THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF WATER

Dar es Salaam Water Supply and Sanitation Authority

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Provision of Consultancy Services for Preparation of Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) Report for Construction of Off-Grid Sanitation Projects

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Comprehensive Project Brief for the Proposed Simplified Sewerage System to be constructed at Mikocheni A and Darajani Street, Mikocheni Ward, Kinondoni Municipality

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STUDY TEAM

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ABBREVIATIONS AND ACRONYMS

A.M.S.L	Above Mean Sea Level
AIDS	Acquired Immune Deficiency Syndrome
BOQ	Bill of Quantities
CBO	Community Based Organization
DAWASA	Dar es Salaam Water Supply and Sanitation Authority
EIA	Environmental Impacts Assessment
EIS	Environmental Impacts Statement
EMA	Environmental Management Act
EMP	Environmental Management Plan
ERB	Engineering Registration Board
ESIA	Environmental and Social Impacts Assessment
ESMP	Environmental and Social Management Plan
GoT	Government of the United Republic of Tanzania
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome
IDA	International Development Association
MoW	Ministry of Works
NEMC	National Environment Management Council
NGO	Non-Governmental Organization
PAPs	Project Affected Persons
RAP	Resettlement Action Plan
SEA	Strategic environmental assessment
SIA	Social Impacts Assessment
STD	Sexually Transmitted Diseases
STI	Sexual Transmitted Infections
TAC	Technical Advisory Committee
TMA	Tanzania Meteorological Authority
ToR	Terms of Reference
TTCL	Tanzania Telecommunications Company Ltd

UAUT	United African University of Tanzania
UTM	Universal Transverse Mercator
VCT	Voluntary Counseling Treatment

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Comprehensive Project Brief for The Proposed Simplified Sewerage System to be constructed at Mikocheni Darajani area, Mikocheni Ward, Kinondoni Municipality in Dar es Salaam Region

1.0 BACKGROUND AND JUSTIFICATION

The Government of the United Republic of Tanzania (GoT) through the Dar es Salaam Water and Sewerage Authority (DAWASA) under the Ministry of Water intends to implement an Off Grid Sanitation Project (OGSP) in Dar es Salaam City to serve peri-urban areas not connected to the central sewerage system. DAWASA has received financing from the International Development Association (IDA) in the form of a credit to implement the project. Prior to implementing the project, the law in Tanzania requires an Environmental Impact Assessment to be conducted and approved by relevant authority. In order to comply with the law in Tanzania, the DAWASA intends to apply a portion of the proceeds of the credit to eligible payments for consulting services for Preparation of Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) Report for construction of off grid sanitation projects.

Dar es Salaam is the largest and most important commercial and industrial center in Tanzania. The city has an estimated population of about 5.0 million and is projected to double at the end of the project horizon of 25 years. About 10% of the population is served by sewers and the rest almost depend on on-site sanitation systems. The sewer coverage is only limited to the area within city centre with a total length of 67.8km and the system is based on a separate system and discharge their effluent into oxidation ponds, and into the sea through sea outfall of about 1.03km long. The onsite sanitation systems result into Faecal sludge of which handling and management throughout the sanitation chain (from domestic containment, transportation as well as disposal and treatment) is currently hygienically inadequate thus posing environmental and public health risks. The Off Grid project is intended to address these challenges. The Off Grid project in divided into several subprojects which will be implemented in the five municipalities of Dar es Salaam City. One of these

is the Construction of Simplified Sewerage System at Mikocheni Darajani area, in Mikocheni Ward, Kinondoni Municipality. The project is planned to connect 260 households with an estimated population of 16,006 people. According to the United Republic of Tanzania Ministry of water, Design manual for water supply and wastewater disposal domestic requirements (2009) 120l/c/day has been adopted in the designing. 80% conversion to wastewater of the consumption in the design has been considered. Therefore, the estimate amount of sewage/Wastewater to be generated per day from the given population is 1,536.576m^3 /day as per design manual.

This study was conducted in accordance with the Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations, 2018 along with the Environmental Impact Assessment and Audit Regulations of 2005. These Regulations provide legal procedures for implementing the requirements of the Environmental Management Act Cap.191 of 2004. The Regulations give mandate to NEMC to oversee the EIA process, which culminates with an award of the EIA Certificate by the Ministry responsible for Environment.

In accordance with the EIA Regulations, NEMC is mandated to screen projects and make decisions of level of EIA required as well as evaluating the adequacy of respective environmental statements. Considering the nature and size of the proposed “Simplified Sewerage System in Kinondoni Municipality”, the project falls under Category “B2” (Non-Mandatory) in accordance with Reg.4 (1)(c) and First Schedule of the amended 2018 Regulations which categorizes the *night soil collection and treatment* being under the ‘*List of small-scale activities and enterprises that require registration but shall not require Environmental Impact Assessment. Further, the projects shall not require screening and scoping, rather, the Project Brief shall be examined and issued with an Environmental Impact Assessment Certificate*’. The regulations require developers to prepare and submit to the National Management Council (NEMC) filled EIA registration forms and “Project Briefs” for all B2 projects. The preparation and content of

the “Project Briefs” is provided under Reg.6 (1). The same has been followed in preparing this “Project Brief”. The study for preparing this project brief was conducted from July to October 2020.

This project brief for the Proposed Construction of Simplified Sewerage System in Kinondoni Municipality is being submitted to NEMC together with EIA Registration Forms for EIA Certificate decision.

1.1 NATURE OF THE PROJECT

A simplified Sewerage System is a sewerage network that is constructed using smaller diameter pipes laid at a shallower depth and at a flatter gradient, this type of sewerage system allows for a more flexible design at lower cost. The pipes are usually laid within the property boundaries, through either the back or front yards, access ways which are too narrow for heavy traffic, therefore little excavation is required. The proposed project concerns construction of Simplified sewerage system for public use at Mikocheni A and Darajani streets, Mikocheni ward, Kinondoni Municipality. The nature of the project enhances environmental protection through proper handling and disposal of domestic sewage. According to First Schedule of the EIA and Audit Regulations (Amended) of 2018, the nature of the project is small and entails no significant impacts. The project can be categorised as Type B2, which according to the regulations are “small-scale activities and enterprises that require registration but shall not require Environmental Impact Assessment. Further, the projects shall not require screening and scoping, rather, the Project Brief shall be examined and issued with an Environmental Impact Assessment Certificate”.

2.0 PROJECT DESCRIPTION

2.1 Project Location

Mikocheni is an administrative ward situated at -6.763743 Longitude, 39.245342 Latitude in Kinondoni Municipal, Dar-es-salaam Region. The ward that is located in the southwest of Dar-es-salaam, comprises of six streets that

is Mikocheni A, Mikocheni Regent Estate, TPDC, Ally Hassan Mwinyi and Darajani, figure 1.

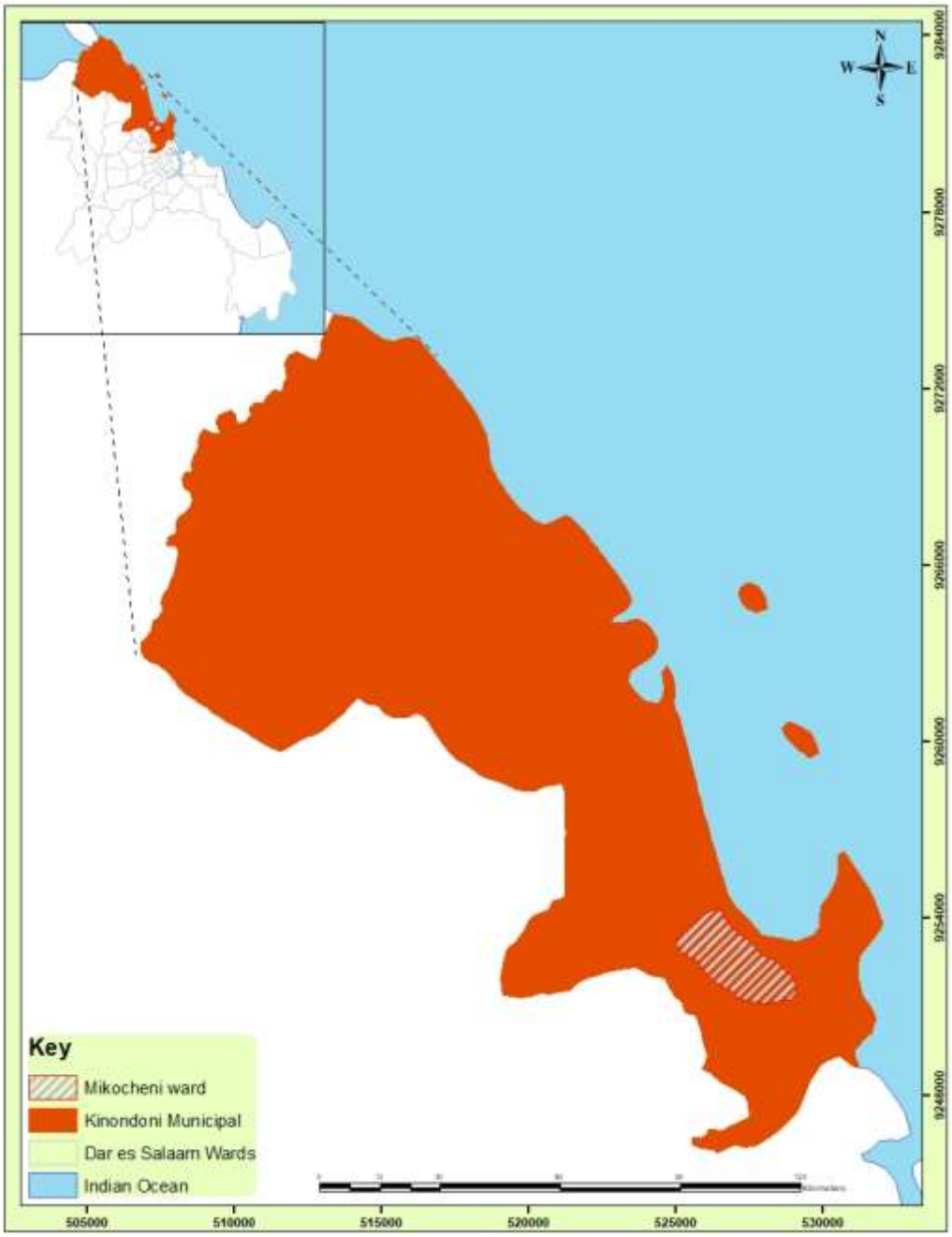


Figure 1: A Map of Dar es salaam region showing the project Municipal

Figure 2: An Extract Google view to show the Location of the project area

2.2 Accessibility

The project area is accessible via Ali Hassan Mwinyi road and Mwai Kibaki road, from City Centre, the site is at the left side 1 Km from Mwai Kibaki road.

The project area is unplanned settlement with restricted access roads for feacal sludge emptying trucks.

2.3 Specific Features

The project area is being served by on site sanitation management that involve domestic containment and emptying trucks that are not satisfactory managed. Apart from illegal emptying, underground seepage of faecal sludge may also contaminate ground water leading to water related diseases within this area. To address above challenges, we recommend construction of simplified sewerage system as the solution of faecal sludge management within the area. The project will be implemented in Mikocheni A and Darajani streets

2.4 Land Use and Land Ownership

The project site is surrounded by unplanned residential and commercial buildings, power lines, Access roads, Industrial complexes, existing Main Sewer network, drainages systems, Figure 3. The proposed project intends to use the existing alleys (*vichochoro)* for installing the simplified sewer pipelines. The local government in the project area has entered into agreement with DAWASA through a formal meeting held on 05/07/2021 to use the alleys whether formal or non-formal for construction of simplified sewerage system and the associated appurtenances so as to improve the sanitation conditions, appendix II.

Figure 3: Power lines, DAWASA Pumping station and alleys (Vichochoro) at Mikocheni A

After installation of sewer pipes the narrow walkways which are prone to erosion will be paved.

2.5 Baseline information

2.5.1 Water Table and water quality analysis

Groundwater is abundant in almost the entire Dar es salaam City. This is evidenced by the fact that shallow wells are one of the sources of domestic water supply for most of the households around the project site and therefore the water table is high which is about 6m. Rises in groundwater level, can cause reductions in strength of the soil that can lead to failures of slopes. In regions of significant slope instability, significant damage to buildings can occur as a result of landslides. Lowering of the groundwater table can cause the soil to consolidate, which induces settlement.

2.5.2 Air quality

The air quality observations indicate that the general air quality in the project area is good as there is no any strange activity contributing to air pollution. However, seasonal variation as well as localized and temporal deterioration in air quality does occur. Smokes and greenhouse gases such as carbon dioxide,

carbon monoxide are expected to be emitted from moving vehicles due to the burning of fossil fuels which passes at Ali Hassan Mwinyi road which and other street roads closer to the project area. During construction phase, air quality of the area will be impacted and the proponent will be advised to use good quality material transportation vehicles.

2.5.3 Noise levels

The noise level at the project area is mainly due to moving vehicle along the road, moving air (wind) or rain and birds. Project activities during construction will change patterns and amplitude of noise in the project area. Operations of construction machines may cause adverse impacts on local residents, and on workers. The proponent have to ensure proper provision of ear mask to the workers and all works have to be executing during the day time.

2.5.4 Climate

Mikocheni A and Darajani wards in Kinondoni Municipality of Dar es Salaam Region in which the proposed site is located is close to the warm Indian Ocean. Thus, the area experiences a tropical wet and dry climate with hot and humid weather throughout the year. Generally, site area has two distinct rainy seasons, ‘long’ rains during April and May, and ‘short’ rains during October and November with a mean annual rainfall of between 800 – 1200mm. The average annual daily temperatures range between 21.9°C and 29.6°C. The climate is also influenced by the south-westerly monsoon winds from April to October and north-westerly monsoon winds between November and March (TMA, 2011). Implementation of Simplified Sewerage system project will not affect the climate in Mikocheni area.

3.0 POLICY, ADMINISTRATIVE AND LEGAL FRAMEWORK

According to the fundamental principles of environment, any developmental activities of this nature such as construction of Simplified sewerage system would have socio-economic and somehow environmental impacts that must be addressed and governed in order to serve public interest and sustainable development. Given the many existing and developing environmental laws, regulations and standards in many African countries, it is worth considering resorting to constitutional provisions to protect and manage the environment. With increasing environmental awareness in recent decades, the environment has become a higher political priority and many constitutions now expressly guarantee a 'right to a healthy environment', as well as the procedural rights necessary to implement and enforce the substantive rights granted. The public or national interest in this aspect is addressed through government Policies and regulated by Principal Acts and Regulations. The implementation of the proposed project shall touch various sectors; therefore, the developer has to comply with number of cross-sectorial policies and legislations relevant to this project. Also, the listed institutions involved in environmental management for the project is included in this chapter.

3.1 Relevant Policies

This section focuses on various policies which guide the development aspects for sustainable vision, apart from the national environmental policy, there are numbers of sector policies that are to be reviewed when executing the proposed development and these include;

3.1.1 National Environmental Policy (NEP, 2021)

The National Environmental Policy of 2021 has just been launched in February 2021. The new policy formulation is a revision of the National Environmental Policy of 1997. The Policy serves as a national framework for planning and sustainable management of the environment in a coordinated, holistic and adaptive approach taking into consideration the prevailing and emerging environmental challenges as well as national and international development issues. Effective implementation of this policy requires mainstreaming of environmental issues at all levels, strengthening institutional governance, and public participation in environmental management regimes. The long-term vision of this policy is geared towards the realization of environmental integrity, assurance of food security, poverty alleviation, and increased contribution of the environmental resources to the national economy. It also recommends strong institutional and governance measures to support the achievement of the desired objectives and goals.

The policy seeks to promote the economy and livelihoods of people while promoting sustainable utilization of natural resources in the country. The policy provides the framework for the formulation of plans, programs, and guidelines for the achievement of sustainable development.

