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MINISTRY OF WATER AND ENERGY
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TERMS of REFERENCE (ToR)

CITY WIDE INCLUSIVE SANITATION PLAN FEASIBILITY STUDY & DETAIL DESIGN OF FECAL SLUDGE AND WASTEWATER MANAGEMENT SYSTEM

September, 2024

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1. Introduction

1.1 Background

Poverty reduction and its ultimate eradication in all its dimensions have been and continue to be the overriding development agenda of the government of Ethiopia. Accordingly, provision of safe and sufficient water supply and adequate sanitation services are indispensable components in the sustainable development of the nation. The provision of safe and adequate water supply and sanitation for the population has significant contribution for reduction of poverty and improvement of socio-economic development. This could be achieved through improving health which reduces expenses for medical treatment and increases productivity and reducing time and labour wasted for fetching water which could be utilized for productive use. Hence, the Ethiopian Government, Donors, NGOs, the private sector, and the community should exert maximum efforts to improve sanitation. The magnitude of the problem is immense and the demand requires coordinated and harmonized response in terms of improving sanitation service delivery.

Currently there are emerging challenges which needs to be duly addressed particularly in the urban settings. Urbanization and housing development is being carried out particularly in major cities and towns of the country including Addis Ababa. Residential and commercial satellite areas with high rising buildings demanding more water particularly for sanitary use is flourishing in these cities and towns. Moreover, due to this the density of residents is also increasing requiring supply of more water to a specific area with adequate pressure as the water need to be supplied to multi story buildings. As the urban water supply requirement is increasing, the challenge of wastewater management is also becoming increasingly demanding. Moreover, various small and medium level businesses and cottage industries which usually use water from the town water supply service are also increasing exerting additional stress on the town water supply and wastewater management. Even though not with the development pace of the major cities and towns, the medium and small towns of the country are also increasing in size and undertaking some housing development activities.

The Ministry of Water and Energy of Ethiopia (MoWE) is a federal organization established to undertake the management of water and energy resources of Ethiopia. According to the ministry's new organizational reform, a unit has been established to coordinate urban and rural fecal sludge and wastewater management efforts. As part of the reform, three state ministries have been created, among which the State Ministry of Water Supply and Sanitation is responsible for sanitation functions in the country. Under the state minister of water supply and sanitation of MoWE Sanitation Infrastructure Development executive office is established to manage national sanitation issues to achieve the national sanitation universal access plan for safely managed sanitation services.

Addis Ababa is the only city in Ethiopia with conventional sewerage network. The city is getting service from centralized and decentralized wastewater treatment units. The city has three wastewater drainage catchments: Kality, Akaki and Eastern. However, it is only the Kality catchment that has sewerage network and treatment plant financed by the World Bank, the Kality treatment plant has been recently upgraded to a capacity of 100,000m³/d. Other cities and towns use drying beds and lagoons for faecal sludge management and do not have sewerage network.

The Sustainable Development Goals, launched in 2015, include a target to ensure everyone everywhere has access to toilets by 2030. This makes sanitation a global development priority. The Sustainable Development Goals provide new impetus for cities to be inclusive, safe, and resilient, to ensure citizens' health and wellbeing, and to provide access to sustainable water and sanitation services. The World Bank has a commitment for the achievement of the SDG by supporting client countries in their efforts to provide their citizens with sanitation. However, it has been learned that there is no single, simple solution to the urban sanitation problem.

Citywide Inclusive Sanitation (CWIS) is a newly introduced approach to support the urban sanitation development. It is an approach that aims to reach everybody with adequate sanitation. CWIS helps to safely manage human excreta at every point along the service chain with effective resource recovery much as possible diverse technical solutions are embraced for adaptive, mixed and incremental approaches; in which onsite and sewerage solutions are combined, to better respond to the realities found in developing country cities. Cities need to develop comprehensive approaches to sanitation improvement that encompass long term planning, technical innovation, institutional reforms and financial mobilization.

2. Study towns profile

2. Table 1: Project Towns in Lots

Lot 1	Lot 2	Lot 3
Ambo	Batu	Kombolcha
Wolkite	Negele Arsi	Woldia
Sebeta	Robe	Debre Tabor
	Dilla	

Lot 1 – Sebeta, Ambo, Wolkite

Sebeta town:

Sebeta Hawas also known as **Alem Gena** (Oromo: Sabbataa Hawaas) is a town in central Oromia Region, Ethiopia. It is located in the Oromia Special Zone Surrounding Finfinne. It is at an elevation of 2369 meters above sea level. Sebeta Hawas is one of four towns in Sebeta Hawas district. The town has no sewerage system. Accordingly, wastewater and faecal sludge management in Sebeta is usually managed using toilets (private, public & communal) and through emptying using vacuum trucks respectively. At present, 82% of the population has access to a private sanitation facility, while the remaining 18% of the population are without private toilet facilities (16%). (Situation Assessment Study of Sebeta town , 2019).

Ambo town:

is a town in west-central Ethiopia. Located in the West Shewa Zone of Oromia Region, west of Addis Ababa, it is the capital city of West Shewa zone.^[1] This town has a latitude and longitude of 8°59'N 37°51'E and an elevation of 2,101 meters. The current waste management situation in Ambo is unsatisfactory. At present, 82% of the population has access to a sanitation facility, while the remaining 18 % of the population didn't have any latrine facility and might be practicing open defecation. Of these available latrine facilities only 16% households are using on-site water-based sanitation systems (Septic tank/ flush toilets) and 86% are dry on-site sanitation systems, which are VIP (4%), pit latrine with slab (31 %) and pit latrine without slab (49%) in the town. (Situation Assessment Study of Ambo town , 2019).

