LVWATSAN – Mwanza
Environmental and Social Management Plan (ESMP) for Water Supply and Wastewater Short-Term Investment Plan for Mwanza City – Tanzania

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Environmental and Social Impact Assessment Report for Water Supply and Wastewater Short-Term Investment Plan for Mwanza City – Tanzania (Revised Draft Report)

March2018

Mwanza Urban Water Supply and Sanitation Authority (MWAUWASA)

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1. Environmental and Social Management Plan

1.1 Introduction

An Environmental and Social Management Plan (ESMP) can be defined as “an environmental and social management tool that can be used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced”. ESMPs are therefore important tools for ensuring that the management actions arising from Environmental Impact Assessment (EIA) processes are clearly defined and implemented through all phases of the project life cycle.

The objectives of this ESMP are to:

(i) Provide a systematic overview of the required measures to manage the mitigation of impacts that will or may result from the proposed rehabilitation and extension of water supply and wastewater works in Mwanza City;

(ii) Indicate main responsibility for implementation of these mitigation measures, as well as the timing of the measures, targets to be achieved, reporting requirements, and indicative costs.

1.2 Implementation Arrangement of the Project Works and the ESMP

Whilst the Ministry of Finance (MoF) is the ‘borrower’ of the loan, the Ministry of Water and Irrigation (MoWI) though MWAUWASA is the ‘Promoter’ and will have the ultimate ownership of this project. The MoWI is charged with the oversight of execution and the provision of enhanced technical assistance as well as carrying the responsibility to supervise execution across the entire project.

Execution at local level rests with the Mwanza Urban Water Supply and Sanitation Authority (MWAUWASA) which is under the Ministry of Water and Irrigation. MWAUWASA effectively acts as the implementing agency on the ground, charged with the responsibility of delivering upon the commitments within its geographical jurisdiction.

Daily oversight of this project at the operational level will be provided by the Project Management Unit (PMU) of MWAUWASA assisted by project management and supervision consultants. The PMU has assigned Contract Managers for each part of the Project. In addition to the above, the Lenders [EIB] have contracted a Lenders’ Supervisor whose role is to act as a “third-party” to monitor the Project, including monitoring physical progress and compliance, procurement supervision and quality assurance of technical solutions and physical deliverables.” The Lender Supervisor will work alongside the PMU to review all implementation tasks. EIB may also appoint independent monitors who would not be full-time but would be contracted for short missions to check compliance of the programme.

MWAUWASA will ensure that the contractor and sub-contractors who will be awarded the tenders for implementing the works adhere to the laid down procedures for construction and commissioning of the proposed development. To be able to minimize potential environmental and social negative impacts, the project will require the support of various institutions in the project area. Table 8-1 outlines the components of the ESMP, as well as the main actors and their responsibilities. The organizational framework for the ESMP is designed to evolve as the project progresses through detailed engineering design, construction, commissioning and operation phases.

1.3 Reporting Arrangements

Monitoring of the ESMP will be a primary responsibility of the Supervision Consultant, reporting to the MWAUWASA-PMU which will be supported by PMC. The PMU will report to NEMC, MOWI and EIB/SC. MWAUWASA will also share relevant information with the Regional Secretariat and other stakeholders wherever necessary. Within the Ministry of Water and Irrigation, it is the Sector Environmental Coordinator who is responsible for environmental issues, reporting directly to the Permanent Secretary. This amplified in the chart below.

1.4 Cost estimates for ESMP

The costs for implementing the mitigation measures have been estimated based on previous similar projects and engineering judgment. The actual costs will be as presented by the successful contractors during bidding exercise. The priced bills of quantities for environmental and social impact mitigation measures shall be made part of the contract for these mitigation measures to be effective.

