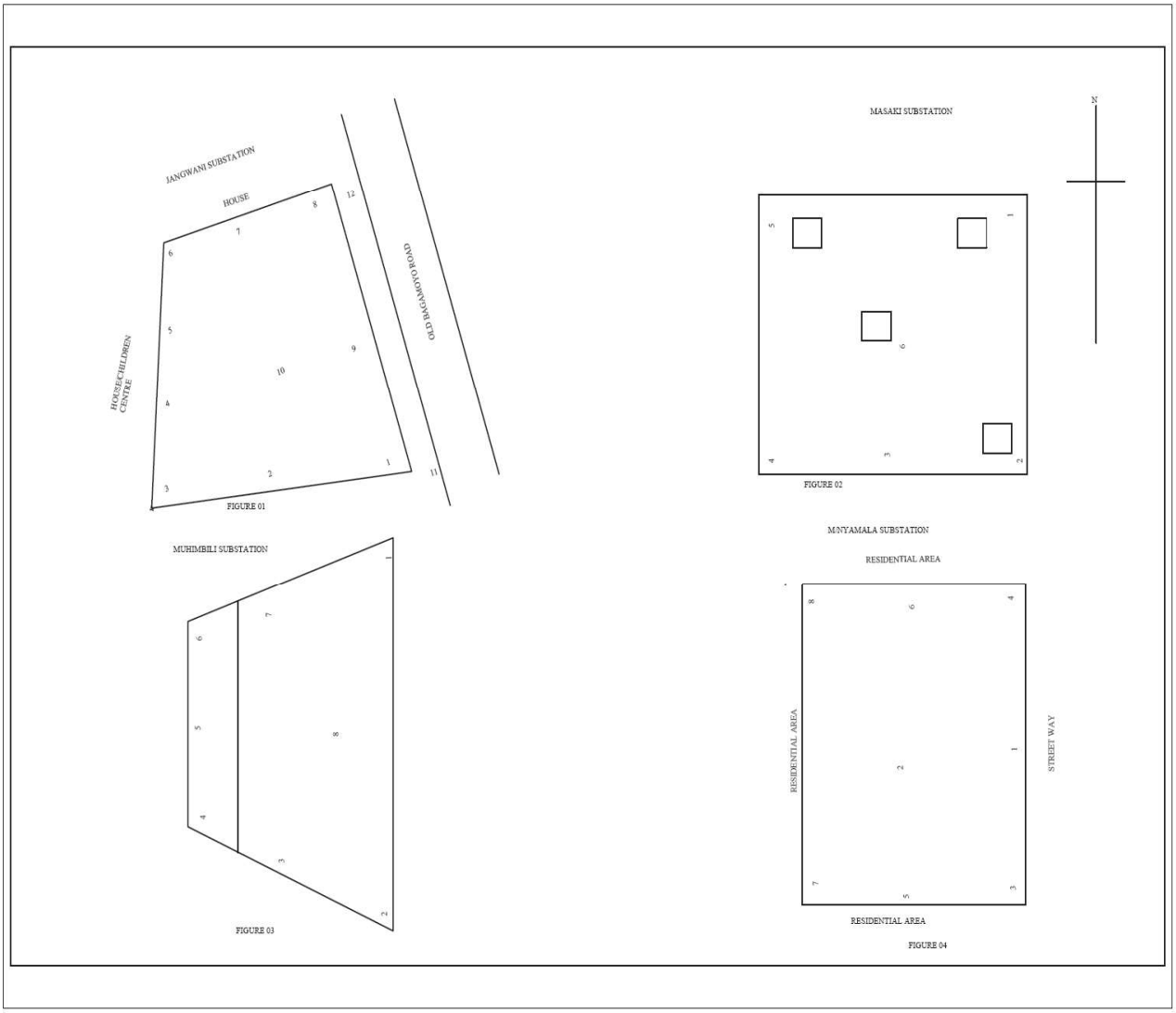
✓ Makumbusho to Msasani 33kV distribution line