Wolikte:

is a town and separate woreda in south-western Ethiopia. The second administrative center of the Central Ethiopia Regional State, and Gurage Zone . The town has a latitude and longitude

of 8°17'N 37°47'E and an elevation between 1910 and 1935 meters above sea level. Based on the 2007 Census conducted by the Central Statistical Agency, this town has a total population of 28,866, of whom 15,074 are men and 13,792 women. The plurality of the inhabitants practiced Ethiopian Orthodox Christianity with 48.17% of the population.

Lot 2 – Batu, Negele Arsi, Robe, Dilla

Batu town:

Is a town and woreda on the road connecting Addis Ababa to Nairobi in the East Shewa Zone of Oromia Region, Ethiopia. The town has a latitude and longitude of 7°56'N 38°43'E with an elevation of 1,643 meters above sea level. The current wastewater management situation in Batu is unsatisfactory. At present, 84% of the population has access to a sanitation facility, while the remaining 16 % of the population didn't have any latrine facility and might be practicing open defecation. Of these available latrine facilities only 11% households are using on-site water-based sanitation systems (Septic tank/ flush toilets) and 89% are dry on-site sanitation systems, which are VIP (9%), pit latrine with slab (42 %) and pit latrine without slab (38%) in the town. (Situation Assessment Study of batu town , 2019).

Arsi Negele town:

Is a city in southeastern Ethiopia. Located in the West Arsi Zone of the Oromia Region on the paved highway north of Shashamane, this town has a longitude and latitude of 7°21'N 38°42'E and an elevation of 2,043 meters above sea level. The town has no sewerage system. Wastewater and faecal sludge management in Negelle Arsi is usually managed using toilets (private, public and communal) and through emptying using vacuum trucks respectively. At present, 83% of the population has access to a sanitation facility, while the remaining 17% of the population are without private toilet facilities (16%) or didn't have any latrine facility and might be practicing open defecation (1%). There is an overlap in mandates and the implementation of regulation and enforcement on illegal wastewater disposal practice is also very weak. (Situation Assessment Study of Arsi negele town , 2019).

Robe town:

It is located about 430 kilometres by road from the capital Located in the Bale Zone, this town has a latitude and longitude of 7°7'N 40°0'E with an elevation of 2,492 meters (8,176 ft) above

sea level. The Wastewater management practices and technologies are key factors that influence the volume of wastewater to be collected and eventually treated. The town has no sewerage system. Accordingly, wastewater and faecal sludge management in Robe is usually managed using toilets (private, public & communal) and through emptying using vacuum trucks respectively. At present, 87% of the population has access to a sanitation facility, while the remaining 13% of the population didn't have any latrine facility (5%) and might be practicing open defecation (7.5%). (Situation Assessment Study of Robe town , 2019).

Dilla town:

It is located on the main road from Addis Ababa to Nairobi. The town has a longitude and latitude of 6°24'30"N 38°18'30"E, with an elevation of 1570 meters above sea level. It was part of Wenago woreda and is currently surrounded by Dilla Zuria woreda. The current wastewater management situation in Dilla is unsatisfactory. At present, 94% of the population has access to a sanitation facility, while the remaining 6 % of the population didn't have any latrine facility and might be practicing open defecation. Of these available latrine facilities only 14% households are using on-site water-based sanitation systems (Septic tank/ flush toilets) and 86% are dry on-site sanitation systems, which are VIP (9%), pit latrine with slab (42 %) and pit latrine without slab (27%) and other facilities (8%) in the town. (Situation Assessment Study of Dilla town , 2019).

Lot 3 - Woldia, Kombolcha, Debre Tabor

Woldia town:

is a town, woreda, and capital of the North Wollo Zone in the Amhara Region in northern Ethiopia. It has an elevation of 2112 meters above sea level and is surrounded by Guba Lafto woreda. Both are located north of Dessie and southeast of Lalibela. The current wastewater management situation in Woldia is unsatisfactory. At present, less than 10% of the faecal sludge produced is safely managed (pit properly covered and abandoned) while more than 90% is disposed unsafely without adequate treatment. This includes open defecation, overflowing onsite sanitation facilities, sludge dumped illegally into the environment and there is no proper disposal system but just a dumping site. The solid waste management is slightly better than the wastewater management. Currently, only 12% of the solid waste safely collected. (Situation Assessment Study of woldia town, 2019).

Kombolcha:

Is located in the north of the capital city of Ethiopia, Addis Ababa at a distance of 375Km and 505Km to the capital of Amhara Nation Regional State, Bahir Dar. The town is located in South Wollo zone of Amhara region. The area of Kombolcha town is 1,579.5 hectare. The geographical location of the town is located at a latitude of 11⁰08'49" and longitude of 39⁰72'92" with an elevation of 2,150 meters above sea level as it has 2,700masl as maximum and 1600masl as minimum. The town has 1,038mm average annual rainfall and usually happens during summer season and its average annual temperature is 20.2°C. The existing wind direction is Southeasterly during most period of the year. According to Central Statistical Agency (2018), the population projection figure of the town had been estimated at a total of 108,581 people. The whole area of the town falls within the watershed of the Borkena River, which actually passes through the center of the town. Most part of the town is plain or flat. Kombolcha town is founded on a graben margin, and field observation revealed that most of the soils of Kombolcha town are waterborne and derived from volcanic rocks. The geology of the city and immediate vicinity pose several serious hazards that must be taken into consideration in all major construction work, including the design of most physical infrastructure. The town becomes industrial center of the region.