Table 1-1. Environmental and Social Management Plan for Water Treatment Plant

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
1 - Vegetation loss through clearance	• Geotechnical Investigations and other engineering surveys will be limited to very small areas meant for receiving permanent works of the project. Therefore limit vegetation clearance to the area required for topographical survey and geotechnical investigation only.	Design Engineer	One month from start of activities	Vegetation lost in necessary areas only	1000	Part of Design engineers cost
2 - Temporary obstruction of access roads by topographic survey and geotechnical investigation teams.	• Signage to direct drivers to alternative free routes shall be placed at all areas or routes due to be surveyed or subjected to geotechnical investigations. • Community sensitization shall be carried out before these activities start (geotechnical investigation and topographical survey.	Design Engineer	At the start of the project	Ensure no complaints from road users	500	Project Cost
3 - Soil erosion	• Earthworks for geotechnical investigation may be carried out during the dry season to prevent soil from being washed away. • Implementation of erosion control measures on disturbed surfaces such as planting vegetation that hold soils together, terracing in steep slopes and securing the available vegetated area (surfaces not required for works shall not be disturbed).	Design Engineer	At the start of the project	Soil erosion is controlled	2000	Part of the Project cost
4 - Disturbances from increased motor vehicles in the area to facilitate topographic survey and geotechnical Investigation	• Allow only necessary traffic for works. • Disruption of traffic movement during survey and geotechnical investigations should be minimized by introducing traffic management plan. • Institute speed limit (40km/hr) to all project vehicles within the project area to be surveyed and subjected to geotechnical investigations.	Design Engineer	Once every week during preconstruction	No complaints	500	Project Cost
5 - Noise from geotechnical Investigation equipment hydraulic augers	• Where the noise is from the geotechnical investigation equipment shall be well maintained and fitted with noise silencers such as mufflers. • Noise levels should be monitored and where it happens to be higher than 85dB (A), PPE in form of ear muffs or ear plugs shall be provided to all those working near the equipment including the operators.	Design Engineer	Once every week	Noise within set limits	2000	Project cost

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
6 - Noise from transport of equipment to proposed project site.	• These are noise for a very short duration similar to all other vehicles passing by on other activities. However efforts shall be made to ensure that the transport trucks are fitted with sound mufflers.	Design Engineer	Once every Week	Noise within allowable limits (<60 dB(A)	500	Project Cost
7 - Likely motor accidents with pedestrians	• Sensitize drivers of project vehicles to observe speed limits in all area and institute punishment to traffic rules offenders.	Design Engineer	Every day during investigations No motor Vehicle	No motor Vehicle accidents	500	Project Cost
1 - Vegetation loss through clearance	• Vegetation clearance shall be limited to the area necessary for permanent works) some trees on the edge shall be left intact. • Clearance of vegetation around the site stations shall be replaced with the natural vegetation on completion of the works.	Contractors	At the beginning of the project On completion of the project		500	
2 - Disturbances to historical and archaeological finds during site clearance	• Notify the Engineer giving the nature and location of the findings. The Engineer will consult the National Museum. • The Contractor shall exercise necessary care so as not to damage artefacts or fossils uncovered during trench excavation operations and shall provide such cooperation and assistance as may be necessary to preserve the findings for removal or other disposition by the employer. • Where appropriate by reason of a discovery, the Engineer shall order delays in the time of performance or changes in the work, or both. If such delays, or changes or both are ordered, the time of performance and contract price shall be adjusted in accordance with the applicable clauses in the general Conditions of Contract.	Contractor	During extraction of construction materials	As set in the EMP for borrow sites	500	
3 - Deterioration of original land use, scenic and visual quality including	• Operations house and buildings to assist the project will be designed to blend well with the surrounding buildings. • Landscaping will be carried out to match the existing surroundings.	Lead Consultant/ Contractor	During construction of the project	Ensure design and construction blends well	1000	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
partial reduction of the wetland area	• Design should minimize wetland area utilized for the construction			with surroundings		
4 - loss of farm areas for the Prisons Department	• Agree compensation in kind in consultation with the relevant Government authorities	Project Proponent	Before the project starts	Ensure written agreement between Project Proponent and Ministry of Home Affairs/Prisons Department		
5 - Disturbances, particularly land scarring at borrow sites or sources of construction materials	• The borrow sites are the ones used for sourcing all other construction materials for projects in the area designated for mining of construction materials. Therefore the project will only contribute to land scarring and will not be the sole project causing this problem. • Since all the borrow areas are privately owned, the contractor employed by the Project Proponent will be buying the construction materials and thus contributing towards restoration of the borrow sites. • Part of the charges for purchase of construction materials shall channelled back for the rehabilitation or reinstatement of the borrow areas.	Contractor	During sources of Construction materials	As set in the EMP for borrow pits/sites	2000	
6 - Nuisance from noise and vibration from construction equipment	• Use of properly serviced and well maintained equipment • Silencers (mufflers) to be used to minimize noise on otherwise noisy equipment such as generators and compressors. • Sensitization of the adjacent communities on likely vibrations and increased noise resulting from construction activities. • Where noise levels will be beyond 85dB (A), ear muffs and plugs shall be provided to all those working within the area with high noise levels.	Mining License Holder	Once every Week	Noise within set limits	1000	
7 - Soil erosion	• Protection of steep slope with reinforcement.	Contractor	Measures	All loose	2000	Part of the