Mikocheni
Msasani
Oy
MS1
MS2
MS3
MS4
MS5
MS6
MS7
MS8
MS9
MS10
MS11
MS12
MS13
MS14
MS15
MS16
MS17
MS18
MS19
MS20
MS21
MS22
MS23
MS24
MS25
MS26
MS27
MS28
MS29
MS30
MS31
MS32
MS33
MS34
MS35
MS36
MS37
MS38
MS39
MS40
MS41
MS42
MS43
MS44
MS45
MS46
MS47
MS48
MS49
MS50
MS51
MS52
MS53
MS54
MS55
MS56
MS57
MS59
MS60
MS62
MS63
MS64
MS66
MS67
MS68
MS69
MS70
MS71
MS72
OY1
OY2
OY3
OY4
OY5
OY6
OY8
OY9
OY10
OY11
OY12
OY14
OY15
OY16
OY17
OY18
OY19
OY20
OY21
OY22
OY23
OY24
OY25
OY26
OY27
OY28
OY32
OY34
OY35
OY37
OY38
OY40
© 2013 Google
Image © 2013 DigitalGlobe
525 m
Imagery Date: 2/19/2012
2003
37 M 529068.67 m E 9251307.38 m S elev 16 m
Eye alt 2.27 km
Google earth

Appendix V: Baseline Environmental Assessment at Four Proposed TANESCO Substations in Dar es Salaam

Appendix Va: Proposed Sites



Appendix Vb: Ambient Air Quality Details

Jangwani Beach S/S Site								
	READING NO	O_2 [%]	CO [mg/m^3]	CO_2 [%]	AMBIENT TEMP. [°C]	SO_2 [mg/m^3]	NO [mg/m^3]	NO_x [mg/m^3]
Point 1	1	20.90	-	-	30.30	-	-	-
	2	20.90	-	-	30.30	-	-	-
	3	20.80	-	-	30.40	-	-	-
	AVERAGE	**20.87**	-	-	**30.33**	-	-	-
Point 2	4	20.70	-	-	30.70	-	-	-
	5	20.80	-	-	30.90	-	-	-
	6	20.80	-	-	31.00	-	-	-
	AVERAGE	**20.77**	-	-	**30.87**	-	-	-
Point 3	7	20.80	-	-	31.30	-	-	-
	8	20.80	-	-	31.30	-	-	-
	9	20.80	-	-	31.40	-	-	-
	AVERAGE	**20.80**	-	-	**31.33**	-	-	-
Point 4	10	20.80	-	-	31.80	-	-	-
	11	20.80	-	-	31.90	-	-	-
	12	20.80	-	-	31.90	-	-	-
	AVERAGE	**20.80**	-	-	**31.87**	-	-	-

Point 5	13	20.70	-	-	32.70	-	-	-
	14	20.80	-	-	33.30	-	-	-
	15	20.80	-	-	33.30	-	-	-
	AVERAGE	**20.77**	-	-	**33.10**	-	-	-
Point 6	16	20.80	-	-	33.60	-	-	-
	17	20.80	-	-	33.80	-	-	-
	18	20.80	-	-	33.80	-	-	-
	AVERAGE	**20.80**	-	-	**33.73**	-	-	-
Point 7	19	20.90	-	-	34.20	-	0.10	0.10
	20	20.90	-	-	34.30	-		
	21	20.90	-	-	34.40	-	-	-
	AVERAGE	**20.90**	-	-	**34.30**	-	**0.05**	**0.05**
Point 8	22	20.80	-	-	34.50	-		
	23	20.80	-	-	34.40	-	-	-
	24	20.90	-	-	34.40	-	-	-
	AVERAGE	**20.83**	-	-	**34.43**	-	-	-
Point 9	25	20.90	-	-	34.80	-	-	-
	26	20.90	-	-	34.60	-	-	-
	27	20.90	-	-	34.70	-	0.10	0.10
	AVERAG	**20.90**	-	-	**34.70**	-	**0.03**	**0.03**

	E							
Point 10	28	20.80	-	-	35.10	-	0.10	0.10
	29	20.90	-	-	35.20	-	-	-
	30	20.90	-	-	35.70	-	-	-
	AVERAGE	**20.87**	**-**	**-**	**35.33**	**-**	**0.03**	**0.03**
Point 11	31	20.90	-	-	35.20	-		
	32	20.90	-	-	34.80	-	-	-
	33	20.90	-	-	34.80	-	-	-
	AVERAGE	**20.90**	**-**	**-**	**34.93**	**-**	**-**	**-**
Point 12	34	20.80	-	-	34.60	-	-	-
	35	20.80	-	-	34.60	-	0.10	0.10
	36	20.90	-	-	34.60	-	-	-
	AVERAGE	**20.83**	**-**	**-**	**34.60**	**-**	**0.03**	**0.03**
MEAN VALUE		**20.84**	**-**	**-**	**33.29**	**-**	**0.01**	**0.01**