Deber tabour town:

is a town and woreda in northern Ethiopia. Located in the Debub Gondar Zone of the Amhara Region, about 100 kilometers southeast of Gondar and 50 kilometers east of Lake Tana, this historic town has a latitude and longitude of 11°51'N 38°1'E with an elevation of 2,706 metres above sea level. The current wastewater management situation in Debre Tabor is unsatisfactory. At present, 32% of the faecal sludge produced is safely managed (pit properly covered and abandoned) while 68% is disposed unsafely without adequate treatment. This includes open defecation, overflowing on-site sanitation facilities, sludge dumped illegally into the environment and there is no proper disposal system but just a dumping site. There are 4 public toilet blocs. Public toilets are all managed by SMEs even though their management is not satisfactory. The solid waste management is poorer than the wastewater management. Almost all-solid waste generating in Debre Tabor town is believed to be dumped in an unsatisfactory manner to the open environment such as on street, street side, and ditches. (Situation Assessment Study of Deber tabour town , 2019).

3. OBJECTIVE OF THE ASSIGNMENT

3.1 General objective

To assess the overall sanitation situation, develop integrated city wide inclusive sanitation plan, prepare a feasibility and detailed design for fecal sludge and wastewater management system including development of implementation guidelines to facilitate the realization of City-Wide Inclusive Sanitation (CWIS) along with a cost recovery business plan for the Towns.

3.2 Specific objectives

- To conduct a comprehensive assessment of the current sanitation situation and existing plan with respect to
 - Review and analysis of all legal documents (the federal and regional constitutions, policies, proclamations, regulations, strategies ordinals, etc.) promulgated at federal, region and town levels by the water, health, environment, urban development and Housing, etc. sectors.
 - Fecal sludge, liquid waste, solid waste, and urban drainage infrastructures development and services status including the institutional framework.
- To develop a comprehensive integrated CWIS Plan (Fecal sludge, liquid waste, solid waste, and urban drainage infrastructures) that promotes inclusive access to safe sanitation services for each town.
- Review and analyse Financial and business arrangement, regulatory framework, and customer oriented programs for all towns.
- Conduct feasibility and detail design by using city wide inclusive sanitation principles focusing on the liquid waste management system (fecal sludge and wastewater management infrastructure, public toilet, communal toilets, Vacuum trucks, institutional toilets....) with an innovative strategies and recommend commensurate management system.
- Develop sanitation business plan based on the cost recovery principle for each towns.

4. SCOPE OF THE WORK

The scope of the work shall include, but not limited to, the task presented under the four Task:

Task I - Situation Assessment and Mapping Stage

For the ten towns, the assessment will evaluate the current sanitation situation, infrastructure, enabling environment, and existing plans regarding liquid waste, solid waste, including storm water, industries & commercial, solid waste management and urban drainage.

Conduct a comprehensive review of the sanitation service chain (Containment-Emptying-Transport-Treatment-Reuse/Disposal), including solid waste management and storm water drainage. This should cover household types, service coverage, technical and operational issues, environmental concerns, institutional and human resources, financing arrangements for capital and operational costs, investment levels, and existing master plans.

In assessing the existing sanitation situation, the consultant is expected to conduct household survey which the key tasks include:

- (i) Conduct sample survey consisting of households, public and private establishments, industries and private actors involved in collection and disposal of fecal sludge and wastewater by developing first all the checklist. Method of sample size determination should be discussed with the client before proceeding.
- (ii) key informants interview with officials and staffs of city administration, health, education, environment, municipal, industries , water and energy and , urban development bureaus, youth groups, etc... and
- (iii) Focus group discussion with vulnerable groups (peoples with disability, women, elderly etc...). For household sample size determination, the Consultants shall use Cochran Formula with p value (estimated variance) of 0.5 and response rate of 80%.
- (iv) Identify social and cultural constraints to access, including identifying groups with the least access to services.
- (v) Discuss these constraints with key stakeholders including, but not limited to, those with currently responsible for sanitation, drainage and solid waste collection, in order to obtain their views on the action required to overcome constraints and create the conditions required for the implementation of integrated plans for drainage and sanitation improvements within the town(s) under this lot. Particular attention should be paid to institutional constraints and the options to overcome them. Discussions

should stress the need for holistic plans that deal with storm water and wastewater collection, treatment and disposal, solid waste collection and disposal, and on-site sanitation solutions in an integrated way. They should also explore the need for an integrated approach that covers the actions needed to improve general planning procedures within towns and to improve systems and procedures that impact on the performance of drainage and sewerage facilities, in particular solid waste management services.

Institutional and Regulatory Analysis

- Review the current legislative rules and regulatory structures for physical Environmental protection, safe environment for health and social protection of natural drains, canals and flood plains or other water bodies. Make recommendations for improvement to the regulatory structure for future protection of these.
- Assess institutional arrangements for liquid waste, urban drainage, and solid waste management.
- Identify key stakeholders, roles, responsibilities, and any overlaps.
- Review existing business models for service delivery, particularly the role of the private sector, and recommend improvements.
- Analyse relevant legislative rules and regulatory structures for protection of natural drains, wastewater service provision, and recommend improvements.
- Assess university located in the study town's sanitation situation management.
- Assess industry and industry parks located in the study towns their liquid waste management system.

Existing Plans & Constraints

- Review existing plans to assess their implementation status.
- Identify demand creation, information, education, and behavior change communication campaigns.
- Identify institutional, financial, technical, and physical constraints hindering plan implementation.
- Discuss constraints with stakeholders to explore solutions for integrated drainage and sanitation plans.

- Review existing business models used for service delivery, including information on the role of the private sector (if any) and recommend appropriate business models.
- Identify and give a summary of existing demand creation, information, education, and behaviour change communication campaigns being planned/ implemented in the towns.