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	• Provision of silt trap to prevent sedimentation. • Construction activities especially land excavation should be carried out during dry seasons. • Avoid excessive clearance of trees and enhance tree planting and landscaping.		applied as construction works proceed otherwise once every month during construction	soils and bare soils protected from erosion		contractor BOQ
8 - Nuisance and inconveniences from increase in traffic levels	• Only essential traffic will be allowed to the project area during traffic peak hours when traffic is a problem. • Sensitization of the nearby communities about the increased traffic. • Materials hauling to tipping site and vice versa will be carried out during off peak periods during the day. • Alternatively finished materials such ready-made concrete, pre-cast elements or pre-assembled materials can be delivered at site when the need arises.	Contractor	Once every Week	No complaints	500	
9 - Contamination of water from leakages of fuels and lubricants from Construction equipment	• Dripping pans to be used to contain all hydrocarbon leakages on construction equipment. • Re-fuelling on designated areas. • In case of hydro • Carbon spills, the contaminated soils will be collected and treated to remove the hydrocarbon and prevent the hydrocarbons from being washed away in storm water to the nearby water bodies.	Contractor	Once every Day	No spillage of lubricants	1000	
10 - Poor air quality from dust and emissions around the construction site and material hauling routes	• Water sprinkling to reduce the dust at the construction sites • Use of dust masks to operators and those working in the dusty areas. • Use of goggles for all operators. • Construction machines/equipment will be well maintained to ensure total fuel combustion. All vehicles involved in construction works will be frequently checked and well serviced during the	Contractor	Once every Month	Within limits	5000	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	whole construction period so that the level of exhaust emissions is reduced. • Speed of vehicles hauling construction materials shall be reduced and the construction materials will be covered with tarpaulins.					
11 - Spread of diseases (HIV/AIDs, STIs or STDs)	• Sensitization and health awareness campaigns to all involved in the project including service providers. • Construction workers to undergo health screening according to the National HIV/AIDs Policy. • Project will assist the nearby health facility in sensitization of those involved in the project.	Contractor	Once every week on weekends	All employees Sensitized and examined	3000	Part of HIV/AIDS sensitization program
12 - Injuries to neighbours from falling into trenches and open pits for inspection chambers. Poor public safety during Construction – Risk to life. Poor safety at Work place.	• Construction sites shall be provided with barricades to protect neighbours and those passing-by. • Therefore the public particularly the children shall not be allowed to come closer to the swing area of excavators or other equipment at site. • In places where there are vehicles transporting construction materials and also at turning places towards the construction site, appropriate warning signage shall be posted. • Sensitization and training of the surrounding communities regarding the risks associated with construction activities. • In case of trenches, and excavated sewer lines, proper barricades have to be applied to warn and protect the people of impending dangers of falling into open trenches. • Constant surveillance from security to make sure that there are no “uninvited guests” in the project area. • All employees working on the construction site will be sensitized to use PPE to avoid occupational risks. Such equipment include hard hats, ear plugs or ear muffs, dust coats or overalls, gloves, dust masks, goggles for eye protection, hard toed boots, safety harness etc.	Supervising Engineer/ Contractor	Every day	Zero injuries	2500	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
13 - Generation of construction solid and liquid wastes	• Site housekeeping to minimize solid and liquid wastes generated from construction and other related activities such as food vending and petty businesses. • Allocate a special area for petty business such as food stalls provided with garbage bins. • Post appropriate signage such as "DO NOT LITTER" or "USITUPE TAKA" at all strategic sites. • Assign Contractor's Environmental or Safety Officer the responsibility to ensure that the surroundings are kept clean. • All excavated spoil should be well managed through levelling or tipped into low lying areas or borrow areas which are no longer useful. • Trash and waste shall be well collected and removed from the site to district waste collection point. • Consult the district council about the suitable trash/waste dumping site and their procedures. • The community should instruct people to stay away from scavenging at the dumping sites. • Solid wastes generated from land clearing shall be collected and disposed of in district sanitary land fill at authorized site. • Decomposable materials shall be collected and combined with district wastes to the authorized dumpsites; plastics and other recyclable materials will be collected and sent out for recycling.	Supervising Engineer. Contractor	Every day	Good house keeping	2000	Project Cost
14 – Vandalism and damage to pipe systems	• Fencing-off and guarding of sensitive facilities • Regular patrols and checks • Offence & penalty system in place and communities made aware of this through appropriate public awareness programs.	Supervising Engineer. Contractor	Every day	Good house keeping	--	
1 - Disturbance from pumps, and engines	• Pump and engines that produce significant noise levels should be equipped with adequate noise silencing equipment, and preferably placed inside noise isolated buildings.	Project Operator (MWAUWASA; MIUWASA)	Monthly during operation	No complaints from surroundings	2000	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
2 - Pollution from effluent from water treatment plant	• Effluent from WTP should be tested regularly and if exceeding permissible standard quality, additional treatment should be conducted to bring quality of the effluent within these levels.	Project Operator (MWAUWASA, MIUWASA)	Monthly during operation	Effluent quality not exceeding GoT standards	2000	
3 - Health risk to laboratory attendant during water treatment and sampling procedures	• Appropriate training and equipment • Safe storage of chemicals	Project Operator (MWAUWASA, MIUWASA)	Monthly during operation	No risks		
4 - Vandalism and damage to pipe system	• Fencing-off and guarding of sensitive facilities • Regular patrols and checks • Offence & penalty system in place and communities made aware of this through appropriate public awareness programs.	Project Operator (MWAUWASA, MIUWASA)	Monthly during operation	No vandalism or damage		
Total					***35,000***	