Msasani S/S Site

	READING NO	O_2 [%]	CO [mg/m^3]	CO_2 [%]	AMBIENT TEMP. [°C]	SO_2 [mg/m^3]	NO [mg/m^3]	NO_x [mg/m^3]
Point 1	37	20.80	-	-	32.80	-	-	-
	38	20.90	-	-	32.90	-	-	-
	39	20.90	-	-	33.00	-	-	-
	AVERAGE	**20.87**	**-**	**-**	**32.90**	**-**	**-**	**-**
Point 2	40	20.80	-	-	33.30	-	-	-
	41	20.90	-	-	33.60	-	-	-
	42	20.90	-	-	33.70	-	-	-
	AVERAGE	**20.87**	**-**	**-**	**33.53**	**-**	**-**	**-**
Point 3	43	20.90	-	-	34.40	-	-	-
	44	20.90	-	-	34.40	-	-	-
	45	20.90	-	-	34.40	-	-	-
	AVERAGE	**20.90**	**-**	**-**	**34.40**	**-**	**-**	**-**
Point 4	46	20.80	-	-	34.70	-	-	-
	47	20.9	-	-	34.70	-	-	-

		0						
	48	20.90	-	-	34.60	-	-	-
	AVERAGE	**20.87**	-	-	**34.67**	-	-	-
Point 5	49	20.80	-	-	34.60	-	-	-
	50	20.90	-	-	34.70	-	-	-
	51	20.90	-	-	34.50	-	-	-
	AVERAGE	**20.87**	-	-	**34.60**	-	-	-
MEAN VALUE		**20.87**	-	-	**34.02**	-	-	-

Muhimbili S/S Site

	READING NO	O_2 [%]	CO [mg/m^3]	CO_2 [%]	AMBIENT TEMP. [°C]	SO_2 [mg/m^3]	NO [mg/m^3]	NO_x [mg/m^3]
Point 6	52	21.00	-	-	33.00	-	-	-
	53	20.90	-	-	32.90	-	-	-
	54	20.90	-	-	33.00	-	-	-
	AVERAGE	**20.93**	-	-	**32.97**	-	-	-
Point 7	55	20.90	-	-	34.30	-	-	-
	56	20.90	-	-	34.40	-	-	-
	57	20.90	-	-	34.30	-	-	-

	AVERAGE	**20.90**	**-**	**-**	**34.33**	**-**	**-**	**-**
Point 8	58	20.90	-	-	34.20	-	-	-
	59	20.90	-	-	34.20	-	-	-
	60	20.90	-	-	34.20	-	-	-
	AVERAGE	**20.90**	**-**	**-**	**34.20**	**-**	**-**	**-**
Point 9	61	20.80	-	-	34.30	-	-	-
	62	20.90	-	-	34.40	-	-	-
	63	20.90	-	-	34.40	-	-	-
	AVERAGE	**20.87**	**-**	**-**	**34.37**	**-**	**-**	**-**
Point 10	64	20.90	-	-	34.30	-	-	-
	65	20.90	-	-	34.40	-	-	-
	66	20.90	-	-	34.50	-	-	-
	AVERAGE	**20.90**	**-**	**-**	**34.40**	**-**	**-**	**-**
Point 11	67	20.90	-	-	35.80	-	-	-
	68	20.90	-	-	35.80	-	-	-
	69	20.90	-	-	35.80	-	-	-
	AVERAGE	**20.90**	**-**	**-**	**35.80**	**-**	**-**	**-**

Point 12	70	20.90	-	-	35.90	-	-	-
	71	20.90	-	-	36.00	-	-	-
	72	20.90	-	-	36.10	-	-	-
	AVERAGE	**20.90**	-	-	**36.00**	-	-	-