The policy's overall objective is to provide a national framework for guiding harmonized and coordinated environmental management for the improvement of the welfare of present and future generations. The specific objectives are i) to strengthen coordination of environmental management in sectors at all levels; ii) to enhance environmentally sound management of land resources for socioeconomic development; iii) to promote environmental management of water sources; iv) to strengthen conservation of wildlife habitats and biodiversity; v) to enhance conservation of forest ecosystems for sustainable provision of environmental goods and services; vi) to manage pollution for the safe and healthy environment; vii) to strengthen the national capacity for addressing climate change impacts; viii) to enhance conservation of aquatic system for the sustained natural ecosystem; ix) to ensure safety at all levels of application of modern biotechnology; x) to promote gender consideration in environmental management; xi) to promote good governance in environmental management at all levels; and xii) to ensure predictable, accessible, adequate and sustainable financial resources for environmental management.
The revised environmental policy in Tanzania is relevant to the Simplified Sewerage System project since it brings forth the foundation of environmental sustainability of development projects translated by having environmental impact assessment study a mandatory undertaking before their implementation.

3.1.2 National Land Policy of 1997

This policy represents a new turning-point in the development of Tanzania. The present system of land tenure accepted since independence, and further developed over three decades is a product of the past. Colonial history, conflicting statutory measures, broad socioeconomic patterns and demographic trends to some extent played a role. All these factors and many others contributed to current problems that exist concerning land tenure and land use. These problems cannot be solved merely by piecemeal legislation or by policy directives. The right to land with secure tenure must be respected, but land problems extend much further than individual claims to tenure rights. They involve other issues such as the economic use of land, rural and urban development, hunting, squatting, the quality and security of title, advancement of agriculture and the protection of the environment. The land use and tenure for this project is guided by national land policy of 1997.

3.1.3 Construction Industry Policy (2003)

Among the major objectives of the policy, which supports a sustainable building development sector, include the promotion and application of cost effective and innovative technologies and practices to support socio-economic development activities such as buildings, road-works, water supply, sanitation, shelter delivery and income generating activities and to ensure application of practices, technologies and products which are not harmful to either the environment or human health. Proposed project is in-line with this policy as ultra-modern technology is used during construction and its operation.

3.1.4 National Health Policy (2003)

The Health Policy is a vital guide towards health development of any country. It is particularly, important in a country like ours where resources and technology are more limited than in other countries, which are relatively better off in both technology and resources. This Policy is a revision of the 1990 Health Policy, which emphasized on the need for increasing community involvement in health development and improved access and equity in health and health services.

The Policy recognizes the challenges of consolidating the principles of the previous health policy in community involvement, improved health services provision, access and equity while addressing the different dimensions of reforms that are taking place in the Public Sector.

The proposed project will adhere to policy requirements to ensure no transmission of such communicable diseases between construction workers and the community, protect workers from all sorts of health risks and hazards; and provide adequate sanitation services within its project and ensure that its activities are not a source of health issues. The project will also facilitate the availability of adequate and equitable services in support of health programs.

3.1.6 National Gender Policy of 2000

The overall objective of the Gender and Development Policy is to promote gender equality and equal participation of men and women through facilitation of access to education, child care, and employment and decision making. Since the proposed Project of construction of Simplified sewerage system will focus on gender inclusivity while offering employment of the laborers, DAWASA will work in line with this Policy in order to promote gender equality and equal participation of men and women in all matters wherever possible and within the ambit of this policy.

3.2 Principal Legislations and Regulations

The ESIA team reviewed several legislations relevant to the construction of Simplified Sewerage system. These involve Principal Acts that support and provide guidelines to implement the intended project as discussed below.

3.2.1 Environmental Management Act (2004)

This Principal Act provides for a legal and institutional framework for sustainable management of the environment in Tanzania. This act restricts the developer or Contracting Authority to implement a project if is likely to have a negative environmental impact; or for which an environmental impact assessment is required under the Act. In part IV the act state that EMA deals with ESIA and other assessments and directs that ESIA is mandatory for all development projects. Section 81, (2) state that an Environmental Impact Assessment study shall be carried out prior to the commencement or financing of a project or undertaking. The project Contracting Authority is required to consider the underlying procedures appropriate as stated in the Act before undertaking project activities including obtaining permission from responsible government bodies. Thereby in adhering to this, the project was registered to NEMC, followed by screening of the project and well along Development of and implementation of ESMP and its monitoring plan.

3.2.2 The Environmental Management (Fees and Charges) Regulations, 2021

These Regulations shall apply in relation to an act or service in respect of which fees and charges are payable under the Act and Regulations made thereunder. The regulations emphasize that “a person shall not, upon payment of fees and charges prescribed in the Schedule to these Regulations, carry on any of the following”:

- Environmental Impact Assessment;
- Environmental Compliance Monitoring and Audit;
- Registration of Environmental Experts;
- Environmental Quality Standards;
- Noise and Vibrations; or
- other activities related to the environment

This project complies with the regulations since the proponent has already paid registration fees and review charges as directed by NEMC.

3.2.3 The Environmental Management (Control of hazardous Waste) regulations, 2021

The objective of these regulations is to protect the environment and human health by preventing or reducing the generation of Hazardous waste, the adverse impacts of the generation and management of hazardous waste and

by reducing overall impacts of resource use and improving the efficiency of such use, which are crucial for the transition to a circular economy. The regulation requires that "any person generating, collecting, storing, transporting, treating, recycling, reusing, recovering and disposing of hazardous waste or any person exercising jurisdiction under these Regulations shall, assure that there are no adverse impacts to be generated or caused by the activity conducted. DAWASA will comply with the requirements of this regulation by reducing the building materials which may generate hazardous impacts, as well as proper handling of such waste such as in use of fuels for various purposes etc.

3.2.4 The Environmental Management (Control of Noise and vibration) regulations, 2015

The regulations focus on the maintenance of a healthy environment for all the people in Mainland Tanzania, the tranquility of their surrounding and their psychological well-being by regulating noise and vibration levels to prescribe the maximum permissible noise and vibration levels from a facility or activity to which a person may be exposed. DAWASA will make sure that all the guidelines under this policy will be considered to ensure the healthy environment to everyone.

3.2.5 The Environmental Management (Prohibition of Plastic Carrier bags) regulations, 2019

Regulations are meant to impose a total ban on the import, export, manufacturing, sale, and use of plastic carrier bags regardless of their thickness. Plastic carrier bags have a wide definition in the Regulations, as a bag made of plastic film, with or without handles, or gussets and to which its layer is in any thickness. The Regulations also categorically state that no person shall sell or offer for sale beverages or other commodities wrapped in plastics unless the nature of such commodities require wrappings by plastics, and restricts any licensing authority from issuing any licenses after the Regulations come into force. Project developer will make sure that there will be no use of plastic bags within the project site and the whole project life time, also in case of the need of carrier bags the proponent will make sure that there will be a n alternative bags which are allowed by the regulations. For the commodities that are wrapped in plastic, then the proponent will make sure that such plastic will be handled properly.

3.2.6 The Environmental Management (Solid Waste Management) regulations, 2007

The solid waste management regulation of 2007, provides general directive on management of solid waste as follows: -

Regulation detail the requirements and responsibilities for managing solid waste in Tanzania

Highlight waste minimization and cleaner production principles alongside the duty to safeguard the public health and the environment from adverse effects of solid waste. Detail permitting requirements, notably that any person dealing with solid waste as collector, transporter, waste depositor or manager of a transfer station will apply to the LGA for a permit. The local authority will also issue licenses to individuals or companies qualified to operate solid waste disposal sites; permit is required to operate an LGA waste disposal site.The proposed project is expected to generate solid waste in each of its phase whereby most of the waste produced are biodegradable (organic solid waste). Therefore, to comply with this regulation DAWASA will make sure that the Contractor will provide collection bins and also will engage the registered solid waste collection contractor.

3.2.7 The Environmental Management (Water Quality) regulations, 2009

Regulations provide for institutional and legal framework for sustainable management and development of water resources; to outline principles for water resources management; to provide for the prevention and control of water pollution; to provide for participation of stakeholders and the general public in implementation of the National Water Policy. These regulations require the sustainable management of water sources and proper use of the available sources without causing any damage towards such sources. Also, the regulations emphasize that it is every one's responsibility to conserve and preserve the available water sources in Tanzania. During all phases of the project there will be water demand, hence DAWASA will make sure that there will be a sustainable use of water.

3.2.8 The Environmental Management (Air Quality) regulations, 2009

The Regulations were formed in order to: -

- Prohibit emissions and releases of hazardous substances into the environment
- Prescribe permissible emission limits and quantities of emissions of sulphur oxide, carbon monoxide, black smoke and suspended particulate matters, nitrogen oxide, ozone, hydrocarbons, dust and lead
- Empower NEMC to issue air pollutant emission permits, enforce compliance, undertake emergency prevention and issue stop orders
- Set baseline parameters on air quality and emissions based on a number of practical considerations and acceptable limits and ensure protection of human health and the environment from various sources of pollution.

3.2.9 The Environmental Management (Soil Quality) regulations, 2009

These Regulations, made by the Minister of State under sections 143, 144 and 230 of the Environmental Management Act, concern soil pollution and soil quality standards and provide with respect to a soil protection permit and compliance system. They also concern measures of enforcement. The object of these Regulations is to

- Set limits for soil contaminants in agriculture and habitat;
- Enforce minimum soil quality standards prescribed by the National Environmental Standards Committee.

Also, the regulations require that, the contaminants of volatile organic compounds in habitat and agricultural soils shall comply with parameters and upper limits as prescribed and contaminants of heavy metals in habitat; agricultural soils shall comply with parameters and upper limits as prescribed and contaminants of pesticides in habitat and agricultural soils shall comply with parameters and upper limits as prescribed. Local government authority may prescribe special or specific measures and guidelines for soil conservation applicable to their respective areas of jurisdictions which are not below standards prescribed under these Regulations. DAWASA will comply with the requirements made under these regulations.

3.2.10 Occupational Health and Safety Act 2003

The provisions of this law require employers to provide decent working environment to employees to guarantee their health and safety. Occupational health and safety services are important for sustainable development of a country, as they reduce occupational accidents and diseases which can have huge economic burden to individuals, enterprises and the nation as whole. Improving health and safety of workers will significantly increase productivity at the workplaces to encourage more investments, increase job creation, higher morale, and job satisfaction hence industrial harmony. The law also entails employers to fulfil obligations of ensuring safety of the equipment's used by workers and providing proper safety gears as required. These provisions shall be enforced during construction and operation of Simplified Sewerage System.

3.2.11 The Water Supply and Sanitation Act No. 12 of 2009

This is also a new legislation that provides for sustainable management and adequate operation and transparent regulation of water supply and sanitation services; provides for establishment of water supply and sanitation authorities as well as community owned water supply organizations; and provides for appointment for service providers. The main aim of this law is to ensure the right of every Tanzanian to have access to efficient, effective and sustainable water supply and sanitation services for all purposes by considering among

others protection and conservation of water resources and development and promotion of public health and sanitation; and protection of the interest of customers. Under this law, the Minister responsible for water affairs shall establish water authority and cluster water authorities in order to achieve commercial viabilities. The Contracting Authority will apply for a water supply connection and if appropriate a sewer connection to DAWASA.

3.2.13 Engineers Registration Act and its Amendments 1997 and 2007

The Acts regulate the engineering practice in Tanzania by registering engineers and monitoring their conduct. It establishes the Engineering Registration Board (ERB), the law requires any local or foreigner engineer to register with ERB before practicing in the country. DAWASA will continue to comply as it has utilized the services of registered engineering firm for its structural designs which it will continue to use to supervise the construction process.

3.2.14 The Contractors Registration (Amendment) Act, 2008

The Contractors Registration Act requires contractors to be registered by the Contractors Board (CRB) before engaging in practice. It requires foreign contractors to be registered by the Board before gaining contracts in Tanzania. DAWASA shall comply with the law requirement during the recruitment of contractors for project implementation.

3.2.15 The Architects and Quantity Surveyors Act (1997)

The Act requires Architects and Quantity Surveyors to be involved in the project to be registered by the Architects and Quantity Surveyor Board (AQSB) before engaging in practice. It also requires foreign contractors to be registered by the Board before gaining contracts in Tanzania. DAWASA has complied with the law requirement during the recruitment of architects who have designed the project and will continue to utilize registered persons in the project implementation.

3.2.16 The Urban Planning Act (2007)

The law provides for the orderly and sustainable development of land in urban areas, to preserve and improve amenities; to provide for the grant of consent to develop land and powers of control over the use of land and to provide for other related matters. Under Section 3, among others the law seeks to improve level of the provision of infrastructure and social services for sustainable human settlement development. This act established planning authorities which include the city, municipal, town and township councils in the country which have responsibilities including:

- Secure the orderly and environmentally sustainable development of area under its jurisdiction;

- Prepare general and detailed planning schemes;
- Control building densities and access to buildings;
- Recommending approval of building schemes and subdivision of plots by developers;
- Secure cooperation of all agencies, utility bodies, land owners and other bodies and institutions involved in the preparation and implementation of planning process;

This act gives the right for a landholder to prepare a detailed planning scheme for his land as long as it follows the general planning scheme. The act also requires landholders to gain consent from planning authorities with jurisdiction in their areas to develop land which may be appended by an environmental impact assessment report if the authority sees it may have injurious effects to the environment. The Contracting Authority has ensured that the development of the project conforms to the general planning scheme of the area and will design the project within the standards required by the Kinondoni Municipal Council and has secured a building permit.

3.2.17 Public Health Act (2009)

Provide for the promotion, preservation, maintenance of public health with a view to ensuring the provisions of comprehensive, functional and sustainable public health services to the general public. Part III (e) of the act requires premises owners to keep their premises free of mosquitoes and other disease vectors, vermin or causative agents; Section 54 prohibits causing or suffering from nuisance likely to be injurious or dangerous to health, land, premises, air or water; Section 63 prohibits overcrowding particularly in schools, institutions and hostels; section 66 requires buildings plans to be submitted to the Municipal authority for building permit and once built not to be occupied until a certificate of occupancy has been issued; Part IV (c) assigns responsibility to City council to remove or appoint an agent to collect, transport and dispose solid and liquid waste and charge fees to beneficiaries of this service and responsibilities for prescribing types of wastes and guidelines for their collection and disposal; Part VI (c) requires application for permits to construct and operate swimming pools and public bathes and gives Municipal authority to regulate them; Section 101 it gives rights to any private sewer to connect it to any available public sewer to discharge foul or storm water therefore the project may connect to and discharge sewage or storm water into the available Wastewater Stabilization ponds.

The Contracting Authority will ensure that the project design, construction and operation does not constitute a nuisance; meets the requirements meets public health requirements for community use; engage a Municipal approved contractor to remove wastes from its facilities and seek the necessary building

and occupancy approvals. This Project has adhered to this in the project designs and shall enforce the same during implementation.

3.2.18 World Bank guidelines for Environmental Management

The main objective of this EMP is to establish a set of mitigation and monitoring measures to minimize the adverse social and environmental impacts that can take place during the implementation stage of the subproject. The measures especially focus on sensitive receptors or sensitive locations. The EMP also provides specific information about the monitoring program during construction stage including locations, frequency and reporting process. This project complies with these guidelines as it has ESMP which contains mitigation and monitoring plans of the identified impacts.

4.0 PROJECT ACTIVITIES

4.1 Mobilization or pre-construction phase

This phase entails mobilization of labour force, and equipment as well as acquisition of various permits as required by the law.

Other activities during this phase include;

- Topographical Survey for setting out purposes,
- Construction Materials' source Investigation,
- Material transportation, storage and material preparation,

4.2 Construction phase

This phase entails all the necessary installations, site grading and placement of the facility components. The major activities include;

- Trench excavation and laying of 4" and 6" PVC pipes for collection of wastewaters from households.
- Backfilling and paving of excavated trenches
- Construction of inspection chambers/junction boxes
- Construction of receiving chambers
- Connection of customers' latrines to the constructed network

4.3 Demobilization phase

This phase will involve the dismantling of temporary structures such as scar fording and removing/spreading spoil materials for proper restoration of the site. Other activities include;

- General cleanliness of the area, that is clearance of all sorts of solid wastes (plastics, wood, metal, papers, etc);
- Deposit all wastes to the authorized dumpsite;

4.4 Operation phase

The phase entails the actual usage of the Simplified sewerage system where as the individual household will be discharging night soil directly to the system. The main task will be occasional clearance of the blockages and timely replacement of leaking pipes undertaken by DAWASA with the sole cooperation from household owners at the vicinity.

4.5 Decommissioning Phase

Decommissioning is not anticipated in the foreseeable future as the completed facility will be serving a number of houses which at present incur many costs to dispose fecal sludge and if not so tend to discharge illegally. However, if this will happen, may entail change of use (functional changes) or demolition triggered by change of land use.