Table 1-2 Environmental and Social Management Plan for Transmission Main

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
1 - Vegetation loss through clearance	• Geotechnical Investigations and other engineering surveys will be limited to very small areas meant for receiving permanent works of the project. Therefore limit vegetation clearance to the area required for topographical survey and geotechnical investigation only.	Design Engineer	One month from start of activities	Vegetation lost in necessary areas only	1000	Part of Design engineers cost
2 - Temporary obstruction of access roads by topographic survey and geotechnical investigation teams.	• Signage to direct drivers to alternative free routes shall be placed at all areas or routes due to be surveyed or subjected to geotechnical investigations. • Community sensitization shall be carried out before these activities start (geotechnical investigation and topographical survey.	Design Engineer	At the start of the project	Ensure no complaints from road users	500	Project Cost

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
4 - Disturbances from increased motor vehicles in the area to facilitate topographic survey and geotechnical Investigation	• Allow only necessary traffic for works. • Disruption of traffic movement during survey and geotechnical investigations should be minimized by introducing traffic management plan. • Institute speed limit (40km/hr) to all project vehicles within the project area to be surveyed and subjected to geotechnical investigations.	Design Engineer	Once every week during preconstructi on	No complaints	500	Project Cost
5 - Noise from geotechnical Investigation equipment hydraulic augers	• Where the noise is from the geotechnical investigation equipment shall be well maintained and fitted with noise silencers such as mufflers. • Noise levels should be monitored and where it happens to be higher than 85dB (A), PPE in form of ear muffs or ear plugs shall be provided to all those working near the equipment including the operators.	Design Engineer	Once every Week	Noise within set limits	2000	Project Cost
6 - Noise from transport of equipment to proposed project site.	• These are noise for a very short duration similar to all other vehicles passing by on other activities. However efforts shall be made to ensure that the transport trucks are fitted with sound mufflers.	Design Engineer	Once every Week	Noise within allowable limits (<60 dB(A)	500	Project cost
7 - Likely motor accidents with pedestrians	• Sensitize drivers of project vehicles to observe speed limits in all area and institute punishment to traffic rules offenders.	Design Engineer	Every day during investigations No motor Vehicle	No motor Vehicle accidents	500	Project Cost
1 - Vegetation loss through clearance	• Vegetation clearance shall be limited to the area necessary for permanent works) some trees on the edge shall be left intact. • Clearance of vegetation around the site stations shall be replaced with the natural vegetation on completion of the works.	Contractors	At the beginning of the project On completion of the project		500	
2 - Disturbances to historical and	• Notify the Engineer giving the nature and location of the findings. The Engineer will consult the National Museum.	Contractor	During extraction of construction	As set in the EMP for borrow sites	500	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
archaeological finds during site clearance	• The Contractor shall exercise necessary care so as not to damage artefacts or fossils uncovered during trench excavation operations and shall provide such cooperation and assistance as may be necessary to preserve the findings for removal or other disposition by the employer. • Where appropriate by reason of a discovery, the Engineer shall order delays in the time of performance or changes in the work, or both. If such delays, or changes or both are ordered, the time of performance and contract price shall be adjusted in accordance with the applicable clauses in the general Conditions of Contract.		materials			
3 - Deterioration of original land use, scenic and visual quality	• Operations house and buildings to assist the project will be designed to blend well with the surrounding buildings. • Landscaping will be carried out to match the existing surroundings.	Lead Consultant/ Contractor	During construction of the project	Ensure design and construction blends well with surroundings	1000	
4 - Resettlement and Disturbance to some of the Residents particularly who will be affected by the Project	• Carry out valuation of the properties within the project areas and effect compensation.	Project Proponent	Before the project starts	Ensure all Affected personnel are Compensated and leave the area before start of initial project activities.		
6 - Nuisance from noise and vibration from construction equipment	• Use of properly serviced and well maintained equipment • Silencers (mufflers) to be used to minimize noise on otherwise noisy equipment such as generators and compressors. • Sensitization of the adjacent communities on likely vibrations and increased noise resulting from construction activities.	Mining License Holder	Once every Week	Noise within set limits	1000	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	• Where noise levels will be beyond 85dB (A), ear muffs and plugs shall be provided to all those working within the area with high noise levels.					
7 - Soil erosion	• Protection of steep slope with reinforcement. • Provision of silt trap to prevent sedimentation. • Construction activities especially land excavation should be carried out during dry seasons. • Avoid excessive clearance of trees and enhance tree planting and landscaping.	Contractor	Measures applied as construction works proceed otherwise once every month during construction	All loose soils and bare soils protected from erosion	2000	Part of the contractor BOQ