Waste Analysis & Economic Potential

- Analyse both liquid and solid waste systems, including their interaction with other services and potential for job creation.
- Trace the wastewater management value chain, including containment, conveyance, and treatment stages.
- Conduct laboratory tests to assess the characteristics of liquid waste from domestic, commercial, and industrial sources.

Clustering of nearby towns for service

- Assess the situation of nearby towns for their need and capacity if available
- Cooperation of the towns in the service areas
- Legal frame available for integrate service use

Waste Removal & Treatment Assessment

- Evaluate existing waste removal and treatment systems, including latrines, septic tanks, vacuum trucks, drying beds, lagoons, and recycling practices.
- Review data on waste collection and disposal over the last 10 years.
- Assess the performance of fecal sludge and wastewater treatment facilities in key institutions (e.g., universities, hospitals, industries).
- The Consultant is expected to analyse wastes (liquid/ solid) in the context of its interaction and complementarily with relevant services, and contribution to creation of job opportunity (viewing waste as business). Through the various reviews and instruments among others, the study team is expected to provide brief description and trends on the following issues.

Utilities & Financial Analysis

- Assess the technical, human resources, and financial management capacity of operating utilities.
- Review financial statements and analyze constraints to financial sustainability.
- Prepare financial projections, including revenue, expenditures, and debt repayment strategies.

Health & Environmental Impact

- Assess the health burden associated with inadequate sanitation services, and review pollution levels in rivers, groundwater, and the environment.
- Collect and review environmental legislation and standards relevant to sanitation.

Sanitation Coverage Mapping.

- Develop a sanitation coverage graph (SFD) for each study town, mapping the status of containment, collection, transport, disposal, and reuse.
- Evaluate the prevalence of open defecation in the study areas.

In over all the Consultant is expected to analyse wastes (liquid/ solid) in the context of its interaction and complementarily with relevant services, and contribution to creation of job opportunity (viewing waste as business). Through the various reviews and instruments among others, the study team is expected to provide brief description and trends on the following issues.

1. Institutional arrangement, regulations and management:
 - Legal and regulatory provisions
 - Institutional arrangement for regulatory and provision of sanitation services
2. Containment;
 - Types of containments available
 - Household (Institutional) level containments
 - Standard containments practiced
 - Identify problems and solutions
3. Conveyance ;
 - Tracing and analysing the wastewater management value chain in the context of the towns
 - Components of a sanitary collection and urban drainage schemes
 - Operation and maintenance (O&M) of the collection systems

- Number of private and government owned vacuum truck in the town
4. Assessment of the characteristics of liquid waste sample laboratory test result as per the need of the town.
 - Characteristics of domestic wastewater, commercial and industrial discharges
 - Potential impacts of industrial outfalls and commercial discharges
 - Identification of quality of untreated wastewater, final effluent and sludge
 5. Liquid and solid waste removal and treatment components
 - Latrines, septic tanks, cesspools, etc.
 - Vacuum trucks
 - Existing drying beds, lagoons and wetlands, and reuse and recycling practices.
 - Solid waste collection practice and facilities, sanitary landfills (landing, wind direction, distance residence),, and recycling practices
 - Collection and disposal data history at least for last 10 years
 - Sewerage system, if any
 - Performance evaluation of existing fecal sludge and wastewater treatment facilities of town(s) and major institutions in the like university, hospital, industries, prison etc.
 6. Operating Utilities;
 - Technical capacity
 - Human resources capacity
 - Financial management capacity
 - Financial statement including income statements, balance sheet and cash flow statements, and existing loan repayments
 - Analyse major constraints to the financial sustainability and the degree of operational subsidies from the local government.
 - Prepare financial projections including revenues, operating and capital expenditures, and debt repayment.
 7. Health and Environmental Situation;
 - Health Status: Burden of diseases associated with inadequate and unsafe sanitation facilities and services

- Status of pollution of rivers, ground water and the environment
 - Collect and review environmental standards, legislation and other environmental documents of relevance to sanitation services in the city.
 - environmental and health impact of the contaminants produced from households and institution
8. Develop a sanitation coverage graph (SFD) of the each study town
- Coverage of containment , collection, transport, disposal and reuse
 - Status of open defecation in the study town

The assessment report will identify the various technical alternatives appropriate for the different sub-regions of each town, defined by the existing situation and introducing a city-wide sanitation improvement approach to a level that can be successfully achieved in each category and accepted by the population and commercial enterprises in each area.

The results of these discussions, together with the information collected in the steps stipulated above, will be used to prepare a report and presentation, setting out the consultants' view of the existing situation and the key issues to be addressed in order to develop an effective approach to service delivery across the sanitation service chain, fecal sludge and wastewater management and treatment, storm drainage, and solid waste. A presentation, summarising the existing situation analysis findings, should also be prepared and should then be presented and discussed at a workshop attended by representatives of all stakeholder groups and organisations. Full sanitation situation assessments and sanitation mapping reports for each town are the expected output of this stage.

The workshop and meetings with representatives of individual organisations and groups should be used to check information and obtain views on the key issues and the possible options for addressing them. Following the workshop, a final version of an 'Assessment of Existing Situation Report' and Presentation should be prepared, prior to moving to the next stage.

Task II – Feasibility study of fecal sludge and Wastewater Management for City Wide Inclusive Sanitation plan

The Feasibility Study stage will follow the Appraisal Workshops from previous stages. The assessment report will identify various technical alternatives tailored to the different sub-regions of each city, based on the current situation, and introduce a city-wide sanitation improvement approach that is feasible and acceptable to local residents and businesses.

The feasibility study will refine the criteria for detailed engineering design for each subproject, offering two or three scenarios for client selection.