5.0 PROJECT DESIGN

Mikocheni Simplified sewerage system will involve construction of a simplified sewerage network discharging wastewater into existing sewer line to Mikocheni wastewater stabilization ponds which have the capacity of accommodating the additional wastewater. The system is planned to collect wastewater from surrounding households using 4" PVC pipes laid in shallow depth trenches. The system will operate under controlled gravity flow in accordance to designed gravity and velocity. Collected sewage will be discharged at the existing

Mikocheni wastewater pumping station and eventually integrated in the central sewerage system.

5.1 Design criteria

5.1.1 Design Criteria Development

A shallow sewer system is a separate sewer system which utilizes gravity for conveying raw sewage from all households to an outlet downstream. It must be set deep enough to receive flows from each user but must be located so that this depth is kept to a minimum. It must have sufficient size and gradient to carry these flows. In addition, maintenance operations, public safety and convenience must be evaluated in the light of water availability and the potential for user participation. The Simplified sewerage Network components will be sized in accordance with design criteria guidelines with a view to effectively cater for the estimated 2036 faecal sludge production horizon.

5.1.2 Design Horizon

The project planning has been taken to be 15 years (from 2021 to 2036), the detailed engineering design are prepared taking into account the ultimate 2036 faecal sludge network capacity requirements. For instance, the Sewer network will be designed to carry the 2036 peak hour demand; the capacity of the receiving faecal sludge treatment plant to be constructed or existing Wastewater stabilization ponds, the former will be similarly determined based on ultimate postulated daily water demand pattern, the later will depend on the design capacity of the existing WSP.

5.1.3 Pipe materials

The most used materials for the condominial system are, PVC Domestic /PVC Reinforced. Although the PVC pipes are usually expensive than the ceramic ones, it is possible to compensate this disadvantage during the construction, due that the PVC pipes are easier and quicker to install. One must consider that the PVC pipes offer excellent flow conditions and are usually more water tight than the ceramic ones. On the other side, these ones offer a higher

mechanical resistance. The Simplified network pipe will be designed for the maximum day demand of the target year 2036.

5.1.4 Minimum depth of sewer

The minimum recommended depth for the pipes are as follows:

Table 1: Minimum depth of sewer

Sewer type	Minimum depth
Side walk condominial branch	0,70 m
Front lot condominial branch	0,40 m
Back lot condominial branch	0,40 m
Side walk public sewer	0,80 m
Traffic road sewer	1,10 m

Wherever the sewer pipe crosses traffic road and the option of deep excavation is not feasible then concrete/steel duct should be put in use at such crossings.

5.1.5 Sewer ventilation

Ventilation to a shallow sewer network is provided through ventilation columns installed along individual water closet house connections. No ventilation columns are usually required along block and street sewers: only in cases of very long street sewer lengths (usually in excess of 5 km) , without any block sewer connections along the length, would the provision of suitable ventilation columns become necessary in order to prevent the sewage sewer from becoming septic. Such situations rarely occur in shallow sewer layouts and the fact that a majority of the sewers are laid at very shallow depths in itself ensures facilitated ventilation.

5.1.6 Inspection chambers

In shallow sewer systems, inspection chambers are located along block and street sewers and should be used in all of these situations:

(a) At the start of the branch

(b) At each time the condominial branch reaches 60 m of length

(c) At each time the public sewer reaches 100 m of length

(d) At the connection between the internal installation and the condominial branch.

(e) At any point where the pipe changes its direction or its slope

(f) At any point where different upstream branches meet and discharge in the same downstream branch

The depth to invert of a sewer at the point where an inspection chamber is required will determine the dimensions of the chamber. Where the depths are shallow, usually up to 0.75 m, there is no necessity for the physical entry to the chamber for purposes of maintenance. However at, greater depths than this the chamber dimensions have to be such that the maintenance crew can physically enter the chamber.

5.1.7 Maximum number of houses to be connected to a single sewer line

Hydraulically over 200 houses may be connected. Given the possible economic and operational advantages of connecting a large number of houses to a single sewer line, there is little justification for limiting the number of houses that may be connected to a sewer, provided sufficient pipe capacity is available. Since water consumption and wastewater generation patterns are often different from country to country, the maximum number of houses to be connected to a sewer should be computed on the basis of the peak flow and the maximum flow capacity corresponding to the minimum gradient

5.1.8 Minimum sewer gradient

Practice recommends that a 100 mm diameter pipe be laid at a minimum sewer gradient of 1 in 167.

5.1.9 Minimum sewer diameter

A minimum sewer diameter of 100 mm is usually recommended In fact, it i.e. definitely not advisable to increase the pipe diameter under the reduced falls proposed for shallow sewers, since this decreases the depth of flow, and solid will thus tend to be deposited frequently in the pipeline.

5.2. Technology description

5.2.1 Layout

To avoid deep excavations, long trunk pipes to interceptors, and large pumping stations, serious consideration is given to splitting the network into two or more smaller systems. Although network layout is also an important part of conventional design, the optimization of pipe lengths and network subdivisions takes on even greater importance in this system.

5.2.2 Hydraulics

Design period

Another approach to sewerage systems that can bring major benefits to the project is to reduce the design period of the sewerage system. A great advantage of using shorter term periods is that it avoids uncertainties of population growth and reduces the high costs of maintenance of large sewer systems with low flow. Other benefits of the reduced design period, are that it can also facilitate financing and achieve greater coverage with the same investment.

Design flow

Wastewater flow quantities are necessarily lower than the quantity of water supplied because water is lost through leakage, garden watering, house cleaning, etc. To determine the expected amount of wastewater, it is important to keep records of pumpage for each day and fluctuations during the day.

Where water use information is not available, the simplified sewerage system is - designed for a minimum flow of 1.5 l/s, infiltration is assumed to be 0.05-1.0 1/s/km of pipe.

5.3. Service Connection

In the simplified design, a 60-cm connection (or inspection) box is placed between the building and the service line. All the sewers or drains from the

house or building enter the box. This box is usually located under the sidewalk in the public right of way as shown in figure 4

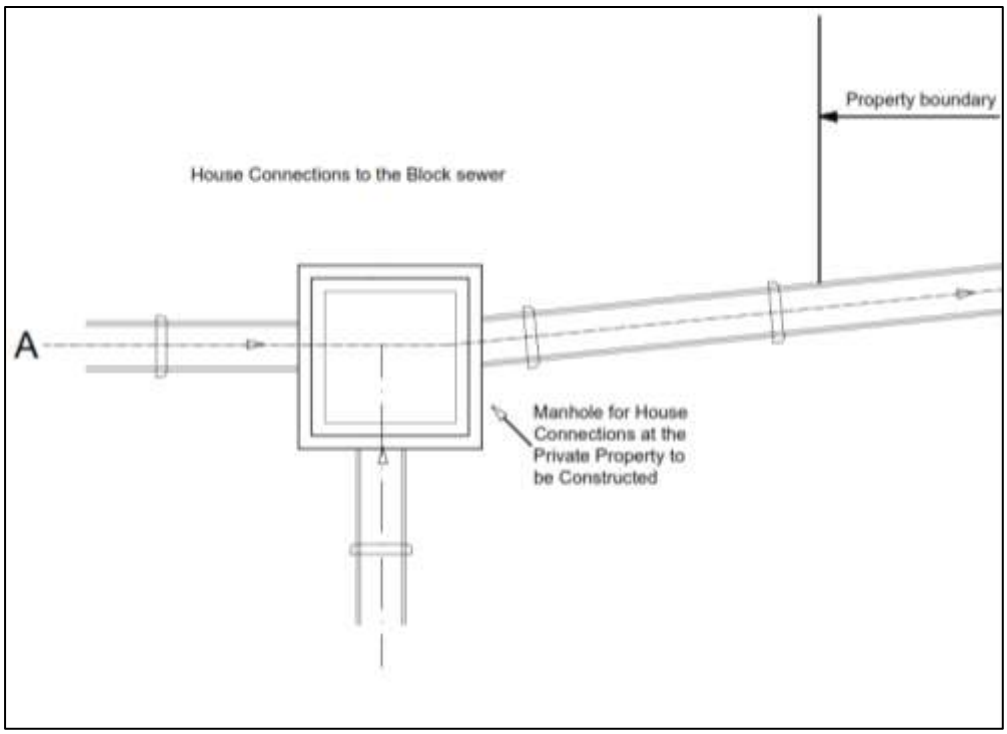


Figure 4: House connection detail

5.4 Depth of sewers

For any type of sewer connection, it is standard to have a minimum depth in which the pipes are laid should be sufficient to make house connections and have a layer of soil over the crown to protect the pipe against structural damage from external loads and frost. On simplified connections, the minimum sewer depths are usually much shallower than the conventional systems. Being as shallow as 0.65-m below sidewalks, 0.95-1.50-m below residential streets (depending on distance from the centerline of street), and 2.5-m below heavily traveled streets.

5.5 Manholes and other appurtenances

One of the most important differences between conventional and simplified sewer systems is that the former utilizes many manholes, whereas the latter type avoids its use as much as possible. The conservative criteria for manhole

use contribute to the high cost of sewerage. figure 5 shows the detail of manhole structure. The use of shallower depths is one way of reducing these costs.

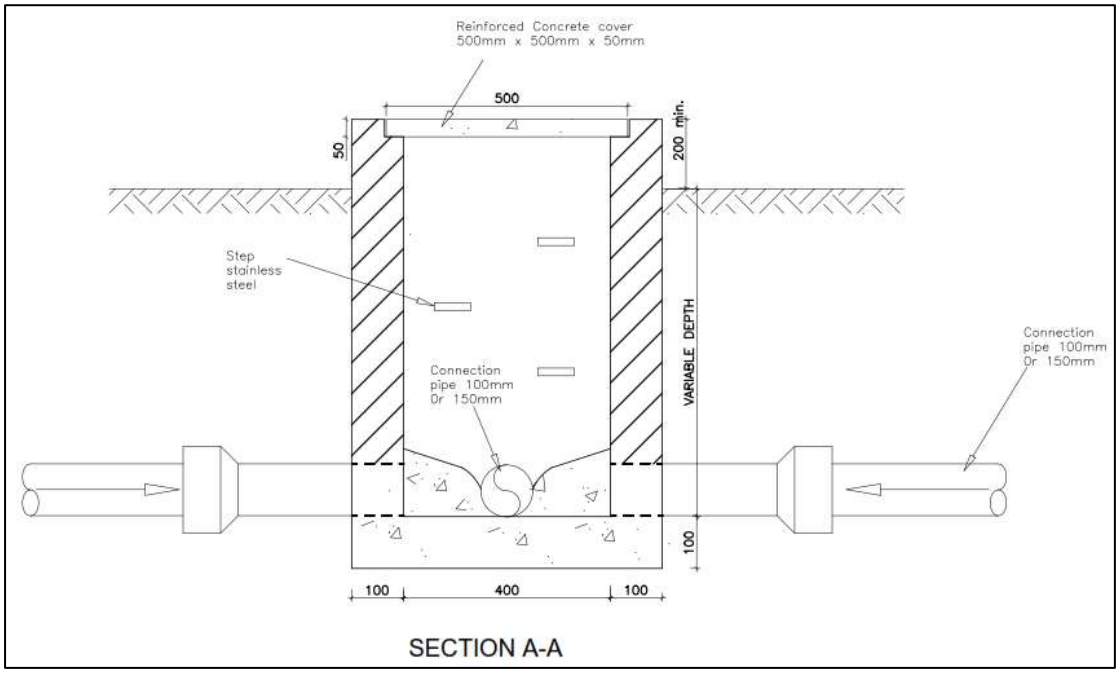


Figure 5: Standard Manhole detail

5.6 Construction Material

The types of materials used in SSS are similar to those used in conventional sewers. The most commonly used and readily available in the market are polyvinyl chloride (PVC) pipes. Additionally, PVC pipes offer the advantage of longer sizes, fewer joints (i.e less infiltration), light weight, water tightness and uniformity.

5.7 Simplified sewerage system connection layout

The proposed construction of simplified sewerage system layout at Mikocheni A Darajani Street covering a total length of about 5,753m is as shown in figure 6, Architectural drawings and other drawings are found in Appendix III.

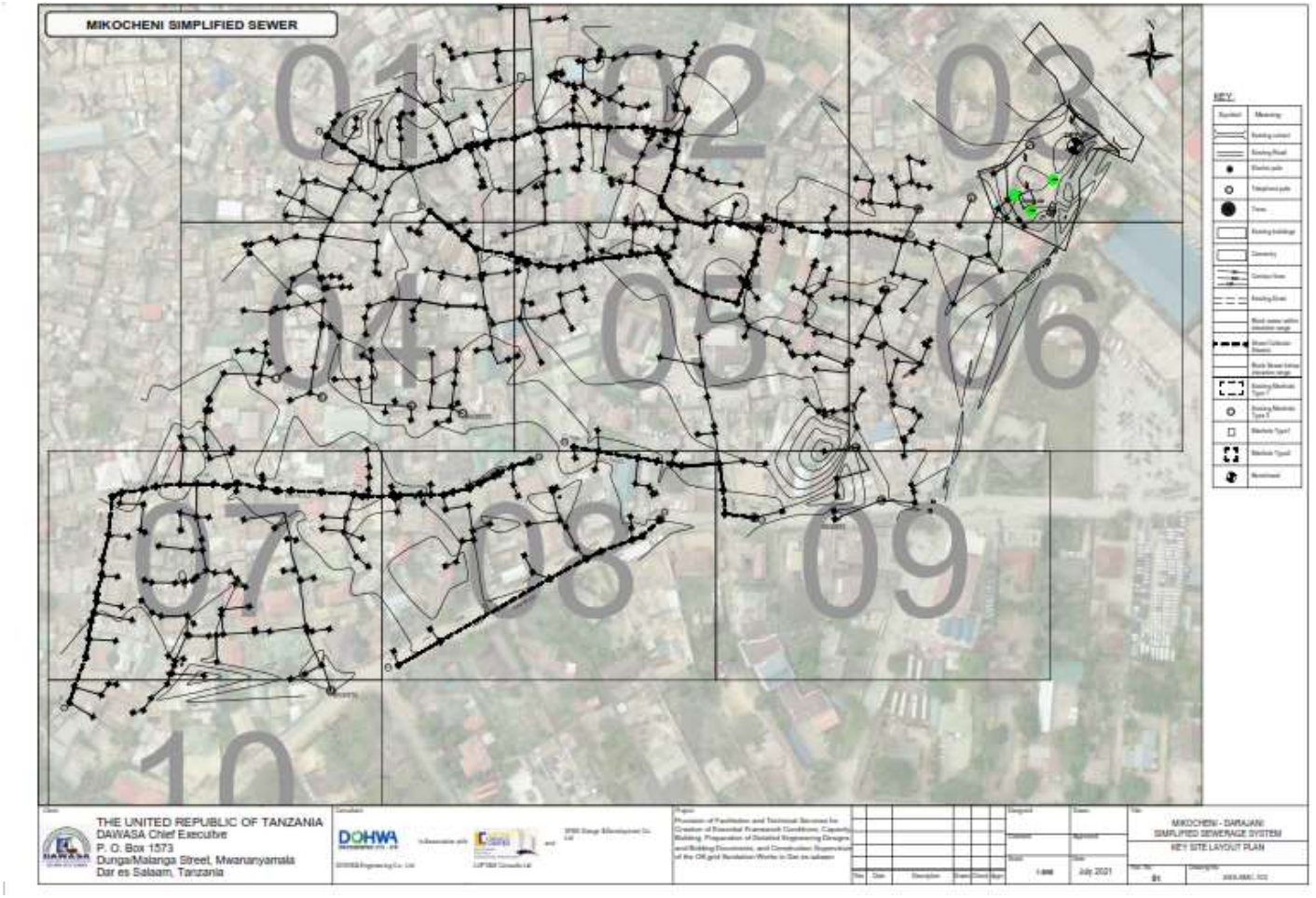


Figure 6: Simplified Sewerage system layout at Mikocheni Darajani

6.0 PROJECT REQUIREMENTS AND WASTE GENERATION

6.1 Project requirements

6.1.1 Construction materials and labour force

The main materials for construction of Simplified sewerage system include cement, aggregates (stones), water, steel, sand, timbers, blocks, PVC pipes, and gravels. All materials are available in the local sources in Tanzania and will be sourced from local Suppliers and Licensed and recognized sources. The estimated quantities of the materials to be included in the BoQ.