MEAN VALUE	**20.90**	-	-	**34.58**	-	-	-

Mwananyamala S/S Site

	READING NO	O_2 [%]	CO [mg/m^3]	CO_2 [%]	AMBIENT TEMP. [°C]	SO_2 [mg/m^3]	NO [mg/m^3]	NO_x [mg/m^3]
Point 1	73	20.90	-	-	34.70	-	-	-
	74	20.90	-	-	34.70	-	-	-
	75	20.90	-	-	34.70	-	-	-
	AVERAGE	**20.90**	-	-	**34.70**	-	-	-
Point 2	76	20.90	-	-	35.70	-	-	-
	77	20.90	-	-	35.80	-	-	-
	78	20.90	-	-	35.90	-	-	-
	AVERAGE	**20.90**	-	-	**35.80**	-	-	-
Point 3	79	20.90	-	-	36.30	-	-	-
	80	20.90	-	-	36.50	-	-	-
	81	20.90	-	-	36.50	-	0.10	0.10
	AVERAGE	**20.90**	-	-	**36.43**	-	**0.03**	**0.03**
Point 4	82	20.80	-	-	37.60	-	-	-
	83	20.90	-	-	38.00	-	-	-

	84	20.90	-	-	38.00	-	0.10	0.10
	AVERAGE	**20.87**	**-**	**-**	**37.87**	**-**	**0.03**	**0.03**
Point 5	85	20.90	-	-	37.30	-	-	-
	86	20.90	-	-	37.20	-	0.10	0.10
	87	20.90	-	-	37.10	-	-	-
	AVERAGE	**20.90**	**-**	**-**	**37.20**	**-**	**0.03**	**0.03**
Point 6	88	20.90	-	-	36.30	-	-	-
	89	20.90	-	-	36.20	-	-	-
	90	20.90	-	-	36.00	-		
	AVERAGE	**20.90**	**-**	**-**	**36.17**	**-**	**-**	**-**
MEAN VALUE		**20.89**	**-**	**-**	**36.36**	**-**	**0.02**	**0.02**
HIGHEST LIMIT (TANZANIA STANDARD)*			**10.00**					**0.12**

* The Environmental Management (Air Quality Standards) Regulations, 2007

Appendix Vc: Noise Level Details

Jangwani Beach S/S

POINT NO.	NOISE LEVEL, dB(A)						
	Reading 1	Reading 2	Reading 3	Reading 4	MEAN	OVER 85 dB(A)?	OVER 90 dB(A)?*
1	60.40	56.40	60.00	63.40	**60.05**	NO	NO
2	62.20	60.00	60.40	61.00	**60.90**	NO	NO
3	57.00	56.60	56.60	56.90	**56.78**	NO	NO
4	63.10	61.90	61.20	62.70	**62.23**	NO	NO
5	63.60	61.90	64.50	62.60	**63.15**	NO	NO
6	63.00	64.40	61.90	64.10	**63.35**	NO	NO
7	63.00	64.40	63.70	63.90	**63.75**	NO	NO
8	63.00	61.50	64.50	62.30	**62.83**	NO	NO
9	60.80	60.10	62.00	60.20	**60.78**	NO	NO
10	62.00	61.40	60.60	60.30	**61.08**	NO	NO
11	67.30	68.00	67.90	69.20	**68.10**	NO	NO
12	69.20	67.10	70.60	66.90	**68.45**	NO	NO
	MEAN NOISE LEVEL				**62.62**	**NO**	**NO**

* Occupational Safety and Health Administration; Occupational Noise Exposure Standard (OSHA – 29 CRF 1910.95)

Msasani S/S

POINT NO.	NOISE LEVEL, dB(A)						
	Reading 1	Reading 2	Reading 3	Reading 4	MEAN	OVER 85 dB(A)?	OVER 90 dB(A)?*
1	54.40	54.10	52.50	52.00	**53.25**	NO	NO

2	56.10	56.30	56.60	55.20	**56.05**	NO	NO
3	56.10	55.80	56.70	56.90	**56.38**	NO	NO
4	55.10	56.20	56.30	54.10	**55.43**	NO	NO
5	56.00	55.30	56.00	56.20	**55.88**	NO	NO
	MEAN NOISE LEVEL				**55.40**	**NO**	**NO**

* Occupational Safety and Health Administration; Occupational Noise Exposure Standard (OSHA – 29 CRF 1910.95)

Muhimbili S/S

POINT NO.	NOISE LEVEL, dB(A)						
	Reading 1	Reading 2	Reading 3	Reading 4	MEAN	OVER 85 dB(A)?	OVER 90 dB(A)?*
1	51.40	50.40	49.50	48.50	**49.95**	NO	NO
2	48.20	50.00	49.80	50.20	**49.55**	NO	NO
3	53.50	52.00	53.60	54.40	**53.38**	NO	NO
4	53.10	53.00	45.00	45.70	**49.20**	NO	NO
5	50.80	51.30	50.10	51.40	**50.90**	NO	NO
6	44.10	44.20	46.00	45.00	**44.83**	NO	NO
7	45.20	45.20	45.20	45.20	**45.20**	NO	NO
	MEAN NOISE LEVEL				**49.00**	**NO**	**NO**