- The Consultant will evaluate possible alternatives for fecal sludge, wastewater, and sanitation management, analysing technology options across the entire sanitation value chain from containment to disposal/re-use, applicable at the city-wide level.
- Procedures for containing, emptying, transport, treatment and reuse/disposal shall be reviewed and proposed in order to foresee and evaluated the advantages and disadvantages.
- An economic analysis and sensitivity tests for each scenario will be provided, including city-wide sanitation facilities like centralized and decentralized treatment, as well as conventional and small-bore sewer systems and onsite sanitation.
- The required topographical survey size and alternative options will be presented.
- For non-sewered area, all applicable "on plot" options (including latrines) shall be analysed including faecal sludge management alternatives.
- The study will consider the effective use of existing household sanitation facilities and their relevance to addressing the sanitation needs of marginalized populations, along with the nature and volume of waste production.

Design Criteria and Conceptual Plan

- Prepare design criteria and concept plan for component of the city fecal sludge and wastewater management project with choice of technology and material to use.
- Population Projection and Industrial Growth
 - ✓ Project the population growth for 20 years according to agreed projections assumptions and methods. Project the likely situation of residential population, industries (type), and commercial activities.
- Liquid Waste Quantities and Characteristics
 - ✓ Estimate liquid waste and faecal sludge generation and characteristics as per the growth projections from residential areas commercial and industrial areas.
- Based on international experiences (such as CWIS projects in Latin African countries, America and South East Asian Countries) relevant to Ethiopian context, review economically, environmentally, socially and technically feasible technologies (with simplified operation and maintenance interventions to ensure the sustainability aspect) with the service management options and also review similar ongoing projects economically, environmentally, socially and technically feasible technologies
- fecal sludge and Wastewater treatment options with appropriate technology and economy recommended, standards for effluent disposal and electromechanical components of the treatment plant based on the preferred alternative.
- Public toilet, communal toilet and institutional toilets location and total number of theses sanitation facilities should be identified.
- fecal sludge and Wastewater treatment potential site should be identified selection parameter should be developed, and propose the best location for the treatment plant.
- Conduct community consultation, take their perception and recommendation, representative consultation must be addressed.

Preliminary Design of System Components

- Review regulation and standards of the Government at national and regional levels related to environmental quality, health, and safety, protection of sensitive areas and endangered species.
- Examine the technical, financial, environmental, social and economic feasibility and sustainability of the proposed system. The economic, financial, and technical analysis will check all possible technology options and analyse scenarios for implementation including the phasing of investments for wastewater management modalities:
 - i) sewage collection and treatment systems,
 - ii) latrine, cess pool and septic tank sludge collection and treatment systems, reuse and recycling and sludge management and
 - iii) other related investments.
- Prepare development plan for urban sanitation (fecal sludge, wastewater, solid waste and urban drainage). The planning period is to be divided into short, medium and long terms.
- Determine the containment facility design parameters for alternative sanitation systems applicable and appropriate for each town.
- Determine the conveyance system parameters for alternative sanitation systems applicable for each town.
- Determine the design parameters for alternative sanitation systems applicable for each sub-region of the town(s). For designing treatment plants, the Consultants shall undertake laboratory tests and establish influent parameters from appropriate places in the town(s), currently having water borne sewerage schemes.
- Conduct the hydraulic analysis and design of sewer network and treatment plant. Computer Software used for the analysis and design shall be submitted and trained to the Client.
- Assess the costs of fecal sludge and wastewater collection and treatment and level of cost recovery possible, and determine tariffs needed to ensure sustainable operations.
 - ✓ Discuss with the town utility a phased, affordable and acceptable way of introducing cost recovery tariffs.
- **ESIA**; Environmental social impact assessment of the project shall be assessed for each town of the impact of the study.

- ✓ Impacts (positive and negative) shall be studied and analyzed on the feasibility level based on information in the baseline survey and the interventions caused by the project implementation (construction) and subsequent operation. Any “red light warning signals” coming out of the baseline study shall be given special attention. The EIA shall conclude with a summary of the assessments and recommendations, and - from an environmental and social standpoint – a recommendation on how to mitigate the adverse/negative impact.
- ✓ Investigate the community’s attitude towards the project there feedback and understanding of the fecal
- ✓ Creating positive social awareness towards the project.
- ✓ Assess the gender impacts of project. → Identify and assess the direct and indirect benefits and adverse social impacts of the project in the short and long-term → Define appropriate mitigation measures for the adverse social impacts
- ✓ Assess the average annual income of the households in the project area
- Together with the feasibility and preliminary design in the steps stipulated above, will prepare a report and presentation, setting out the Consultants' view of the feasibility study and the appropriate options for discussion in order to approve the selected option by stockholder basically the town water supply and sewerage utilities, Municipality and Regional Water Bureau, MoWE. Following the workshop, a final version of “Feasibility Study and Preliminary Design report” and presentation should be prepared, prior to moving to the next stage. The city administration must sign off and accept the result on the report before the Consultant started the detail design.

Task III – develop integrated urban CWIS development plan for each town.

The consultant is expected to develop the Integrated City Wide Inclusive Sanitation Strategy/plan based on the feasibility study and recommendation report which incorporates the situation and need assessment including detailed analysis of current sanitation conditions, including infrastructure gaps, service coverage, health implications, and environmental impact.

The CWIS plan document needs to be comprehensive with narration on Baseline/ Situational assessment at all level, Stakeholder engagement strategies, strategic vision and goals, technical considerations, a detailed action plan outlining the short term, medium term and long term interventions, timelines and responsibilities, resource and budget requirement, Financial plan with cost estimate of proposed intervention, potential revenue generation strategies, M&E Framework with identification of appropriate KPI and data collection and reporting means, Environmental and Social risk and mitigation framework, analysis and recommendation on appropriate Policy and regulatory framework that will guide and frame the activities up to 2050 or above.