6.1.2 Labour force

The labour force will be determined by the Contractor; nevertheless, it is projected that during the construction phase the project will require not less than 100 workers both skilled and non-skilled laborers for each phase of project construction. During operational phase it is estimated that 30 unskilled workers will be retained for operating the system.

6.1.3 Machinery and Equipment

The proposed project development will employ various standard construction equipment and machinery. Equipment expected to be used during the construction works are Tippers, Concrete Mixers, poker vibrators, Wheel barrow, Compactor, etc. All equipment and machineries for construction works needed by the proposed project will be determined when the bill of quantities (BoQ) and selection of Contractor is finalized. These equipment shall be temporary and shall be demobilized once project is completed. On the other hand, the hand tools which will be used during construction phase constitutes; Shovels, hoes, hammer, pickaxe, buckets etc.

6.2 Wastes generation

The major wastes generation associated with the project are solid wastes and liquid waste. The solid wastes so produced will be collected and properly disposed at the collection points ready for transportation to the dumpsite.

6.2.1 Liquid waste management

During the maximum operation phase a total of 1,025m^3 per day of liquid waste is estimated to be received at the downstream receiving chamber of the conventional sewer running close to the project site.

6.2.2 Solid waste management

From experience point of view, households connected to the simplified sewerage system tend to throw solid wastes especially used sanitary pads into their toilet sinks thinking flushing will help but he results has always been immediate blockage.

The project design will ensure installation of garbage screen at each household level to prevent the system blockage from single individual's fault. This among others will render the household with the blockage to ensure the situation is well and timely handled at their own costs.

Therefore, solid wastes should be properly disposed at the collection points waiting for solid waste pickup trucks. Table 2 below shows solid and liquid wastes to be generated by the project and the methods of their disposal.

Table 2: Management of construction and operation wastes

Solid waste			
Type of waste	**Sources**	**Estimated Quantity (Kg)**	**Disposal / Management procedure**
Biodegradable materials mainly domestic waste (food, paper, wood etc.)	- Construction crew	30-50	Accessible litter bins within the camp site and later to the city waste disposal system (engage a private company)
Non- biodegradable materials (plastic, glass)	- Construction crew	5-10	Recycling/ reuse (Plastics to be sent to plastic recyclers and glass bottles to be sent to glass recyclers)
Liquid waste			
Type of waste	**Sources**	**Estimated Quantity (m^3)**	**Disposal / Management procedure**

- Excreta (domestic) human - Grey water /cleaners	- Toilets and floor cleaning	1,025	Use of existing septic tanks and pit latrines and after construction will use the Simplified sewerage system for further treatment downstream

7.0 POTENTIAL IMPACTS

7.1 Mobilization Phase

7.1.1 Positive impacts

7.1.1.1 Employment opportunities

Labour force for the project will be originated from Mikocheni Ward and the surrounding communities in Kinondoni areas. Even though during construction the employment will be on short term basis, employees will have been benefiting from the project. Some will witness their incomes and livelihood improvement.

7.1.2 Negative impacts

7.1.2.1 Noise pollution

Noise pollution is likely to occur due to the application of construction equipment and generators at the site.

Mitigation Measure

- The proponent shall maintain equipment in good running conditions to ensure that ambient noise level and vibrations pollution into the environment is very minimum to comply with Tanzania standards.

- The noisy construction activities will be scheduled at normal working hours. Regular inspection and maintenance of construction vehicles and equipment will be done to ensure that they have mufflers installed and worn parts are replaced

7.1.2.2 Air Pollution from dust emission

Air pollution is likely to occur due to the emission of suspended particulate matter (dust) to the atmosphere from the construction activities.

Mitigation Measure

- Mixing equipment shall be sealed properly and vibrating equipment will be equipped with dust removing devices.
- Also all vehicles that generate excessive black smoke will not be used.
- Adequate training and use of personal protective equipment (PPE) such as eye glasses and dust masks will be ensured in order to reduce risks associated with dust.

7.2 Construction Phase

7.2.1 Positive Impacts

7.2.1.1 Employment opportunities

Labour force for the project will be originated from Mikocheni Ward and the surrounding communities in Kinondoni areas. Even though during construction the employment will be on short term basis, employees will have been benefiting from the project. Some will witness their incomes and livelihood improvement.

7.2.1.2 Increased socio-cultural interaction

Increased socio-cultural interaction is another anticipated positive impact. The implementation of the project will bring many people from different cultural backgrounds. The interactions may bring about social changes in the communities around the project areas. Interaction with technocrats as a result of new immigrants (customers) into the area will stimulate adoption of the new technologies.

7.2.1.3 Increased Revenue to the nation through taxes, both direct and indirect

DAWASA is expected to increase its revenue collection on implementing this project. This will be through monthly payment of sanitation services by the respective household. The revenue collected will contribute towards expansion of the water supply and sanitation service within DAWASA service area.

7.2.1.4 Cost reduction for sewage management

The proposed facility will make it easier for the Institutions and households which at present incur unbearable costs for proper dislodging the septic tanks when full. That simply means the households in the vicinity and the institutions will benefit through direct connection to the downstream treatment facility depending on the nature of topography.

7.2.2 Negative impacts

7.2.2.1 Increased HIV/AIDS and other sexual related diseases:

Local communities surrounding the project area have to be aware of the fact that HIV/AIDS is present in their areas but accede to it not being at an alarming rate. The communities were worried that with an influx of people into the project area the pace of spread will accelerate especially during the construction phase.

Mitigation Measures

- Contractor shall enforce a code of conduct in the project area to encourage respect for the local community and to maintain self-cleanliness of the working area at all times.

- The contractor shall deploy locally available labour to reduce risk of spreading communicable diseases (especially STDs).

- In order to prevent more HIV/AIDS infection, during the implementation phase, the project should include information education and communication component (IEC) in its budget. This will help to raise more awareness on HIV/AIDS, and means to suppress its incidence.

- A safety, health and environment induction course shall be conducted to all workers, putting more emphasis on HIV/AIDS, which has become a national disaster.

7.2.2.2 Land degradation and increased erosion

Establishment of new facility within the project area might result into land degradation and promote soil erosion.

Mitigation Measures

- Unnecessary trench excavation close to the buildings and sensitive re-alignments shall be avoided.
- Lined drainage channels at sensitive terrains shall be provided to control speed and volumes of storm-water.
- The contractor should plant grass or any other vegetation cover to minimise exposed soil surface.
- Directing flow to properly designated channels within the facility site.
- Timely backfilling
- Paving the erosion prone alleys

7.2.2.3 Noise pollution

Noise pollution is likely to occur due to the application of construction equipment and generators at the site.

Mitigation Measure

- The proponent shall maintain equipment in good running conditions to ensure that ambient noise level and vibrations pollution into the environment is very minimum to comply with Tanzania standards.
- The noisy construction activities will be scheduled at normal working hours. Regular inspection and maintenance of construction vehicles and equipment will be done to ensure that they have mufflers installed and worn parts are replaced

7.2.2.4 Air Pollution from dust emission

Air pollution is likely to occur due to the emission of suspended particulate matter (dust) to the atmosphere from the construction activities.

Mitigation Measure

- Mixing equipment shall be sealed properly and vibrating equipment will be equipped with dust removing devices.
- Also all vehicles that generate excessive black smoke will not be used.
- Adequate training and use of personal protective equipment (PPE) such as eye glasses and dust masks will be ensured in order to reduce risks associated with dust.

7.2.2.5 High Risk of Health associated with construction work

Construction activities exposes the workers to a lot of risks for example risk of getting into contact with fecal sludge matter, injuries, COVID-19 pandemic etc

Mitigation measure

- The project proponent shall ensure that all personnel are provided with appropriate protective gear.
- All works shall be planned and conducted in accordance with relevant OHS Guidelines. First Aid Kit as well as regular medical check-ups for the workers will be provided during the entire working hours.
- Adequate number of firefighting equipment/extinguishers will be provided in every few distance to help putting off fire in case of occurrence.
- Excavated pits should be protected by warning tape and guardrails to prevent workers and passersby from falling
- Provision of hand washing equipment and soap at every entrance and exit and at random passage ways within the construction site.
- Ensure all workers to take precautionary measures against COVID-19 by washing hands with soap frequently, practicing social distancing and using face masks of their preference.

7.2.2.6 Waste generation during construction

A lot of waste will be generated especially during construction stage. For example, pipework is likely going to produce some plastics which need to be disposed of. Construction of waste water chambers will both generate wastes. Other wastes will be generated from cleaning of construction equipment and containers like mixers and paint buckets.

Mitigation measures:

- Stick to the design specifications
- Provide waste containers
- Provide training to workers and orient them towards environmental protection values

7.2.2.7 Sewer leakage/overflow

Sewer leakage/overflow is likely to occur during house connections to the newly constructed system.

Mitigation Measure

- Ensure proper methodology for house connections
- Ensure availability of a standby cesspit emptier to desludge the pit latrines and septic tanks before connection
- Sensitization of the local community to avoid puncturing the sewer pipes
- Ensure sealed and watertight connection at each pipe junctions

7.3 Operation Phase

7.3.1 Positive Impacts

7.3.1.1 Improved social-economic livelihood and dignity within the beneficiary society

The project will improve the living conditions in Kinondoni Municipal specifically Mikocheni Mikocheni Darajani whereby the project operation phase will do away with illegal faecal sludge dislodging especially during rainy season or

during the night. The monthly charged fee for each connected household will be such as affordable by the intended customer. Thus, there will be increased money circulation that result into increased income consequently better standard of living of people in the project area.

7.3.1.2 Increased Revenue to the nation through taxes, both direct and indirect

DAWASA is expected to increase its revenue collection on implementing this project. This will be through monthly payment of sanitation services by the respective household. The revenue collected will contribute towards expansion of the water supply and sanitation service within DAWASA service area.

7.3.1.3 Cost reduction for sewage management

The proposed facility will make it easier for the Institutions and households which at present incur unbearable costs for proper dislodging the septic tanks when full. That simply means the households in the vicinity and the institutions will benefit through direct connection to the downstream treatment facility depending on the nature of topography.

7.3.1.4 Reduce risk of soil and groundwater pollution

The operation of the newly constructed Simplified Sewerage system will help to do away with groundwater contamination resulting from illegal discharge of fecal sludge during rain season.

7.3.2 Negative Impacts

7.3.2.1 Sewer leakage/overflow

Sewer leakage/overflow is likely to occur due to the possibility of blockage or pipe rupture resulted from human activities.

Mitigation Measure

- Ensure timely maintenance of the blocked sewer section.

- Installation of screen at receiving individual household interceptor Manhole.
- Sensitization of the local community to avoid dumping solid wastes into the toilet sinks.
- Installation of flushing mechanism so as to scour any possible deposited silt/sludge.
- Inspection of the sewer lines and manholes for any possible pre-mature leakage/overflow

8.0 ACTION PLAN FOR PREVENTION AND MANAGEMENT OF ACCIDENTS DURING IMPLEMENTATION STAGE

The project shall be implemented in compliance to labour laws in Tanzania, in particular, the Occupational Health and Safety Act (2003). Clauses to protect the health and safety of workers shall be included in the contract documents for implementation stage.

8.1 Occupational Health and Safety

The proponent is committed to protect the health and safety of its employees and those of its contractors, to ensuring that activities are conducted in a manner that protects the environment and people. The Contractor shall provide and enforce the use of appropriate personal protective equipment for all workers e.g. overalls, gloves, masks, etc. (wherever required). Tanzanian/international construction standards will be followed for quality and safety to workers. First aid facility will be installed at the construction site.

8.1.1 Emergency preparedness Plan

The proponent is committed to ensure the availability of the emergency preparedness plan in place prior to commencement of construction phase. Among others the plan should contain; identified risks, Team Build up, Availability of critical information, updated alert and response procedures and ensuring that the plan is working by putting it to some tests.

8.2 Security

The whole proposed project will take care of security matters of the site by fencing the storage area and provide gates for entrance and exit purposes. The project proponent shall have a 24 hours security services from a private company to secure the whole project premise at the site. The project proponent will install the best firefighting system at the site. The purpose of fire protection is to protect life, goods, and activities within the project site.

The following are some of the active and passive fire-fighting equipment that will be employed;

- Portable Fire Extinguishers

8.3 Monitoring, Maintenance and repair

The management of the facility will be upon both DAWASA and Kinondoni Municipal Council to ensure the approved design or plan is implemented accordingly. Furthermore, provision of basic services will be executed at high quality as intended.

9.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

9.1 Environmental and Social Management Plan

The Environmental and Social Management Plan (ESMP) presents the implementation schedule of the proposed mitigation measures for both environmental and social impacts. The ESMP for the proposed Construction of Simplified Sewerage System at Mikocheni Darajani area Mikocheni ward is summarized in Table 3. The ESMP also indicates environmental costs needed to implement the recommended mitigation measures. The site selection process has been done, however engineering designs are being prepared and will soon be incorporated with the mitigation measures recommended in this report. Additional recommendations are provided in the ESMP to enable the

Simplified sewerage system to be constructed and operated in environmentally friendly manner.

DAWASA in collaboration with Kinondoni Municipality shall be the main implementer of the ESMP through. The environmental measures incorporated in the detailed engineering design will be attached to the Bills of Quantities and Contract Documents. Moreover, there will be an Environmental, Social, Health and Safety (ESHS)Code of Conduct to be signed by the Contractor(s) to show their commitment in the implementation of the Environmental, Social, Health and Safety. The implementation of the Code will be supervised by DAWASA or his consultant.

The ESHS Code is a set of Guidelines attached to the Bidding Document and Contract to be adopted by Contractor during project implementation. It contains the commitment and obligations of the Contractor and its subsidiaries (i.e. Sub-Contractors and staff) to undertake construction activities in accordance with all applicable Laws, Rules, and Regulations. The Contractor and its subsidiaries shall comply with the Code of Conduct with high ethical standards. Failure to observe the Code, will subject the firm to disciplinary action, including Contract termination. Violation of the Code, is violation of Law which may result to civil and/or criminal penalties to Contractors, Supervisors or Firm.

Some of the issues to be included in the ESHS shall include;

- Site specific **ESMP, HSMP**,
- Traffic Management Plan **(TMP), where applicable**
- HIV/AIDS Awareness Program,
- Occupational Health and Safety Awareness Program.
- Sexual Harassment Prevention Policy
- Child Labour Prevention Policy

The environmental and social mitigation and enhancement measures incorporated in the detailed engineering design will be attached to the Contract Documents. The Contractor shall take stock of the contents of the Project Brief.