8 - Nuisance and inconveniences from increase in traffic levels	• Only essential traffic will be allowed to the project area during traffic peak hours when traffic is a problem. • Sensitization of the nearby communities about the increased traffic. • Materials hauling to tipping site and vice versa will be carried out during off peak periods during the day. • Alternatively finished materials such ready-made concrete, pre-cast elements or pre-assembled materials can be delivered at site when the need arises.	Contractor	Once every Week	No complaints	500	
9 - Contamination of water from leakages of fuels and lubricants from Construction equipment	• Dripping pans to be used to contain all hydrocarbon leakages on construction equipment. • Re-fuelling on designated areas. • In case of hydrocarbon spills, the contaminated soils will be collected and treated to remove the hydrocarbon and prevent the hydrocarbons from being washed away in storm water to the nearby water bodies.	Contractor	Once every Day	No spillage of lubricants	1000	
10 - Poor air quality from dust and emissions around the construction site	• Water sprinkling to reduce the dust at the construction sites • Use of dust masks to operators and those working in the dusty areas. • Use of goggles for all operators.	Contractor	Once every Month	Within limits	5000	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
and material hauling routes	• Construction machines/equipment will be well maintained to ensure total fuel combustion. All vehicles involved in construction works will be frequently checked and well serviced during the whole construction period so that the level of exhaust emissions is reduced. • Speed of vehicles hauling construction materials shall be reduced and the construction materials will be covered with tarpaulins.					
11 - Spread of diseases (HIV/AIDs, STIs or STDs)	• Sensitization and health awareness campaigns to all involved in the project including service providers. • Construction workers to undergo health screening according to the National HIV/AIDs Policy. • Project will assist the nearby health facility in sensitization of those involved in the project.	Contractor	Once every week on weekends	All employees Sensitized and examined	3000	Part of HIV/AIDS sensitizatio n program
12 - Injuries to neighbours from falling into trenches and open pits for inspection chambers. Poor public safety during Construction – Risk to life. Poor safety at Work place.	• Construction sites shall be provided with barricades to protect neighbours and those passing-by. • Therefore the public particularly the children shall not be allowed to come closer to the swing area of excavators or other equipment at site. • In places where there are vehicles transporting construction materials and also at turning places towards the construction site, appropriate warning signage shall be posted. • Sensitization and training of the surrounding communities regarding the risks associated with construction activities. • In case of trenches, and excavated sewer lines, proper barricades have to be applied to warn and protect the people of impending dangers of falling into open trenches. • Constant surveillance from security to make sure that there are no “uninvited guests” in the project area. • All employees working on the construction site will be sensitized to use PPE to avoid occupational risks. Such equipment include hard hats, ear plugs or ear muffs, dust coats or overalls, gloves,	Supervising Engineer/ Contractor	Every day	Zero injuries	2500	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	dust masks, goggles for eye protection, hard toed boots, safety harness etc.					
13 - Generation of construction solid and liquid wastes	• Site housekeeping to minimize solid and liquid wastes generated from construction and other related activities such as food vending and petty businesses. • Allocate a special area for petty business such as food stalls provided with garbage bins. • Post appropriate signage such as "DO NOT LITTER" or "USITUPE TAKA" at all strategic sites. • Assign Contractor's Environmental or Safety Officer the responsibility to ensure that the surroundings are kept clean. • All excavated spoil should be well managed through levelling or tipped into low lying areas or borrow areas which are no longer useful. • Trash and waste shall be well collected and removed from the site to district waste collection point. • Consult the district council about the suitable trash/waste dumping site and their procedures. • The community should instruct people to stay away from scavenging at the dumping sites. • Solid wastes generated from land clearing shall be collected and disposed of in district sanitary land fill at authorized site. • Decomposable materials shall be collected and combined with district wastes to the authorized dumpsites; plastics and other recyclable materials will be collected and sent out for recycling.	Supervising Engineer. Contractor	Every day	Good house keeping	2000	Project cost
14 – Vandalism and damage to pipe systems	• Fencing-off and guarding of sensitive facilities • Regular patrols and checks • Offence & penalty system in place and communities made aware of this through appropriate public awareness programs.	Supervising Engineer. Contractor	Every day	Good house keeping	--	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
4 - Vandalism and damage to pipe system	• Fencing-off and guarding of sensitive facilities • Regular patrols and checks • Offence & penalty system in place and communities made aware of this through appropriate public awareness programs.	Project Operator (MWAUWASA)	Monthly during operation	No vandalism or damage		
Total					***35,000***	