It is expected that the plan focuses on providing comprehensive sanitation services to the entire town, addressing the needs of all residents, including vulnerable and marginalized populations which focuses on developing strategies for infrastructure development, service delivery models, regulatory frameworks, capacity building, community engagement, and monitoring and evaluation mechanisms across the entire town.

Detail tasks include:-

- Discuss applicable options of international and national experience and select institutional arrangements, potential technologies, infrastructure, management systems, engagement of private sectors, financing mechanisms specific to the towns.
- Identify relevant stakeholders, define engagement levels, roles, responsibilities, and integration mechanisms for CWIS proposed actions across various sectors.
- Propose policy and regulatory requirements for short, medium, and long-term CWIS implementation to establish and reinforce sanitation service regulations and standards for quality, safety, and sustainability.

- Propose short, medium, and long-term actions for management, technologies, infrastructures (e.g., public toilets, sewer systems, fecal/septage treatment plants), considering environmental, social, cultural, and climate change risks and opportunities.
- Outline financial requirements, financing options, and human skill requirements aligned with the town's master plan.
- Define Behavioural Change Communication interventions for each stakeholder in CWIS implementation.

Task IV. Detail Design of fecal sludge and Wastewater Management City Wide Inclusive Sanitation plan

The key components in the detailed design of sanitation infrastructure development and services are as follows:

Site Survey and Assessment:

- Conduct a detailed survey of the area to assess the existing conditions, including topography, soil composition, water sources, and existing infrastructure,.
- Identify suitable locations for new sanitation facilities or upgrades to existing infrastructure (sewer networks if available, treatment sites, transfer sites, public toilets, communal toilets (if applicable)).

Technology and Material Selection:

- Choose appropriate technologies and materials for sanitation infrastructures toilets, transfer stations fecal sludge and wastewater management.
- Consider factors like efficiency, cost-effectiveness, environmental impact, and ease of maintenance.
- Examples of technologies: anaerobic digestion, activated sludge process, constructed wetlands.
- Materials: corrosion-resistant pipes, durable containment structures.

Geotechnical investigation ;

- Topographic surveying and geotechnical investigations, for sewer routes and for major components like treatment plant.
 - ✓ Topographical survey shall be undertaken at the selected FSTP and WWTP sites and sewer routes to enable detailed design of structures and pipelines. The topographical survey will also establish benchmarks to be used in setting out the works during construction. ,
 - ✓ A detailed soil investigation shall be carried out to provide accurate information both general and specific about the substrata profile and relevant soil parameters at site on the basis of which the foundation for various structures and equipment of fecal sludge and waste water treatment plants and sewer lines can be efficiently designed.

Engineering Design:

- Develop engineering designs for sanitation infrastructure, including sewage systems, treatment plants, pumping stations, and disposal/ reuse facilities.
- Specify the materials, dimensions, and construction methods required for each component of the infrastructure.

Technical Specifications:

- Provide detailed technical specifications for all components of the sanitation infrastructure, including pipes, pumps, tanks, treatment units, and other equipment.
- Ensure that the specifications meet local regulations and standards for sanitation infrastructure.

Hydraulic and Structural Design:

- Perform hydraulic and structural design calculations to ensure that the sanitation infrastructure can handle the expected flow rates and loads.
- Design structures such as manholes, tanks, and treatment units to withstand the required hydraulic and structural demands.

Treatment Process Design:

- Design the treatment processes for wastewater and fecal/septage waste management, including primary, secondary, and tertiary treatment stages.
- Specify the treatment methods, equipment, and chemicals required to achieve the desired effluent quality.

Pumping and Conveyance Systems:

- Design pumping stations and conveyance systems to transport wastewater and solid waste from the source to treatment facilities.
- Specify the pump capacities, pipe sizes, and layouts for the conveyance systems.

Environmental Considerations:

- Incorporate environmental considerations into the design, such as odor control measures, energy efficiency, and waste minimization strategies.
- Ensure that the design complies with environmental regulations and minimizes the impact on natural ecosystems.

Safety and Risk Mitigation:

- Identify potential safety hazards associated with the sanitation infrastructure and develop risk mitigation measures to protect workers and the public.
- Design safety features such as barriers, warning signs, and emergency response protocols.

Cost Estimation:

- Prepare detailed cost estimates for the construction, installation, and operation of the sanitation infrastructure.
- Break down the costs into categories such as materials, labor, equipment, permits, and contingency funds.

Construction Drawings:

- Create detailed construction drawings, including plans, sections, elevations, and details, to guide contractors in building the sanitation infrastructure.
- Provide clear and comprehensive documentation to ensure that the construction process follows the design specifications.
- **Implementation Plan:** Create a timeline and action plan for the implementation of the designs.
- **Community Involvement:** Incorporate feedback from community stakeholders in the design process.
- Detail design and drawing preparation for public, communal and institutional toilets options
- Detail design and drawing preparation for “on-plot” sanitation options including faecal sludge and wastewater management facilities
- Detail design and drawing preparation for “on-plot” sanitation options including public, communal and institutional toilets.

- Detail design of water borne sewerage system, with treatment plant
 - The design shall include detail design of sewer appurtenance and ancillary building (if any) such as laboratory buildings.
- Detail structural and electro-mechanical components design (if any)
 - Prepare detailed cost estimates and financing plans for each of the project components and the Project as a whole. Prepare the financial arrangements specifying the foreign exchange and local currency costs as applicable.