Table 3: Environmental and Social Management Plan for the Proposed Construction of Simplified sewerage system at Mikocheni Darajani area, Mikocheni ward, Kinondoni Municipal

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
Mobilization Phase				
Increased waste generation	○ Stick to the design specifications ○ Provide waste containers ○ Provide training to workers and orient them towards environmental protection values	Contractor/DAWASA/Kinondoni Municipal Council	To be included in the BOQ	
Noise pollution during construction	○ The proponent shall maintain equipment in good running conditions to ensure that ambient noise level and vibrations pollution into the environment is very minimum to comply with Tanzania standards ○ All construction works will be scheduled at normal working hours.	Contractor/DAWASA/Kinondoni Municipal Council	500,000.00	

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
	○ Proper inspection and maintenance of construction vehicles and equipment will be done to ensure that they have mufflers installed and worn parts are replaced			
Construction Phase				
Increased waste generation	○ Stick to the design specifications ○ Provide waste containers ○ Provide training to workers and orient them towards environmental protection values	Contractor/DAWASA/Kinondoni Municipal Council	To be included in the BOQ	
Increased HIV/AIDS and other STD	○ The contractor shall enforce a code of conduct in the project area to encourage respect for the local community and to maintain self-cleanliness of the working area at all times.	Contractor/DAWASA/Kinondoni Municipal Council	5,000,000.00	

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
	○ The contractor shall deploy locally available labor to reduce the risk of spreading communicable diseases (especially STDs). ○ To prevent more HIV/AIDS infections, during the implementation phase, the project should include an information education and communication component (IEC) in its budget. This will help to raise more awareness on HIV/AIDS and means to suppress its incidence. ○ A safety, health, and environment induction course shall be conducted for all workers, putting more			

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
	emphasis on HIV/AIDS, which has become a national disaster.			
Land degradation and increased erosion	o The contractor should pave the walkways prone to erosion whose quantities are shown in the BoQ o To obtain the construction materials official negotiations should be performed with wards leaders to avoid conflict.	Contractor/DAWASA/Kinondoni Municipal Council	25,000,000	
Noise pollution during construction	o The proponent shall maintain equipment in good running conditions to ensure that ambient noise level and vibrations pollution into the environment is very minimum to comply with Tanzania standards	Contractor/DAWASA/Kinondoni Municipal Council	1,000,000.00	

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
	○ All construction works will be scheduled at normal working hours. ○ Proper inspection and maintenance of construction vehicles and equipment will be done to ensure that they have mufflers installed and worn parts are replaced			
Dust generation during construction	○ Mixing equipment shall be sealed properly and vibrating equipment will be equipped with dust-removing devices. ○ Also, all vehicles that generate excessive black smoke will not be used. ○ Adequate training and use of personal protective equipment (PPE) such as eyeglasses and dust masks will be ensured to	Contractor/DAWASA/Kinondoni Municipal Council	3,000,000.00	

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
	reduce risks associated with dust.			
Health Risks associated with construction works	○ The project proponent shall ensure that all personnel is provided with appropriate protective gear. ○ All works shall be planned and conducted following relevant OHS Guidelines. First Aid Kit as well as regular medical check-ups for the workers will be provided during the entire working hours. ○ An adequate number of firefighting equipment/extinguishers will be provided every few distances to help to put off the fire in case of occurrence.	Contractor/DAWASA/Kinondoni Municipal Council	3,000,000.00	

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
	○ Excavated pits should be protected by warning tape and guardrails to prevent workers from falling ○ Adhere to good maintenance			
Demobilization phase				
Noise pollution during construction	○ The proponent shall maintain equipment in good running conditions to ensure that ambient noise level and vibrations pollution into the environment is very minimum to comply with Tanzania standards ○ All construction works will be scheduled at normal working hours. ○ Proper inspection and maintenance of construction vehicles and	Contractor/DAWASA/Kinondoni Municipal Council	500,000.00	

Impact	Mitigation Measure	Responsible Institution	Estimated One Time Cost (TZS)	Estimated Annual cost (TZS)
	equipment will be done to ensure that they have mufflers installed and worn parts are replaced			
Operational Phase				
Health Risks associated with construction works	○ The project proponent shall ensure that all personnel is provided with appropriate protective gear. ○ All works shall be planned and conducted following relevant OHS Guidelines. First Aid Kit as well as regular medical check-ups for the workers will be provided during the entire working hours. ○ Adhere to good maintenance	Contractor/DAWASA/Kinondoni Municipal Council	Depend on the operational manual	
Total			**38,000,000.00**	**38,000,000.00**

10. 0 MONITORING PLAN

10.1 Environmental Monitoring

The national EIA guidelines require the developer to prepare and undertake monitoring plan of implemented development projects. Monitoring is needed to check if and to what extent the impacts are mitigated, benefits enhanced and new problems addressed. Recommendations for monitoring have been included in the Table 4. The monitoring plan also assigns responsibilities for different actors. Moreover, the ward and street environmental committees will shoulder the long-term monitoring of the project.

Table 4: Monitoring Plan for the Proposed Construction of Simplified sewerage system at Mikocheni Darajani, Mikocheni Ward Ward, Kinondoni Municipal

Environmental Impact	Mitigation Measure	Parameter	Monitoring Frequency	Sampling Area	Measurement Unit	Method	Target Level/ Standard	Responsibility for monitoring	Estimated Annual (or once cost (TZS)
		Mobilization Phase							
Dust	-Dust suppression -Use of efficient equipments	Presence of nuisance dust PM2.5 PM10	Daily	Immediate working area	µg/m^3	Physical-visual	25 µg/m^3 for PM2.5 and 50 µg/m^3 for PM10	Contractor/Mikocheni ward	None
Air Quality	-vehicles that generate excessive black smoke will not be used. -use of personal protective equipment (PPE)	SO2, CO, NOX, Dust PMX	Daily	Around the Inspection chambers	Presence of smells	Smelling (nasal)	Absence of nuisance smells	MikocheniWard/ DAWASA/Kinondoni Municipal Council	2,500,000.00
Waste Generation	-Provision storage containers	Amount of waste generated	Weekly	At the working area	Amount of waste	Physical measurement or estimation	All waste contained	Contractor/Mikocheni ward/DAWASA/ Kinondoni Municipal Council	In BOQ

Environmental Impact	Mitigation Measure	Parameter	Monitoring Frequency	Sampling Area	Measurement Unit	Method	Target Level/ Standard	Responsibility for monitoring	Estimated Annual (or once cost (TZS)
Health risks	- Provision of PPEs	Number of health risk recorded	Daily	At working area	Accidents	Counting	NO accident	Contractor/Mikocheni ward/DAWASA/ Kinondoni Municipal Council	In BOQ
HIV/AIDS	-Enforce of code of conduct	Number of HIV/AIDS Cases	Monthly	Workers	Training	Numbers	One per month during construction phase only	Contractor/Mikocheni ward/DAWASA/ Kinondoni Municipal Council	5,000,000.00
Biodiversity		Habitats/ Removal of biodiversity	Once (at commencement)	Working area	Destruction of habitat or removal of biodiversity	Area affected	Minimal disturbance to biodiversity	Contractor/Mikocheni ward/DAWASA/ Kinondoni Municipal Council	1,000,000.00
		Construction phase							
Dust	-Dust suppression -Use of efficient equipments	Presence of nuisance dust PM2.5 PM10	Weekly	Immediate working area	Presence of nuisance dust	Physical-visual	-	Contractor/Mikocheni ward	None
Air Quality	-vehicles that generate excessive black smoke	Smell and Odor	Weekly	Around the Inspection chambers	Presence of smells	Smelling (nasal)	Absence of nuisance smells	Mikocheni Ward/DAWASA/ Kinondoni Municipal Council	2,500,000.00

Environmental Impact	Mitigation Measure	Parameter	Monitoring Frequency	Sampling Area	Measurement Unit	Method	Target Level/ Standard	Responsibility for monitoring	Estimated Annual (or once cost (TZS)
	will not be used. -use of personal protective equipment (PPE)								
Waste Generation	-Provision storage containers	Amount of waste generated	Weekly	At the working area	Amount of waste	Physical measurement or estimation	All waste contained	Contractor/Mikocheni ward/DAWASA/ Kinondoni Municipal Council	In BOQ
Health risks	-Provision of PPEs	Number of health risk recorded	Daily	At working area	Accidents	Counting	NO accident	Contractor/Mikocheni ward/DAWASA/ Kinondoni Municipal Council	In BOQ
HIV/AIDS	-Enforce of code of conduct	Number of HIV/AIDS Cases	Monthly	Workers	Training	Numbers	One per month during construction phase only	Contractor/Mikocheni ward/DAWASA/ Kinondoni Municipal Council	5,000,000.00
Biodiversity		Habitats/ Removal of	Once (at commencement)	Working area	Destruction of habitat or removal of biodiversity	Area affected	Minimal disturbance to	Contractor/Mikocheni ward/DAWASA/ Kinondoni	1,000,000.00

Environmental Impact	Mitigation Measure	Parameter	Monitoring Frequency	Sampling Area	Measurement Unit	Method	Target Level/ Standard	Responsibility for monitoring	Estimated Annual (or once cost (TZS)
		biodiversity					biodiversity	Municipal Council	
		Demobilization Phase							
Dust	-Dust suppression -Use of efficient equipments	Presence of nuisance dust PM2.5 PM10	Weekly	Immediate working area	Presence of nuisance dust	Physical-visual	-	Contractor/Mikocheni ward	None
Air Quality	-vehicles that generate excessive black smoke will not be used. -use of personal protective equipment (PPE)	Smell and Odor	Weekly	Around the Inspection chambers	Presence of smells	Smelling (nasal)	Absence of nuisance smells	Mikocheni Ward/DAWASA/ Kinondoni Municipal Council	2,500,000.00
Waste Generation	-Provision storage containers	Amount of waste generated	Weekly	At the working area	Amount of waste	Physical measurement or estimation	All waste contained	Contractor/Mikocheni Ward/DAWASA/ Kinondoni Municipal Council	In BOQ
Health risks	-Provision of PPEs	Number of health	Daily	At working area	Accidents	Counting	NO accident	Contractor/Mikocheni ward/DAWASA/	In BOQ

Environmental Impact	Mitigation Measure	Parameter	Monitoring Frequency	Sampling Area	Measurement Unit	Method	Target Level/ Standard	Responsibility for monitoring	Estimated Annual (or once cost (TZS)
		risk recorded						Kinondoni Municipal Council	
HIV/AIDS	-Enforce of code of conduct	Number of HIV/AIDS Cases	Monthly	Workers	Training	Numbers	One per month during construction phase only	Contractor/Mikocheni ward/DAWASA/ Kinondoni Municipal Council	5,000,000.00
Biodiversity		Habitats/ Removal of biodiversity	Once (at commencement)	Working area	Destruction of habitat or removal of biodiversity	Area affected	Minimal disturbance to biodiversity	Contractor/Mikocheni ward/DAWASA/ Kinondoni Municipal Council	1,000,000.00
		Operation phase							
Leakage/Overflow	-Frequent monitoring and inspection of the network -Frequent maintenence	Amount of wastewater leaked	Monthly	Around the Inspection chambers	Presence of smell and pre mature leakages	Physical-visual	- Absence of nuisance smells and any pre-mature leakage	DAWASA/Mikocheni ward	12,000,000.00
Air Quality	-vehicles that generate excessive black smoke will not be used.	Smell and Odor	Monthly	Around the Inspection chambers	Presence of smells	Smelling (nasal)	Absence of nuisance smells	Mikocheni Ward/DAWASA/ Kinondoni Municipal Council	2,500,000.00

Environmental Impact	Mitigation Measure	Parameter	Monitoring Frequency	Sampling Area	Measurement Unit	Method	Target Level/ Standard	Responsibility for monitoring	Estimated Annual (or once cost (TZS)
	-use of personal protective equipment (PPE)								
Waste Generation	-Provision storage containers	Amount of waste generated	Monthly	At the working area	Amount of waste	Physical measurement or estimation	All waste contained	Contractor/Mikocheni ward/DAWASA/ Kinondoni Municipal Council	In operation manual
Health risks	-Provision of PPEs	Number of health risk recorded	Monthly	At working area	Accidents	Counting	NO accident	Contractor/Mikocheni ward/DAWASA/ Kinondoni Municipal Council	In operation manual
HIV/AIDS	-Enforce of code of conduct	Number of HIV/AIDS Cases	Annually	Workers	Training	Numbers	One per month during construction phase only	Contractor/Mikocheni ward/DAWASA/ Kinondoni Municipal Council	In operation manual
								Total	**28,000,000.00**

11. 0 DECOMMISSIONING PLAN

11.1 Decommissioning

The decommissioning is not anticipated in the foreseeable future. However, if this will happen, may entail change of use (functional changes) or demolition triggered by change of land use. In view of this, specific mitigation measures pertaining to environmental impacts of decommissioning works cannot be proposed at the moment with a reasonable degree of certainty.

A decommissioning plan that takes environmental issues into consideration shall be prepared by the developer prior to the decommissioning works. Currently the study is discussing the preliminary plan that will be used as insight for Decommissioning plan in future.

This plan will serve to ensure that the decommissioning and ultimate dispositions of the residential buildings are considered during the initial design and construction of that facility.

11.2 Aim of the Preliminary Plan

The preliminary plan serves to establish decommissioning as an important consideration from the inception of the project, during design and throughout the operation of the project. The plan has the following purposes:

a) To ensure that the Sewer network project designers are aware of decommissioning during the initial design stage of the project.
b) To identify the ultimate decommissioning options and final project status. Appropriate options would be evaluated and narrowed to the decommissioning method of choice as the end of project life is approached.
c) To notify the regulatory agencies that, important aspects of decommissioning are considered as early as possible during the initial design of the project.

11.3 Content of the Preliminary Plan

The preliminary plan provides general description of the proposed decommissioning methods considered feasible for the project though with low level of significance. The description is intended to demonstrate that the methods considered are practical and that they protect the health and safety of the public and decommissioning personnel.

Design personnel should study the proposed decommissioning methods and ensure that the design incorporates all features that will facilitate decommissioning like;

i). An estimate of manpower, materials and cost anticipated to support decommissioning processes.

ii). A description of the anticipated final disposition and status of the structures at site as well as reinstatement of the project area.

iii). Identification of records that should be maintained during construction and operation which might facilitate decommissioning.

11.4 Project Decommissioning Methodology and Schedule

The proponent shall implement all aspects of project decommissioning, including but not limited to, all engineering works, environmental assessment, permitting, construction, and mitigation activities associated with the removal of the structures. The proponent shall monitor environmental impacts during and after project removal to respond to defined events during the monitoring phase, some of the considerable issues to be addressed by the plan are:

1. Decommissioning will involve, but not limited to the specified list, because some issues or problems may raise during subsequent monitoring and audits;

- Wherever possible, the pipelines, toilets and Manholes will continuously be rehabilitated and renovated. The solid wastes have to be disposed in accordance to the instruction directives given in EMSP and Kinondoni Municipal Council Office that is decommissioning permit.

- Employees will be terminated from their employments. In doing this, three important things will be observed;

  i. The proponent have to ensure that their contributions to the pension fund will be made monthly as required by the law

  ii. A training programme will be facilitated to ensure that appropriate skills to responsible workers is adequately given.

  iii. Terminations benefits such as transport and disturbance allowances will be provided to all employees.

2. On decommissioning the proponent will search for experts' opinions in order to convert the entire premises into or other uses.

3. The restoration plan for the entire premises will be made by proponent (with expertise from environmental engineers and economists) and then forwarded to NEMC for approval

4. DAWASA shall obtain all permits required to undertake decommissioning of the project.

The demotion process will begin soon after closure plan has completed and approved by the responsible organs. The proponent will make inventory to all components that need to be displaced, removed and or disposed. This inventory will include like building structures, equipment, and sanitary facilities that need to be demolished/dismantled. Lastly, mode of disposal will have to be finalized. The information will assist in the preparation of the final decommissioning plan for approval by NEMC.

After the approval of the decommissioning plan the metal parts will be removed first within the first three (3) months (it's important to ensure that they are not vandalized). The second three (3) months of the decommissioning will be used to remove concrete structures and foundations. All disturbed areas will be landscaped and re-vegetated using indigenous trees.

Project decommissioning has five phases;

1. Pre-removal monitoring: Pre-removal monitoring includes environmental and socio-economic status of the project site and the surrounding. This monitoring is essential to identify if there is any environmental or social liability which need to be settled before the permit to closure is given. This period will also be used to inventories all assets and facilities that need to be disposed of and to prepare a final decommissioning plan for approval by NEMC
2. Permitting: DAWASA shall obtain all permits required to undertake removal of the project structures. This basically will include NEMC, Kinondoni Municipal Council and other stakeholders that will be recommended at that particular time.
3. Interim Protective Actions: This will take care of any interim protective measure that needs to be implemented to protect human health and environment, if any.
4. Project Removal: As noted above, the removal of the project will be completed within one year.
5. Post-Removal Activities: Post-Project removal monitoring will continue for one year

12.0 PROJECT BUDGET

The investment cost for the proposed Simplified sewerage system is estimated to be around Tshs. 1.0 billion that will be financed The World Bank.

13. 0 STAKEHOLDER VIEWS ON THE PROPOSED PROJECT

During this study, different stakeholders were consulted. Among these include the Kinondoni Municipal Council and community at Mikocheni Darajani area (see Figure 7). Consultations were made through meetings.