Table 1-3 Environmental and Social Management Plan for Sewerage System

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
1 - Vegetation loss through clearance	• Geotechnical Investigations and other engineering surveys will be limited to very small areas meant for receiving permanent works of the project. Therefore limit vegetation clearance to the area required for topographical survey and geotechnical investigation only.	Design Engineer	One month from start of activities	Vegetation lost in necessary areas only	1000	Part of Design engineers cost
3 - Soil erosion	• Earthworks for geotechnical investigation may be carried out during the dry season to prevent soil from being washed away. • Implementation of erosion control measures on disturbed surfaces such as planting vegetation that hold soils together, terracing in steep slopes and securing the available vegetated area (surfaces not required for works shall not be disturbed).	Design Engineer	At the start of the project	Soil erosion is controlled	2000	Part of the Project cost
5 - Noise from geotechnical Investigation equipment hydraulic augers	• Where the noise is from the geotechnical investigation equipment shall be well maintained and fitted with noise silencers such as mufflers. • Noise levels should be monitored and where it happens to be higher than 85dB (A), PPE in form of ear muffs or ear plugs shall be provided to all those working near the equipment including the operators.	Design Engineer	Once every Week	Noise within set limits	2000	Project Cost
6 - Noise from transport of	• These are noise for a very short duration similar to all other vehicles passing by on other activities. However efforts shall be	Design Engineer	Once every Week	Noise within allowable	500	Project Cost