* Occupational Safety and Health Administration; Occupational Noise Exposure Standard (OSHA – 29 CRF 1910.95)

Mwananyamala S/S

POINT NO.	NOISE LEVEL, dB(A)						
	Reading 1	Reading 2	Reading 3	Reading 4	MEAN	OVER 85 dB(A)?	OVER 90 dB(A)?*
1	59.70	58.50	57.10	59.30	**58.65**	NO	NO

2	56.80	56.00	55.20	50.10	**54.53**	NO	NO
3	58.10	59.70	58.00	60.40	**59.05**	NO	NO
4	66.00	65.80	66.50	66.20	**66.13**	NO	NO
7	49.60	47.00	46.60	49.00	**48.05**	NO	NO
8	52.00	48.70	52.10	50.60	**50.85**	NO	NO
	MEAN NOISE LEVEL				**56.21**	**NO**	**NO**

* Occupational Safety and Health Administration; Occupational Noise Exposure Standard (OSHA – 29 CRF 1910.95)

Appendix Vd: Particulate (Dust) Level Details

Jangwani Beach S/S								
NO	VALUE	READING 1	READING 2	READING 3	MEAN	MAXIMUM LIMIT*	TEST AVERAGE	TEST MAX.
1	AVERAGE	-	0.023	-	**0.008**		**NO**	
	MAXIMUM	-	0.207	-	**0.069**			**NO**
2	AVERAGE	-	-	-	-		**NO**	
	MAXIMUM	-	-	-	-			**NO**
4	AVERAGE	-	0.018	0.067	**0.028**	**0.230**	**NO**	
	MAXIMUM	-	0.249	0.473	**0.241**			**YES**
6	AVERAGE	0.160	0.024	0.057	**0.080**		**NO**	
	MAXIMUM	2.225	0.373	0.774	**1.124**			**YES**
9	AVERAGE	0.129	0.385	0.023	**0.179**		**NO**	

	MAXIMUM	0.522	1.681	0.221	**0.808**			**YES**
12	AVERAGE	0.006	0.003	0.010	**0.006**		**NO**	
	MAXIMUM	0.040	0.048	0.082	**0.057**			**NO**

* WHO guidelines

Msasani S/S

NO	VALUE	READING 1	READING 2	READING 3	MEAN	MAXIMUM LIMIT*	TEST AVERAGE	TEST MAX.
1	AVERAGE	0.002	0.008	0.012	**0.007**		**NO**	
	MAXIMUM	0.059	0.159	0.204	**0.141**			**NO**
6	AVERAGE	0.007	0.067	0.042	**0.039**		**NO**	
	MAXIMUM	0.183	0.818	0.754	**0.585**			**YES**

* WHO guidelines

Muhimbili S/S

NO	VALUE	READING 1	READING 2	READING 3	MEAN	MAXIMUM LIMIT*	TEST AVERAGE	TEST MAX.
8	AVERAGE	0.010	0.062	-	**0.024**	**0.230**	**NO**	
	MAXIMUM	0.176	0.446	-	**0.207**			**NO**

* WHO guidelines

Mwananyamala S/S

NO	VALUE	READING 1	READING 2	READING 3	MEAN	MAXIMUM LIMIT*	TEST AVERAGE	TEST MAX.
1	AVERAGE	-	0.306	0.535	**0.280**		**YES**	
	MAXIMUM	-	3.400	2.100	**1.833**			**YES**
2	AVERAGE	0.041	0.068		**0.055**		**NO**	
	MAXIMUM	0.500	5.220		**2.860**			**YES**
8	AVERAGE	0.068	0.063	0.066	**0.066**	**0.230**	**NO**	
	MAXIMUM	5.220	5.220	5.220	**5.220**			**YES**
7	AVERAGE	0.062	0.069	0.064	**0.065**		**NO**	
	MAXIMUM	0.541	0.541	0.541	**0.541**			**YES**
3	AVERAGE	0.028	0.027	0.031	**0.029**		**NO**	
	MAXIMUM	0.990	0.990	0.990	**0.990**			**YES**