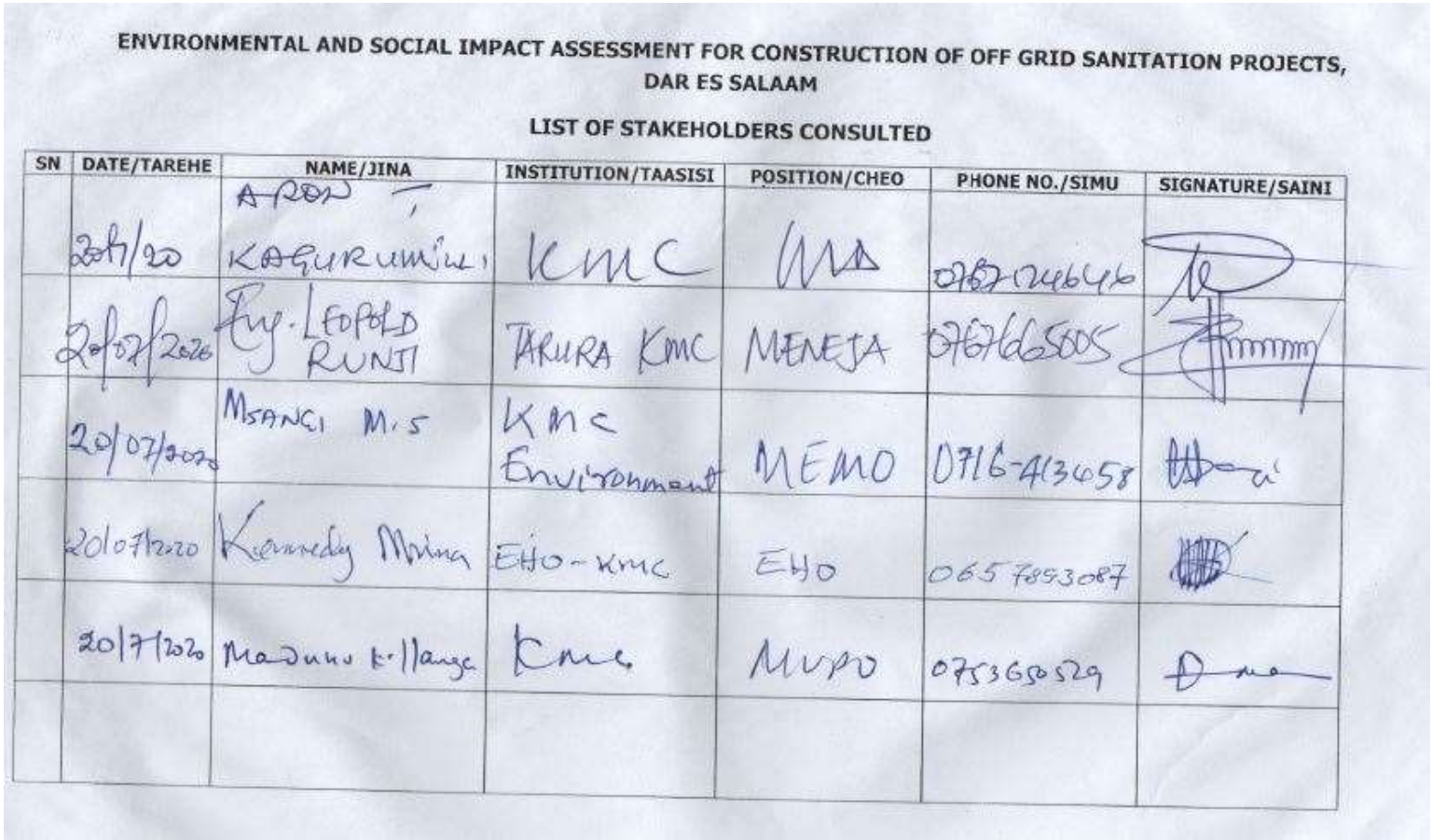
Figure 7: Stakeholder's consultation meeting at Kinondoni Municipal office and Mikocheni Darajani community

During the meeting, the consultant gave a brief explanation on the proposed Simplified sewerage system. The project description covered proposed location, type and design (a typical design was displayed). The stakeholders were given chance give their views on the project. Moreover, the consultant offered chance to clarify issues where stakeholders wanted to be given more explanations. The comments by stakeholders were analyzed and incorporated in the design of mitigation measures. Table 4 summarizes the issues raised. The names of the stakeholders consulted are given in Appendix II.

Table 5: Stakeholders issues and concerns

Institution	Name	Position	Issues/ concerns	Response
KINONDONI MUNICIPAL COUNCIL	Aron T. Kagurumjuli	MD-KMC	-Awareness to the community about the project -Employment to the local people -The project will reduce the problem of open discharge of waste water since there is the problem of waste water management	Section 7.2.2.7 Section 7.3.2.1
KINONDONI MUNICIPAL COUNCIL	Kennedy Mrina	EHO-KMC	-In case of direct discharge to the Ocean has the possibility of transmitting diseases like earthworm to fishes and then back to human consumer	Section 5.0

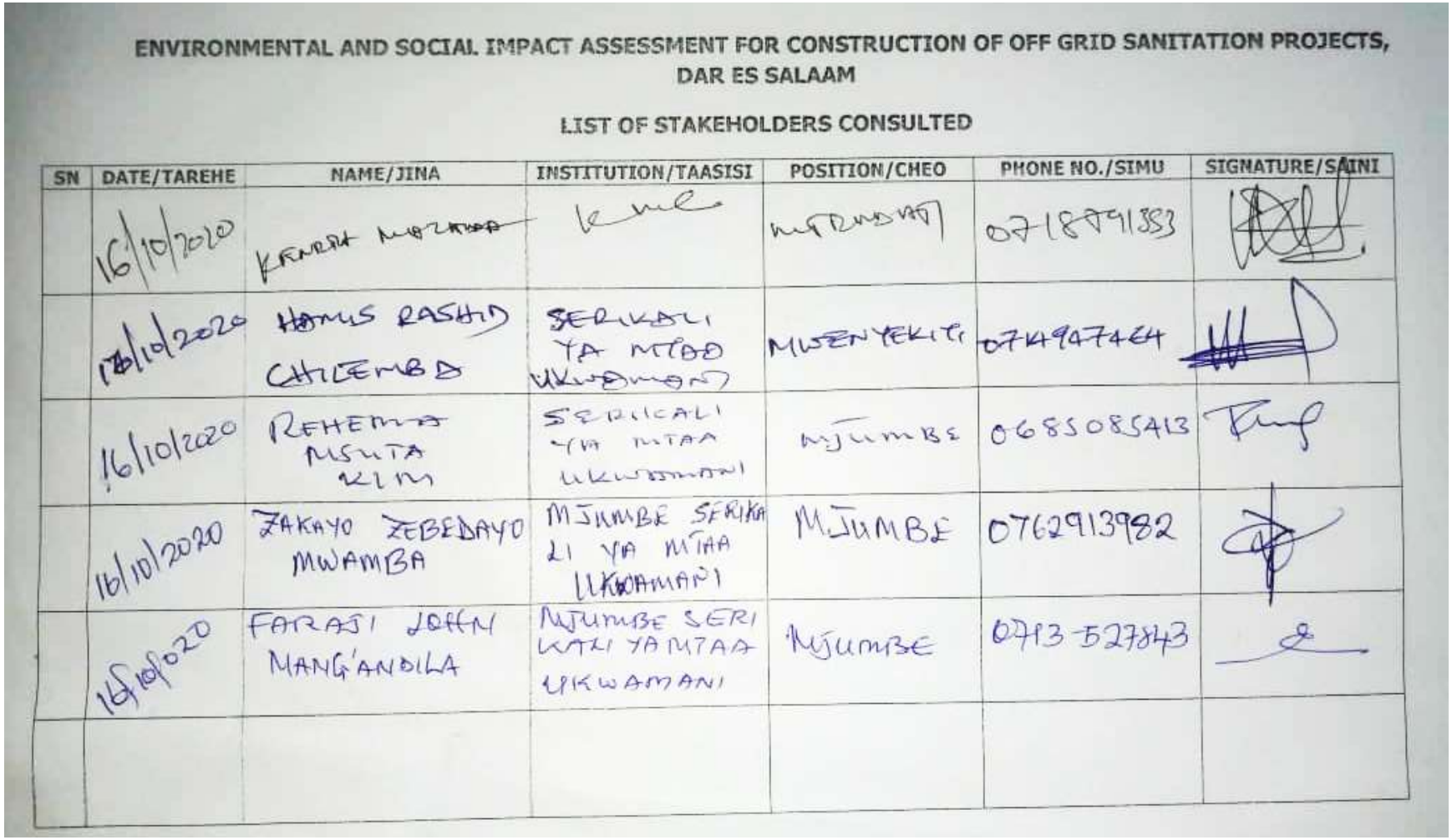
Appendix I: List of Stakeholders Consulted



ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR CONSTRUCTION OF OFF GRID SANITATION PROJECTS, DAR ES SALAAM

LIST OF STAKEHOLDERS CONSULTED

SN	DATE/TAREHE	NAME/JINA	INSTITUTION/TAASISI	POSITION/CHEO	PHONE NO./SIMU	SIGNATURE/SAINI
	20/7/20	AARON KAGURUMULI	KMC	WA	0767246426	
	20/07/2020	Eng. LEOPOLD RUNJI	TARURA KMC	MENEJA	0767665005	
	20/07/2020	MSANGI M.S	KMC Environment	MEMO	0716-413658	
	20/07/2020	Kennedy Mbina	EHO-KMC	EHO	0657893087	
	20/7/2020	Madunu E. Mlanga	KMC	MVPO	0753650529	



ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR CONSTRUCTION OF OFF GRID SANITATION PROJECTS, DAR ES SALAAM

LIST OF STAKEHOLDERS CONSULTED

SN	DATE/TAREHE	NAME/JINA	INSTITUTION/TAASISI	POSITION/CHEO	PHONE NO./SIMU	SIGNATURE/SAINI
	16/10/2020	[illegible]	[illegible]	[illegible]	0718791353	
	16/10/2020	HAMIS RASHID CHILEMBA	SERIKALI YA MTAA WA [illegible]	MWENYEKITI	0749474464	
	16/10/2020	REHEMA MSUTA KIM	SERIKALI YA MTAA WA [illegible]	MJUMBE	0685085413	
	16/10/2020	ZAKAYO ZEBEDAYO MWAMBA	MJUMBE SERIKALI YA MTAA [illegible]	MJUMBE	0762913982	
	16/10/2020	FARAJI JOHN MANG'ANDILA	MJUMBE SERIKALI YA MTAA LIKWAMANI	MJUMBE	0713 527843	

Appendix II: Permit to use the walkways/alleys for SSS infrastructures

HALMASHAURI YA MANISPAA YA KINONDONI
BARUA ZOTE ZITUMWE KWA AFISA MTENDAJI WA MTAA

Simu Na: 0714 - 943498

OFISI YA MTENDAJI WA MTAA
MTAA WA MIKOCHENI "A"
KATA YA MIKOCHENI
MANISPAA YA KINONDONI
S.L.P. 31902

KUMB.NA. SM/MKC "A"/KND/2021/10 **TAREHE 05/07/2021**

AFISA MTENDAJI MKUU
DAWASA
S.L.P 1573
D.S.M

YAH: IDHINI YA KUTUMIA MAENEO PENDEKEZWA KWA AJILI YA UJENZI WA MIRADI YA USAFI WA MAZINGIRA.

Husika na somo tajwa hapo juu.

Tafadhali rejea mawasiliano yako ya awali kati ya DAWASA na Ofisi ya Mkurugenzi, kuhusu utoaji wa maeneo ya wazi kwa ajili ya ujenzi wa miradi ya usafi wa mazingira kwenye maeneo ya pembezoni iliyo chini ya ufadhili wa Benki ya Dunia (WSSP 11).

Kwa barua hii tunakujulisha kuwa Serikali ya Mtaa imetoa idhini ya kutumia maendeo yaliyopendekezwa kwa ajili ya ujenzi wa miradi ya ukusanyaji na uondoshaji maji taka (Simplif ed Sewarage System).

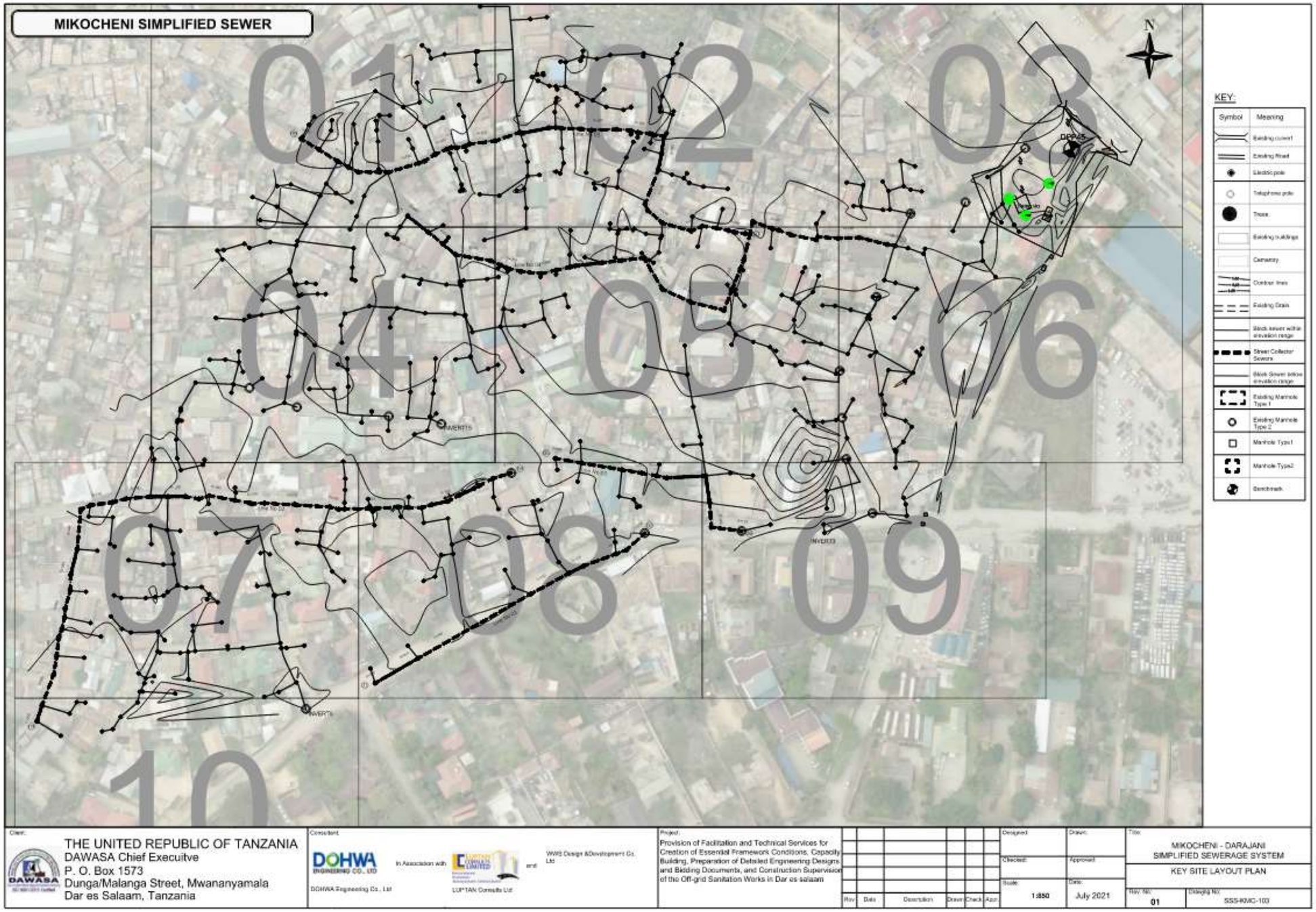
Maeneo yatakayotumika kwa ajili ya miradi ni njia rasmi na zisizorasmi zilizopo hapa ntaani.