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
equipment to proposed project site.	made to ensure that the transport trucks are fitted with sound mufflers.			limits (<60 dB(A)		
7 - Likely motor accidents with pedestrians	• Sensitize drivers of project vehicles to observe speed limits in all area and institute punishment to traffic rules offenders.	Design Engineer	Every day during investigations No motor Vehicle	No motor Vehicle accidents	500	Project Cost
1 - Vegetation loss through clearance	• Vegetation clearance shall be limited to the area necessary for permanent works) some trees on the edge shall be left intact. • Clearance of vegetation around the site stations shall be replaced with the natural vegetation on completion of the works.	Contractors	At the beginning of the project On completion of the project		500	
2 - Disturbances to historical and archaeological finds during site clearance	• Notify the Engineer giving the nature and location of the findings. The Engineer will consult the National Museum. • The Contractor shall exercise necessary care so as not to damage artefacts or fossils uncovered during trench excavation operations and shall provide such cooperation and assistance as may be necessary to preserve the findings for removal or other disposition by the employer. • Where appropriate by reason of a discovery, the Engineer shall order delays in the time of performance or changes in the work, or both. If such delays, or changes or both are ordered, the time of performance and contract price shall be adjusted in accordance with the applicable clauses in the general Conditions of Contract.	Contractor	During extraction of construction materials	As set in the EMP for borrow sites	500	
3 - Deterioration of original land use, scenic and visual quality	• Operations house and buildings to assist the project will be designed to blend well with the surrounding buildings. • Landscaping will be carried out to match the existing surroundings.	Lead Consultant/ Contractor	During construction of the project	Ensure design and construction blends well with surroundings	1000	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
4 - Resettlement and Disturbance to some of the Residents particularly who depend on these plot for cultivation or entrepreneurship activities	• Carry out valuation of the properties within the project areas and effect compensation.	Project Proponent	Before the project starts	Ensure all Affected personnel are Compensated and leave the area before start of initial project activities.		
5 - Land scarring at borrow sites or sources of construction materials	• The borrow sites are the ones used for sourcing all other construction materials for projects in the area designated for mining of construction materials. Therefore the project will only contribute to land scarring and will not be the sole project causing this problem. • Since all the borrow areas are privately owned, the contractor employed by the Project Proponent will be buying the construction materials and thus contributing towards restoration of the borrow sites. • Part of the charges for purchase of construction materials shall channelled back for the rehabilitation or reinstatement of the borrow areas.	Contractor	During sources of Construction materials	As set in the EMP for borrow pits/sites	2000	
6 - Nuisance from noise and vibration from construction equipment	• Use of properly serviced and well maintained equipment • Silencers (mufflers) to be used to minimize noise on otherwise noisy equipment such as generators and compressors. • Sensitization of the adjacent communities on likely vibrations and increased noise resulting from construction activities. • Where noise levels will be beyond 85dB (A), ear muffs and plugs shall be provided to all those working within the area with high noise levels.	Mining License Holder	Once every Week	Noise within set limits	1000	
7 - Soil erosion	• Protection of steep slope with reinforcement. • Provision of silt trap to prevent sedimentation.	Contractor	Measures applied as construction	All loose soils and bare soils	2000	Part of the contractor BOQ