Affordability and Cost Recovery

- Review the impact and affordability of introducing full and partial cost recovery in fecal sludge and wastewater management services. Assess demand on the basis of price, income, and access to alternative supplies. Analyse the affordability of wastewater services and assess willingness to pay for them. Identify mechanism for protecting exclusion of the poor and vulnerable groups.
- Assess in detail (a) financial management capacity, and (b) financial performance including borrowing capacity and debt service coverage ratios relating to existing and potential new loans. Prepare financial projections including revenues, operating and capital expenditures, and debt repayment.
- Investigate alternative financing schemes for improving urban sanitation, including for example Municipal bonds, and public-private partnerships. .
- Identify magnitude and duration of subsidy, its fiscal implication to the city administration, and appropriate and timely exit plan and move towards full cost recovery.

Project Implementation Plan

- Prepare detailed project implementation and phasing schedules for each component, and investigate implementation options including integrated design-procure construct packages to improve implementation efficiency.
- Prepare an effective project performance monitoring system (PPMS) that includes monitoring of the project's performance, benefits, and impact on poverty reduction. Identify the training needs to strengthen performance monitoring capacity.
- Hold discussions with the city stakeholders to identify key issues and obtain their views on capacity building components. Develop a capacity building program, and outline training programs and recommended interventions that should be included in the project, and estimated costs.
- Assess the possibility of land acquisition in the Project that fits to the type of alternatives selected. Where land acquisition is required, (such as temporary or permanent)the Consultant shall inform the Utility of the location, outline the likely resettlement requirements
- Prepare an action plan to acquire the land (including the preparation of cadastral plans) and resettle residents.

Bid document

- Bid document Preparation based on the World Bank or ppa current guidelines
 - Procurement requirements for works and goods & related works;
 - The Bill of quantities shall be detailed and specific to each item of material unit and activity required and no lumped activities are allowed to be submitted.
 - Engineering Estimates derived from cost rate analysis prepared on Excel spreadsheet correlated with outputs (manpower and equipment) and material.
 - Detail specification which are correspondingly related to the BOQ items of material using the recent format and standards
 - Production 3-D view of all treatment structures in appropriate CAD format
 - The Arc GIS report both the soft and hard copy shall have complete presentation of the design pipe routes, stations, major junction boxes, proposed treatment plants separated by implementation
 - Detailed drawings for each components structures of the project

- Prepare a complete bid document for construction based on the WB or ppa procurement guidelines
- The consultant shall use and submit with the current version of all software including ArcGIS, AutoCAD and software used for sewer network and treatment plant design.

Human Resource Management and Capacity Building

- Develop management system proposal to manage the newly constructed system, manpower facility to manage the system, manpower organization and structure with different combination of specialists, capacity building necessary to the staff to manage the new system and the type and number of auxiliary building necessary to the staff to control the system with all cost break down.
- Recommend subproject interventions to address gender imbalances, and interventions to support other vulnerable groups, which will result in poverty reduction and social inclusion strategy under the project.
- Develop and recommend mechanisms and procedures for public consultation and community participation in project planning, operation and maintenance, project implementation and management, particularly in relation to levels of service performance, tariffs, and environmental protection.
- Justify the project from the point of view of social dimensions (social impact, impact on poverty, marginalized and vulnerable groups, and gender specific issues)

Environment and social screening

- Environment and social screening Conduct environmental and social impact assessment to understand the impact due to the proposed intervention, based on criteria established.

Town's WSS Utility Sanitation Service Business Plan

Creating a business plan for a town's Water Supply and Sanitation Utility's sanitation service involves detailed planning to ensure the provision of sustainable and inclusive sanitation services. Here are some key components that should be included in the business plan:

- **Description of Services:** detailed information on the sanitation services to be provided, including types of services, service areas, service levels, and any unique selling points.
- **Market Analysis:** analysis of the demand for sanitation services in the town, including demographics, trends, competition, and potential growth opportunities.
- **Business Model:** description of the business model, revenue streams, pricing strategy, cost structure, and how the sanitation services will be financed.
- **Legal and Regulatory Considerations:** overview of the legal and regulatory framework governing sanitation services in the town, including permits, licenses, and compliance requirements.
- **Operational Plan:** details on how the sanitation services will be delivered, including service delivery processes, staffing requirements, equipment needs, and quality assurance measures.
- **Marketing and Sales Strategy:** Strategies for promoting the sanitation services, acquiring customers, and building partnerships with relevant stakeholders.
- **Financial Projections:** financial forecasts, including revenue projections, expenses, cash flow analysis, break-even analysis, and return on investment.
- **Risk Management Plan:** identification of potential risks and mitigation strategies to address operational, financial, regulatory, and other risks.
- **Sustainability and Impact:** strategies for ensuring the sustainability of the sanitation services, including environmental impact considerations and social benefits.
- **Monitoring and Evaluation:** key performance indicators and monitoring mechanisms to track the progress and impact of the sanitation services.
- **Implementation Timeline:** timeline for implementing the business plan, including milestones and deadlines for key activities.
- **Stakeholder Engagement:** strategies for engaging with key stakeholders, including the community, local authorities, NGOs, and other partners.

5. Trainings:

- 1) The Consultant shall arrange "on-job training" for counter- part staffs of the utilities, through the study and design period.
- 2) Capacity building training on wastewater management practices to utilities and stack holders. The facilitation and invitation will be organized by the utility and regions
- 3) The Consultant shall provide capacity building training on every relevant or used software's (wastewater flow analysis and design, treatment plant, GIS etc.) for staffs of each region, Utilities and Ministry. The study team shall arrange the training session, prior to getting in to the feasibility stage of the consultancy services.