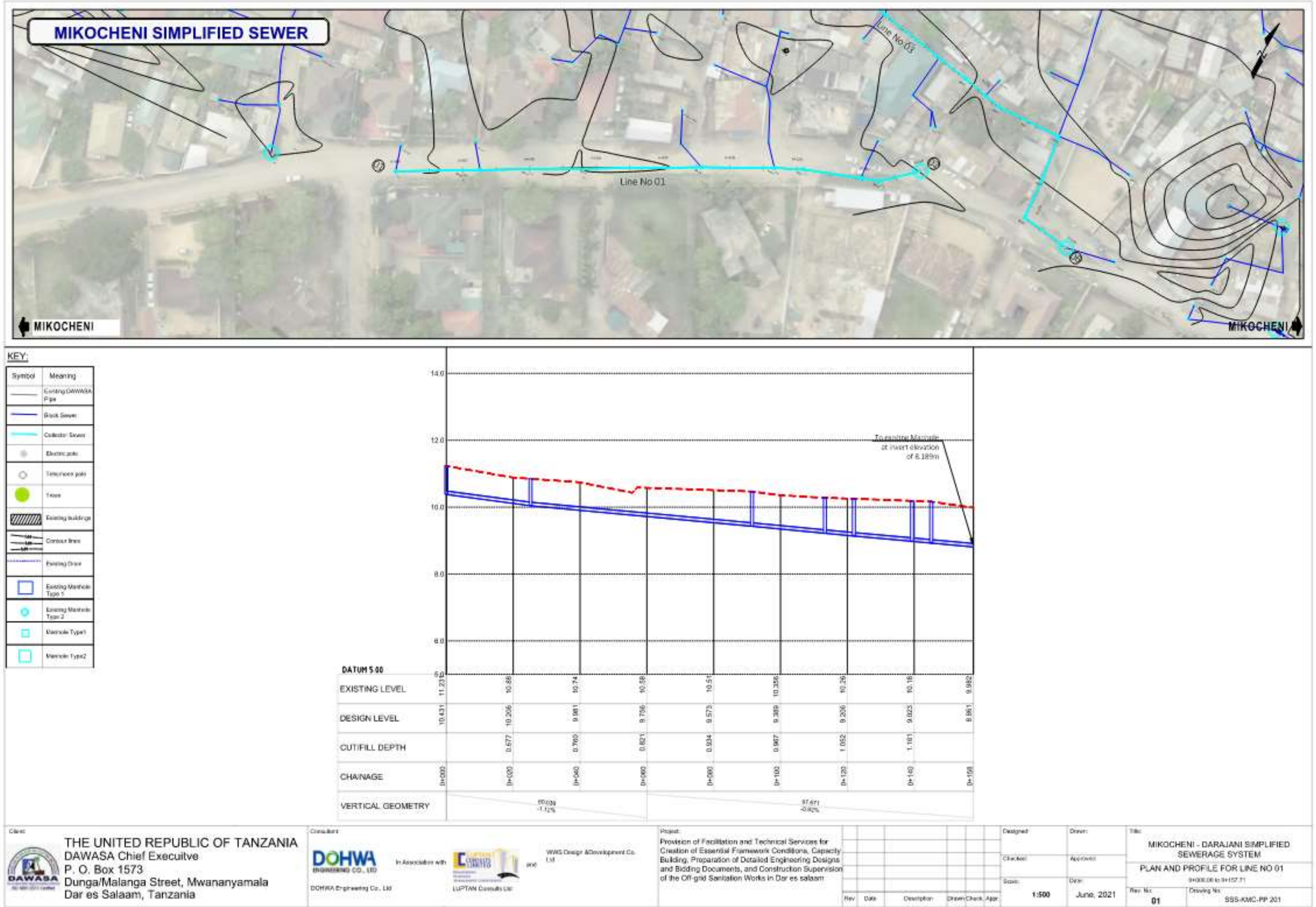
Ahsante.

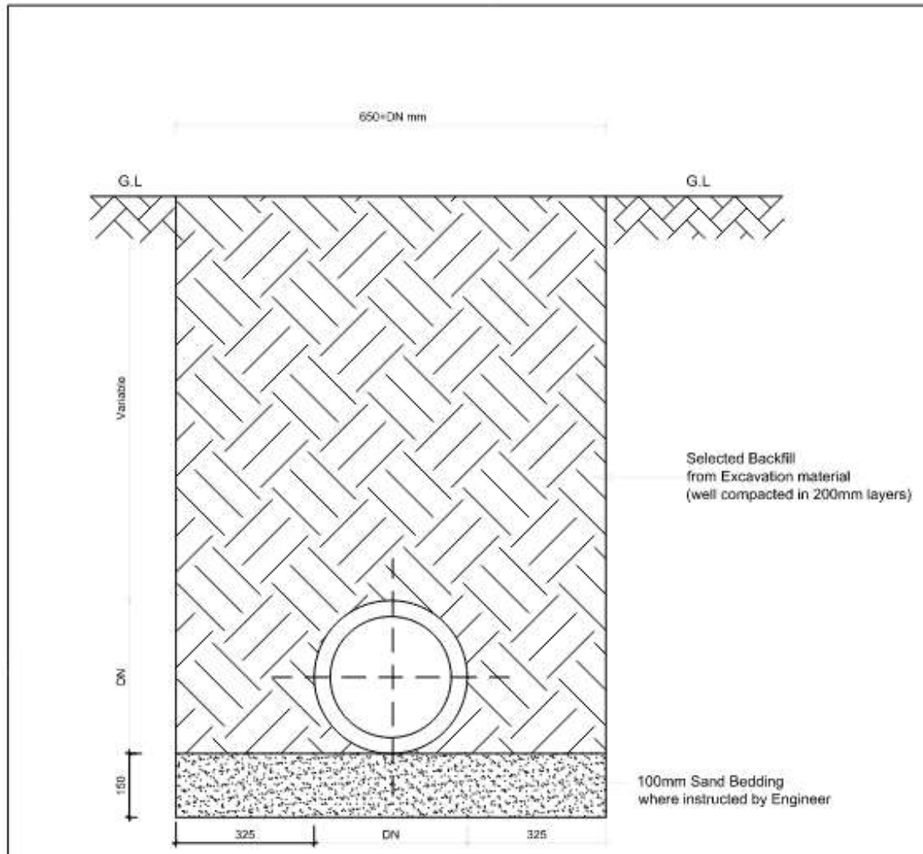
HALMASHAURI YA MANISPAA YA KINONDONI
AFISA MTENDAJI WA MTAA

ZAMDA A. CHIA
MTENDAJI
MTAA MIKOCHENI "A"

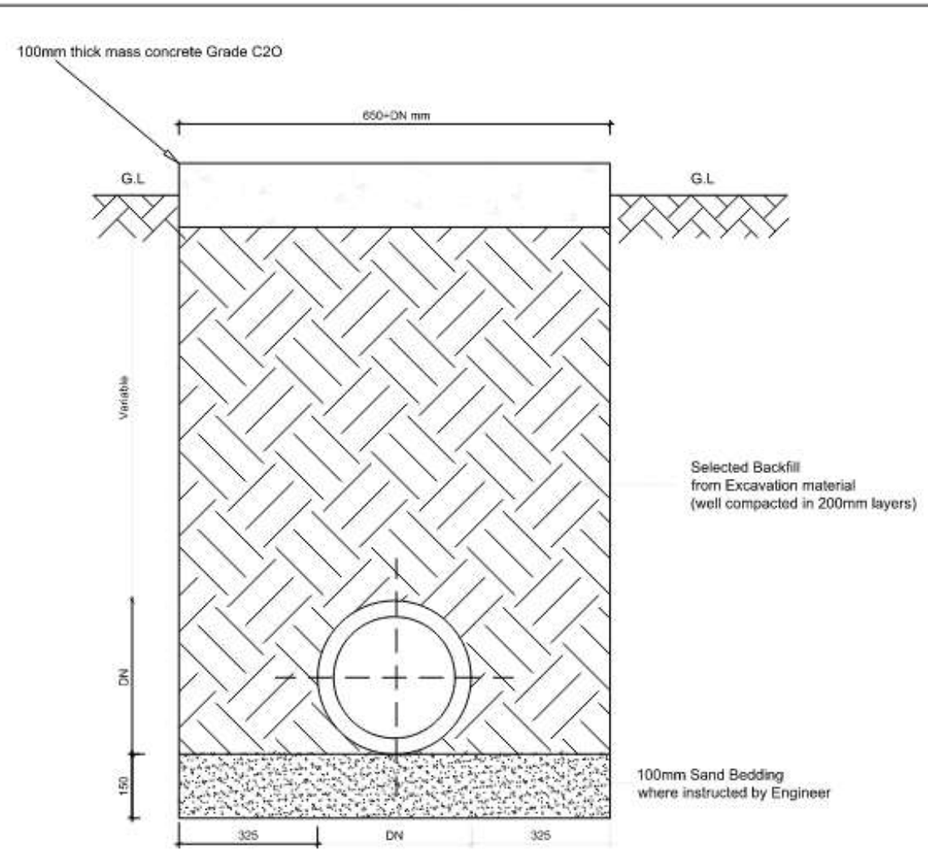
Appendix III. Site Layout Plan and other detail drawings




MIKOCHENI SIMPLIFIED SEWER
Line No 01
Line No 03
MIKOCHENI
MIKOCHENI
KEY:
Symbol
Meaning
Existing DAWASA Pipe
Block Sewer
Collector Sewer
Electric pole
Telephone pole
Trees
Existing buildings
Contour lines
Existing Drain
Existing Manhole Type 1
Existing Manhole Type 2
Manhole Type1
Manhole Type2
14.0
12.0
10.0
8.0
6.0
To existing Manhole at invert elevation of 8.189m
DATUM 5.00
EXISTING LEVEL
11.23
10.88
10.74
10.58
10.51
10.356
10.26
10.18
9.982
DESIGN LEVEL
10.431
10.206
9.981
9.756
9.573
9.389
9.206
9.023
8.861
CUT/FILL DEPTH
0.677
0.760
0.821
0.934
0.967
1.052
1.161
CHAINAGE
0+000
0+020
0+040
0+060
0+080
0+100
0+120
0+140
0+158
VERTICAL GEOMETRY
-1.12%
-0.92%
Client:
THE UNITED REPUBLIC OF TANZANIA
DAWASA Chief Execuitve
P. O. Box 1573
Dunga/Malanga Street, Mwananyamala
Dar es Salaam, Tanzania
DAWASA
Consultant:
DOHWA ENGINEERING CO., LTD
DOHWA Engineering Co., Ltd
In Association with
LUPTAN Consults Ltd
and
WWS Design &Development Co. Ltd
Project:
Provision of Facilitation and Technical Services for Creation of Essential Framework Conditions, Capacity Building, Preparation of Detailed Engineering Designs and Bidding Documents, and Construction Supervision of the Off-grid Sanitation Works in Dar es salaam
Rev
Date
Description
Drawn
Check
Appr
Designed:
Drawn:
Checked:
Approved:
Scale:
1:500
Date:
June, 2021
Title:
MIKOCHENI - DARAJANI SIMPLIFIED SEWERAGE SYSTEM
PLAN AND PROFILE FOR LINE NO 01
Rev. No:
01
Drawing No:
SSS-KMC-PP 201



BEDDING IN NORMAL AND ROCKY SOIL



TYPICAL ENCASEMENT OF SEWER PIPE ALONG THE WALK WAYS

Notes:
1. Minimum width of trench excavation is 750mm and Maximum width is 850mm. In the areas where available width is less than the required width to excavate, the contractor will inform the engineer for approval.
2. Minimum depth for excavation for collector sewers is 0.8m and for block sewer is 0.4m. Excavation depths will vary depending on the slope requirement and existing ground level as per drawing.
3. The contractor will be required to confirm all levels to maintain slope of pipeline as indicated in the hydraulic setting out data

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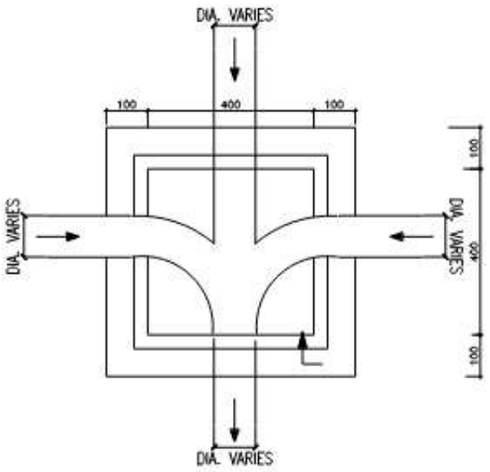
DOHWA Engineering Co., Ltd
In Association with
LUPTAN Consults Ltd
and
WKS Design &Development Co. Ltd

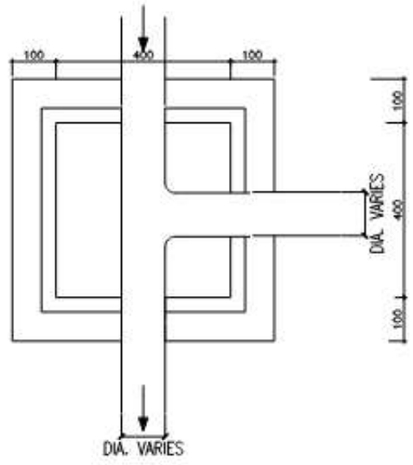
Project:
Provision of Facilitation and Technical Services for Creation of Essential Framework Conditions, Capacity Building, Preparation of Detailed Engineering Designs and Bidding Documents, and Construction Supervision of the Off-grid Sanitation Works in Dar es salaam

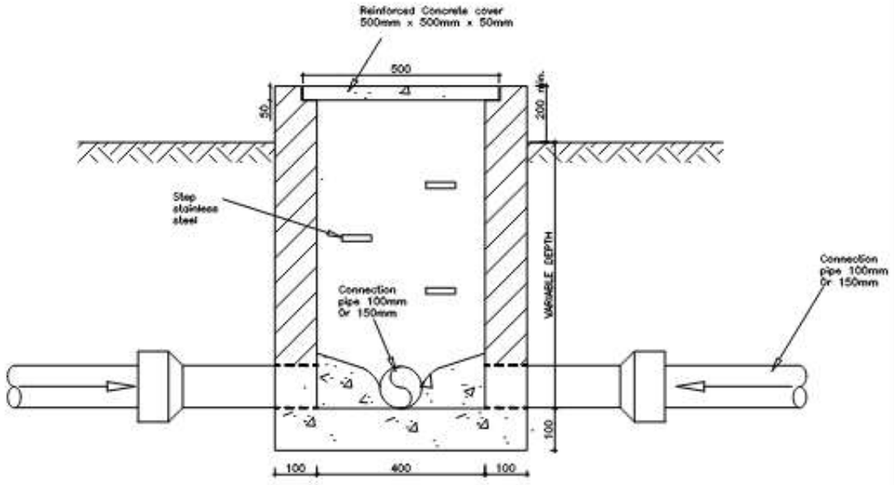
Rev	Date	Description	Drawn	Check	Appr

Designed:
Drawn:
Checked:
Approved:
Scale: NTS
Date: July, 2021

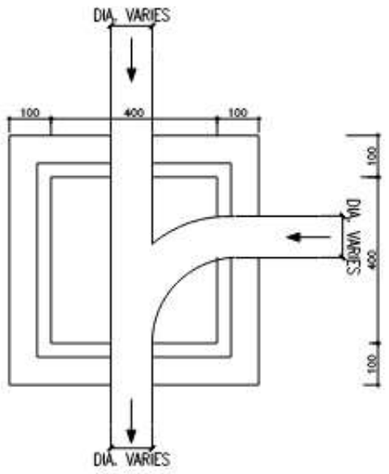
Title:
SIMPLIFIED SEWER SYSTEM STANDARD DETAILS DRAWINGS
TYPICAL CROSS SECTIONS AND TRENCH DETAILS
Rev. No: 01
Drawing No: SSS-STD-301

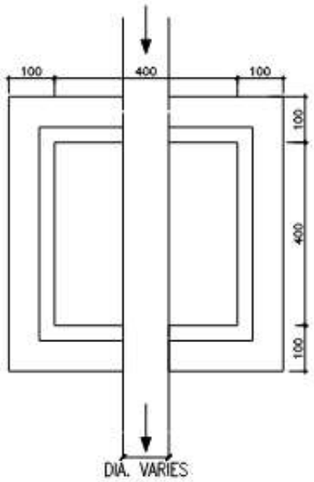




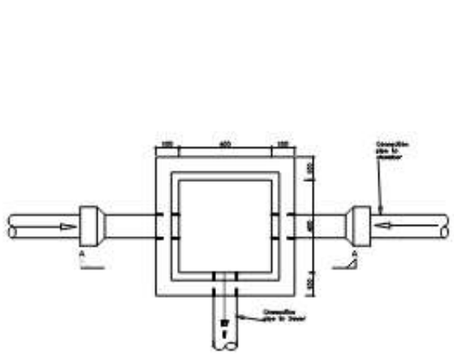


SECTION A-A

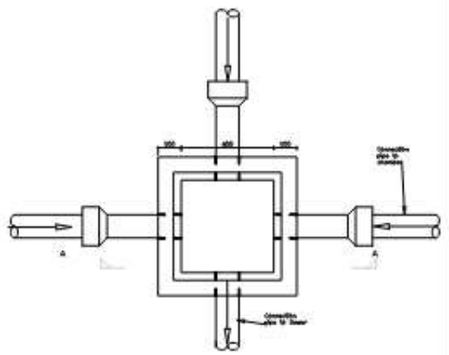




STANDARD MESH DETAILS FOR CONCRETE REINFORCEMENT					
TYPE	WIRE SPACING		WIRE DIAMETER		WEIGHT/SQUARE METERS (kg/m2)
	Main mm	Cross mm	Main mm	Cross mm	
A252	200	200	08	08	3.95
A396	200	200	10	10	3.95
STEEL	HIGH TENSILE , ACCORDING TO BS 4482				