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	• Construction activities especially land excavation should be carried out during dry seasons. • Avoid excessive clearance of trees and enhance tree planting and landscaping.		works proceed otherwise once every month during construction	protected from erosion		
8 - Nuisance and inconveniences from increase in traffic levels	• Only essential traffic will be allowed to the project area during traffic peak hours when traffic is a problem. • Sensitization of the nearby communities about the increased traffic. • Materials hauling to tipping site and vice versa will be carried out during off peak periods during the day. • Alternatively finished materials such ready-made concrete, pre-cast elements or pre-assembled materials can be delivered at site when the need arises.	Contractor	Once every Week	No complaints	500	
9 - Contamination of water from leakages of fuels and lubricants from Construction equipment	• Dripping pans to be used to contain all hydrocarbon leakages on construction equipment. • Re-fuelling on designated areas. • In case of hydrocarbon spills, the contaminated soils will be collected and treated to remove the hydrocarbon and prevent the hydrocarbons from being washed away in storm water to the nearby water bodies.	Contractor	Once every Day	No spillage of lubricants	1000	
10 - Poor air quality from dust and emissions around the construction site and material hauling routes	• Water sprinkling to reduce the dust at the construction sites • Use of dust masks to operators and those working in the dusty areas. • Use of goggles for all operators. • Construction machines/equipment will be well maintained to ensure total fuel combustion. All vehicles involved in construction works will be frequently checked and well serviced during the whole construction period so that the level of exhaust emissions is reduced.	Contractor	Once every Month	Within limits	5000	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	• Speed of vehicles hauling construction materials shall be reduced and the construction materials will be covered with tarpaulins.					
11 - Spread of diseases (HIV/AIDs, STIs or STDs)	• Sensitization and health awareness campaigns to all involved in the project including service providers. • Construction workers to undergo health screening according to the National HIV/AIDs Policy. • Project will assist the nearby health facility in sensitization of those involved in the project.	Contractor	Once every week on weekends	All employees Sensitized and examined	3000	Part of HIV/AIDS sensitization program
12 - Injuries to neighbours from falling into trenches and open pits for inspection chambers. Poor public safety during Construction – Risk to life. Poor safety at Work place.	• Construction sites shall be provided with barricades to protect neighbours and those passing-by. • Therefore the public particularly the children shall not be allowed to come closer to the swing area of excavators or other equipment at site. • In places where there are vehicles transporting construction materials and also at turning places towards the construction site, appropriate warning signage shall be posted. • Sensitization and training of the surrounding communities regarding the risks associated with construction activities. • In case of trenches, and excavated sewer lines, proper barricades have to be applied to warn and protect the people of impending dangers of falling into open trenches. • Constant surveillance from security to make sure that there are no “uninvited guests” in the project area. • All employees working on the construction site will be sensitized to use PPE to avoid occupational risks. Such equipment include hard hats, ear plugs or ear muffs, dust coats or overalls, gloves, dust masks, goggles for eye protection, hard toed boots, safety harness etc.	Supervising Engineer/ Contractor	Every day	Zero injuries	2500	
13 - Generation of construction solid and liquid wastes	• Site housekeeping to minimize solid and liquid wastes generated from construction and other related activities such as food vending and petty businesses.	Supervising Engineer. Contractor	Every day	Good house keeping	2000	Project cost

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	• Allocate a special area for petty business such as food stalls provided with garbage bins. • Post appropriate signage such as "DO NOT LITTER" or "USITUPE TAKA" at all strategic sites. • Assign Contractor's Environmental or Safety Officer the responsibility to ensure that the surroundings are kept clean. • All excavated spoil should be well managed through levelling or tipped into low lying areas or borrow areas which are no longer useful. • Trash and waste shall be well collected and removed from the site to district waste collection point. • Consult the district council about the suitable trash/waste dumping site and their procedures. • The community should instruct people to stay away from scavenging at the dumping sites. • Solid wastes generated from land clearing shall be collected and disposed of in district sanitary land fill at authorized site. • Decomposable materials shall be collected and combined with district wastes to the authorized dumpsites; plastics and other recyclable materials will be collected and sent out for recycling.					
14 – Vandalism and damage to pipe systems	• Fencing-off and guarding of sensitive facilities • Regular patrols and checks • Offence & penalty system in place and communities made aware of this through appropriate public awareness programs.	Supervising Engineer. Contractor	Every day	Good house keeping	--	
1 – Noise disturbance from pumps, and engines	• Pump and engines that produce significant noise levels should be equipped with adequate noise silencing equipment, and preferably placed inside noise isolated buildings.	Project Operator (MWAUWASA)	Monthly during operation	No complaints from surroundings	2000	
2 - Pollution from effluent from the treatment plant	• Effluent from WTP should be tested regularly and if exceeding permissible standard quality, additional treatment should be conducted to bring quality of the effluent within these levels.	Project Operator	Monthly during operation	Effluent quality not exceeding GoT standards	2000	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
		(MWAUWASA)				
3- Foul odour emanation from the waste water ponds	• Maintain a sufficient buffer zone between treatment plant and residential premises with tree/garden cover • Design modification entailing enclosing the main inlet pipe within a covered structure	Supervision Consultant/MWAUWASA				
Nuisance and health risk from burst sewerage pipes	•					
3 - Health risk to laboratory attendant during waste water treatment and sampling procedures	• Appropriate training and equipment • Safe storage of chemicals	Project Operator (MWAUWASA)	Monthly during operation	No risks		
Bird Breeding	•					
4 - Vandalism and damage to pipe system	• Fencing-off and guarding of sensitive facilities • Regular patrols and checks • Offence & penalty system in place and communities made aware of this through appropriate public awareness programs.	Project Operator (MWAUWASA)	Monthly during operation	No vandalism or damage		
Total					***35,000***	