* WHO guidelines

Appendix Ve: Ground Vibration Details

Jangwani S/S

POINT NO.	MEASURED VIBRATION LEVEL, m/s^2							
	Reading 1	Reading 2	Reading 3	Reading 4	MEAN	DAILY EXPOSURE*	OVER EAV**	OVER ELV**
9	0.10	0.10	0.10	0.10	**0.10**	**0.05**	NO	NO
11	0.70	0.80	1.10	0.80	**0.85**	**0.43**	NO	NO
12	0.40	0.50	0.70	1.10	**0.68**	**0.34**	NO	NO
	MEANVIBRATIONLEVEL				**0.54**	**0.27**	NO	NO

EAV = Exposure Action Value (0.5 m/s^2)

ELV = Exposure Limit Value (1.15 m/s^2)

* Computed based on 2 hours duration of exposure to vibration per day

** Control of Vibration at Work Regulations 2005, No. 1093 (UK.)

Masaki S/S

POINT NO.	MEASURED VIBRATION LEVEL, m/s^2							
	Reading 1	Reading 2	Reading 3	Reading 4	MEAN	DAILY EXPOSURE*	OVER EAV**	OVER 1.15**
1	0.30	0.40	0.50	0.20	**0.35**	**0.18**	NO	NO
2	0.40	0.20	0.10	0.60	**0.33**	**0.16**	NO	NO
3	0.50	0.60	0.70	0.10	**0.48**	**0.24**	NO	NO
4	-	-	-	0.80	**0.20**	**0.10**	NO	NO
5	0.40	0.30	0.30	0.20	**0.30**	**0.15**	NO	NO
	MEAN VIBRATION LEVEL				**0.33**	**0.17**	NO	NO

EAV = Exposure Action Value (0.5 m/s^2)

ELV = Exposure Limit Value (1.15 m/s^2)

* Computed based on 2 hours duration of exposure to vibration per day

** Control of Vibration at Work Regulations 2005, No. 1093 (UK.)

Muhimbili S/S

POINT NO.	MEASURED VIBRATION LEVEL, m/s^2							
	Reading 1	Reading 2	Reading 3	Reading 4	MEAN	DAILY EXPOSURE*	OVER EAV**	OVER 1.15**
1	0.80	0.90	1.10	0.70	**0.88**	**0.44**	NO	NO
2	-	-	-	-	-	-	NO	NO
3	-	-	-	-	-	-	NO	NO
4	0.70	1.00	0.80	1.30	**0.95**	**0.48**	NO	NO
5	0.20	0.20	0.20	0.20	**0.20**	**0.10**	NO	NO
6	0.60	0.40	0.30	0.20	**0.38**	**0.19**	NO	NO
7	-	-	-	-	-	-	NO	NO
	MEAN VIBRATION LEVEL				**0.34**	**0.17**	NO	NO

EAV = Exposure Action Value (0.5 m/s^2)
ELV = Exposure Limit Value (1.15 m/s^2)
* Computed based on 2 hours duration of exposure to vibration per day
** Control of Vibration at Work Regulations 2005, No. 1093 (UK.)

Mwananyamala S/S

POINT NO.	MEASURED VIBRATION LEVEL, m/s^2							
	Reading 1	Reading 2	Reading 3	Reading 4	MEAN	DAILY EXPOSURE*	OVER EAV**	OVER 1.15**
1	0.70	1.10	0.90	1.00	**0.93**	**0.46**	NO	NO
2	1.10	1.00	0.90	1.20	**1.05**	**0.53**	YES	NO
3	0.90	1.10	0.70	1.20	**0.98**	**0.49**	NO	NO
4	1.40	1.50	1.20	1.20	**1.33**	**0.66**	YES	NO
7	1.00	0.80	1.10	1.00	**0.98**	**0.49**	NO	NO
8	0.60	0.50	0.40	0.40	**0.48**	**0.24**	NO	NO
	MEAN VIBRATION LEVEL				**0.95**	**0.48**	NO	NO

EAV = Exposure Action Value (0.5 m/s^2)

ELV = Exposure Limit Value (1.15 m/s^2)

* Computed based on 2 hours duration of exposure to vibration per day

** Control of Vibration at Work Regulations 2005, No. 1093 (UK.)

Appendix VI: Attachments form Attendance Registers and minutes taken for the Consulted People during ESIA study