PLAN
INSPECTION CHAMBER
CONNECTIONS TYPE I



PLAN
INSPECTION CHAMBER
CONNECTIONS TYPE II

Client:
THE UNITED REPUBLIC OF TANZANIA
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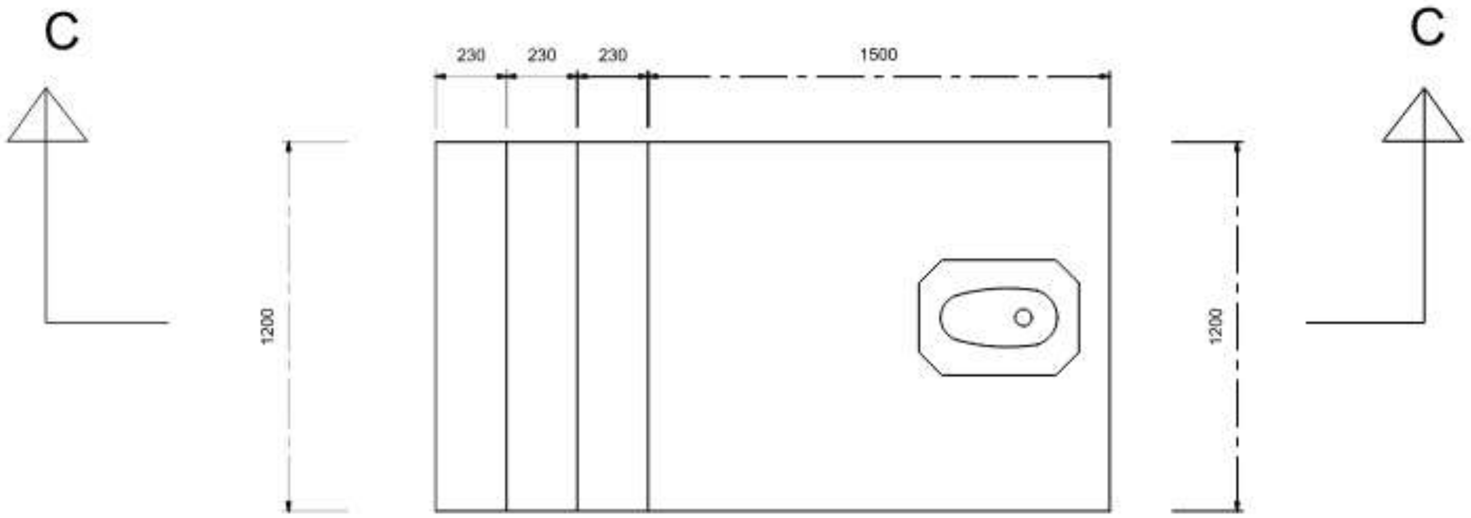
Project:
Provision of Facilitation and Technical Services for Creation of Essential Framework Conditions, Capacity Building, Preparation of Detailed Engineering Designs and Bidding Documents, and Construction Supervision of the Off-grid Sanitation Works in Dar es salaam

Rev	Date	Description	Drawn	Check	Appr

Designed:
Drawn:
Checked:
Approved:
Scale: NTS
Date: June, 2021

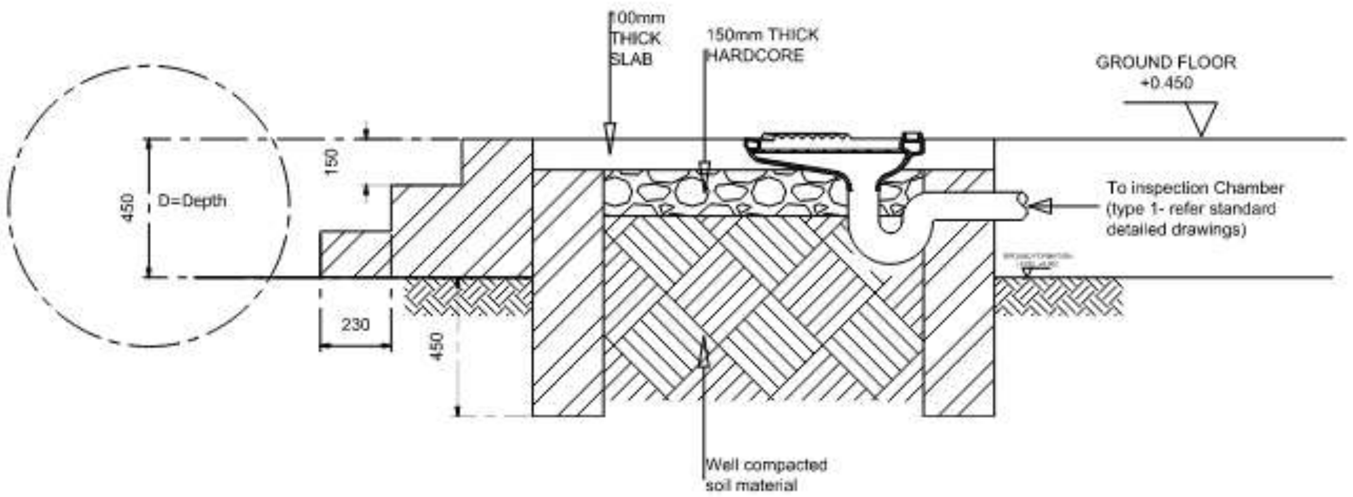
Title:
SIMPLIFIED SEWER SYSTEM
STANDARD DETAILS DRAWINGS
INSPECTION CHAMBER 400mm x 400mm
GENERAL ARRANGEMENT
Rev. No: 01
Drawing No: SSS/MC/STD 303



TOP PLAN
Scale 1:10

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN
2. DO NOT SCALE FROM THIS DRAWING
3. THE SCALES GIVEN ON THIS DRAWING REFER TO THE A1 SIZE ORIGINAL DRAWING
4. THE SUBGRADE SHALL BE COMPACTED TO 99% MAXIMUM DRY DENSITY BEFORE THE PLACEMENT OF HARDCORE
5. CONCRETE SHALL BE CLASS C30/37 FOR STRUCTURAL MEMBERS AND CLASS C8/10 FOR BLINDING
6. THE MAXIMUM SIZE OF AGGREGATE SHALL BE 20mm UNLESS OTHERWISE SHOWN
7. REINFORCEMENT SHALL BE HIGH TENSILE DEFORMED TYPE WITH A CHARACTERISTIC YIELD STRESS OF AT LEAST 429N/mm²
8. COVER TO REINFORCEMENT SHALL BE:
   - FOUNDATIONS 50mm
   - SLABS 25mm
   - WALLS AND BEAMS 30mm
9. LAPS TO ALL REINFORCEMENT SHALL BE 50 * BAR DIAMETER UNLESS OTHERWISE SHOWN



SECTION C-C

Scale 1:10

Client: THE UNITED REPUBLIC OF TANZANIA
DAWASA Chief Executitve
P. O. Box 1573
Dunga/Malanga Street, Mwananyamala
Dar es Salaam, Tanzania

Consultant: DOHWA Engineering Co., Ltd in Association with LUPTAN Consults Ltd and WWS Design &Development Co. Ltd

Project: Provision of Facilitation and Technical Services for Creation of Essential Framework Conditions, Capacity Building, Preparation of Detailed Engineering Designs and Bidding Documents, and Construction Supervision of the Off-grid Sanitation Works in Dar es salaam

Rev	Date	Description	Drawn	Check	App

Designed: | Drawn: | Checked: | Approved: | Scale: SHOWN | Date: June, 2021

Title: SIMPLIFIED SEWER SYSTEM STANDARD DETAILS DRAWINGS
DEMONSTRATION TOILET
Rev. No: 01 | Drawing No: SSS-STD-305-02

Annex I: Generic Environmental Management for Construction Activities

ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION ACTIVITIES

Proper environmental management of construction projects can be achieved only with adequate site selection and project design. As such, the Environmental and Social Assessment (ESA) for subprojects involving any new construction, or any rehabilitation or reconstruction for existing projects, should provide information as to screening criteria for site selection and design including the following:

1.1 SITE SELECTION

Sites should be chosen based on community needs for additional projects, with specific lots chosen based on geographic and topographic characteristics. The site selection process involves site visits and studies to analyze: (i) the site's urban, suburban, or rural characteristics; (ii) national, state, or municipal regulations affecting the proposed lot; (iii) accessibility and distance from inhabited areas; (iv) land ownership, including verification of the absence of squatters and/or other potential legal problems with the land acquisition; (v) determination of site vulnerability to natural hazards, (i.e. intensity and frequency of floods, earthquakes, landslides, hurricanes, volcanic eruptions); (vi) suitability of soils and subsoils for construction; (vii) site contamination by lead or other pollutants; (viii) flora and fauna characteristics; (ix) presence or absence of natural habitats and/or ecologically important habitats on-site or in the vicinity (e.g. forests, wetlands, coral reefs, rare or endangered species); and (ix) historic and community characteristics.

1.2 PROJECT DESIGN

Project design criteria include, but are not limited to, the consideration of aspects such as heating, ventilation, natural and artificial light energy efficiency, floor space (ft2) per bed/ward, requirements for x-ray rooms, adequacy of corridors for wheelchair/bed access, adequate water supply and sanitation systems, historical and cultural considerations, security and handicapped access.

1.3 CONSTRUCTION ACTIVITIES AND ENVIRONMENTAL RULES FOR CONTRACTORS

The following information is intended solely as broad guidance to be used in conjunction with local and national regulations. Based on this

information, environmental rules for contractors should be developed for each project, taking into account the project size, site characteristics, and location (rural vs. urban).

After choosing an appropriate site and design, construction activities can proceed. As these construction activities could cause significant impacts on and nuisances to surrounding areas, careful planning of construction activities is critical. Therefore the following rules (including specific prohibitions and construction management measures) should be incorporated into all relevant bidding documents, contracts, and work orders.

1.3.1 Prohibitions

The following activities are prohibited on or near the project site:

- Cutting of trees for any reason outside the approved construction area;
- Hunting, fishing, wildlife capture, or plant collection;
- Use of unapproved toxic materials, including lead-based paints, asbestos, etc.
- Disturbance to anything with architectural or historical value;
- Building of fires;
- Use of firearms (except authorized security guards);
- Use of alcohol by workers.

1.3.2 Construction Management Measures

Waste Management and Erosion:
Solid, sanitation, and, hazardous wastes must be properly controlled, through the implementation of the following measures:

Waste Management:

- Minimize the production of waste that must be treated or eliminated.
- Identify and classify the type of waste generated. If hazardous wastes (including health care wastes) are generated, proper procedures must be taken regarding their storage, collection, transportation, and disposal.
- Identify and demarcate disposal areas indicating the specific materials that can be deposited in each.
- Control placement of all construction waste (including earth cuts) to approved disposal sites (>300 m from rivers, streams, lakes, or wetlands). Disposal of in authorized

areas all of garbage, metals, used oils, and excess material generated during construction, incorporating recycling systems and the separation of materials.

Maintenance:

- Identify and demarcate equipment maintenance areas (>15m from rivers, streams, lakes, or wetlands).
- Ensure that all equipment maintenance activities, including oil changes, are conducted within demarcated maintenance areas; never dispose of spent oils on the ground, in watercourses, drainage canals, or in sewer systems.
- Identify, demarcate and enforce the use of within-site access routes to limit the impact to site vegetation.
- Install and maintain an adequate drainage system to prevent erosion on the site during and after construction.

Erosion Control

- Erect erosion control barriers around the perimeter of cuts, disposal pits, and roadways.
- Spray water on dirt roads, cuts, fill material and stockpiled soil to reduce wind-induced erosion, as needed.
- Maintain vehicle speeds at or below 10mph within the work area at all times.

Stockpiles and Borrow Pits

- Identify and demarcate locations for stockpiles and borrow pits, ensuring that they are 15 meters away from critical areas such as steep slopes, erosion-prone soils, and areas that drain directly into sensitive water bodies.
- Limit extraction of material to approved and demarcated borrow pits.

Site Cleanup

- Establish and enforce daily site clean-up procedures, including maintenance of adequate disposal facilities for construction debris.

1.3.3 Safety During Construction

The Contractor's responsibilities include the protection of every person and nearby property from construction accidents. The Contractor shall be responsible for complying with all national and local safety

requirements and any other measures necessary to avoid accidents, including the following:

- Carefully and mark pedestrian-safe access routes. o If school children are in the vicinity, include traffic safety personnel to direct traffic during school hours.
- Maintain a supply of supplies for traffic signs (including paint, easel, sign material, etc.), road marking, and guard rails to maintain pedestrian safety during construction.
- Conduct safety training for construction workers before beginning work.
- Provide personal protective equipment and clothing (goggles, gloves, respirators, dust masks, hard hats, steel-toed and –shanked boots, etc.,) for construction workers and enforce their use.
- Post Material Safety Data Sheets for each chemical present on the worksite.
- Require that all workers read, or are read, all Material Safety Data Sheets. Clearly explain the risks to them and their partners, especially when pregnant or planning to start a family. Encourage workers to share the information with their physicians, when relevant.
- Ensure that the removal of asbestos-containing materials or other toxic substances is performed and disposed of by specially trained workers.
- During heavy rains or emergencies of any kind, suspend all work.
- Brace electrical and mechanical equipment to withstand seismic events during the construction.

1.3.4 Nuisance and dust control

To control nuisance and dust the Contractor should:

- Maintain all construction-related traffic at or below 15 mph on streets within 200 m of the site.
- Maintain all on-site vehicle speeds at or below 10 mph.
- To the extent possible, maintain noise levels associated with all machinery and equipment at or below 90 dB.
- Insensitive areas (including residential neighborhoods, hospitals, rest homes, etc.) more strict measures may need to be implemented to prevent undesirable noise levels.
- Minimize production of dust and particulate materials at all times, to avoid impacts on surrounding families and businesses, and especially to vulnerable people (children, elders).

- Phase removal of vegetation to prevent large areas from becoming exposed to wind.
- Place dust screens around construction areas, paying particular attention to areas close to housing, commercial areas, and recreational areas.
- Spray water as needed on dirt roads, cut areas, and soil stockpiles or fill material.
- Apply proper measures to minimize disruptions from vibration or noise coming from construction activities.

1.3.5 Community Relations

To enhance adequate community relations the Contractor should:

- Following the country and EA requirements, inform the population about construction and work schedules, interruption of services, traffic detour routes, and provisional bus routes, as appropriate.
- Limit construction activities at night. When necessary ensure that night work is carefully scheduled and the community is properly informed so they can take necessary measures.
- At least five days in advance of any service interruption (including water, electricity, telephone, bus routes) the community must be advised through postings at the project site, at bus stops, and in affected homes/businesses.

3.1.6 Chance Find Procedures for Culturally Significant Artifacts

The Contractor is responsible for familiarizing themselves with the following “Chance Finds Procedures”, in case culturally valuable materials are uncovered during excavation, including:

- Stop work immediately following the discovery of any materials with possible archeological, historical, paleontological, or other cultural value, announce findings to project manager, and notify relevant authorities;
- Protect artifacts as well as possible using plastic covers, and implement measures to stabilize the area, if necessary, to properly protect artifacts
- Prevent and penalize any unauthorized access to the artifacts o Restart construction works only upon the authorization of the relevant authorities.

1.4 ENVIRONMENTAL SUPERVISION DURING CONSTRUCTION

The bidding documents should indicate how compliance with environmental rules and design specifications would be supervised, along with the penalties for non-compliance by contractors or workers. Construction supervision requires oversight of compliance with the manual and environmental specifications by the contractor or his designated environmental supervisor. Contractors are also required to comply with national and municipal regulations governing the environment, public health, and safety.