6. Deliverables of the Assignment

The major deliverables for the assignment

1. Situation Assessment and Mapping Stage report the town
2. Feasibility study of fecal sludge and Wastewater Management City Wide Inclusive Sanitation plan report of the town. It includes;
 - 2.1. Design Criteria and Conceptual Plan
 - 2.2 Feasible options for the town considering CWIS principle
 - 2.3 Preliminary Design of System Components report
 - 2.4 ESIA full report
3. Integrated urban CWIS development master plan for each town
4. Detail Design of fecal sludge report and Wastewater Management City Wide Inclusive Sanitation

The expected outputs from the Consultant are:

A. **Inception Report** - The inception report shall clearly indicate initial desk review, field observations, existing situation, revised methodologies and approach to the consulting services, revised schedule for activities, expert program, next deliverable schedule and contacted individuals and references used. The inception report shall be presented for evaluation for working groups established at the Ministry, Regions, and Utilities and approved by the Client.

B. **Monthly Report** - The study team shall submit monthly progress report, holding works done and updated schedule.

C. **Sanitation Situation assessment report**

The assessment of each town will evaluate the current sanitation situation, infrastructure, enabling environment, and existing plans regarding liquid waste, solid waste, including storm water, industries & commercial, solid waste management and urban drainage:

D. **Feasibility report:** The Feasibility Study stage shall follow on from the Appraisal Workshops for the previous stages of the study. The assessment report will have identified the various different technical alternatives appropriate.

E. **Detail Assessment and Development Plan Report (CWIS) plan**

Review report on existing WWS study and design reports sanitation infrastructures conveyance and transporting systems including the storm drainage system functioning in the towns. It shall also include details of activities stated in Task I above. The Draft report shall be commented at the appraisal workshop to be conducted.

Zonal (where applicable) hydrological data analysis, Wastewater characterization, and volume quantification based on the sub-catchment of the towns' sewerage flow and wastewater management systems.

Detailed geotechnical and topographic surveys report and drawings

Plan & profile in

- A3, A0 (general layout) and A1 paper size.
- The topography coordinates shall be addendum UTM measurements.
- The whole proposed route shall be surveyed.

- The soil investigation along selected topographic survey routes and selected treatment sites; detailed working drawings in international standard using CAD and arc GIS.
- The drawings should contain all the details required for execution of the project.

Feasibility study and preliminary design report on city wide inclusive sanitation schemes

Detailed design report of city wide inclusive sanitation schemes, including sewerage network and treatment plant, if applicable.

- F. **Detail Design report:** The scenario, selected at the feasibility study for each sector of the specific town, shall be further discussed, designed, and cost estimated
- G. **Technical Specifications, BoQ and detail drawings:** The specification shall confirm to the best-fit material production standard, equipment output and method of for all system components readable with bill of quantity pay items. The presentation shall follow standard numbering method of quantity surveying.
- H. **Detailed Business Plan and cost recovery:** Prepare detailed cost estimates and financing plans for each of the project components and the Project as a whole. Prepare the financial arrangements specifying the foreign exchange and local currency costs as applicable aligning with cost recovery principle.

7 . Mode of Deliveries

The Consultant shall from time to time prepare and submit colour copies of its findings, monthly reports, draft assessment reports and development plan reports, and final reports at the time and place indicated in the ToR and later in the Contract. The table below indicates the deliverables type, submission date and the total duration of the services.

Table A - Schedule of Deliverables

Task	Report/ Deliverable	No. of Hard & Soft Copies	Time
	Inception Report (draft)	5 copies both in soft and hard copies	End of 1 st month
	Inception report review by the Client		2 nd week of 2 nd month
	Final Inception report (final, after workshop)	5 copies both in soft and hard copies	end of 2 nd month
Task #1	Draft Report on Assessment of existing sanitation situation, infrastructure works and existing plan with respect to liquid waste, drainage and solid waste. including Draft Development Plan	5 copies both in soft and hard copies	End of /5 th month
	Draft Assessment Report and Development Plan Review by the Client		mid of the 6 th month
	Workshop to review each towns situational assessment draft report		
	Final Report Assessment of existing sanitation situation, infrastructure works and existing plan with respect to liquid waste, drainage and solid waste, including Development Plan:	5 copies both in soft and hard copies	start of 7 th month

	(After Workshop)		
Task #2	Draft feasibility study fecal sludge and wastewater management	5 copies both in soft and hard copies	Mid of 8 ^h month
	Draft Feasibility study Review by the Client		2 st week of the 9 th month
	Workshop to review the draft feasibility study for each project town		4 th week of the 9 th month
	Final feasibility study of fecal sludge and wastewater management (after workshop)	5 copies both in soft and hard copies	Mid of 10 th month
Task #3	Draft integrated urban CWIS development plan for each town.		Mid of 11 th month
	urban CWIS development plan Review by the Client		
	Final urban CWIS development plan	5 copies both in soft and hard copies	
Task #4	detail design of fecal sludge and wastewater management reporting	5 copies both in soft and hard copies	Mid of 13 th month
	detail design Review by the Client		End of 13 th month
	Workshop to review the CWIS plan for each project town		Mid of 14 th month
	Final detail design of fecal sludge and wastewater management (after workshop)		1 st week of 15 th month
	ArcGIS shape file	5 copies both in soft and	
	After the study and completion of	hard copies	

	<p>design, the consultant shall submit the master plan of the sewer system network with ArcGIS shape file in addition to the print outs, Geotechnical and topographic surveying report. Profiles and layout</p> <p>Bid Document including Drawings, Technical Specifications and Bills of Quantities and every documents and soft ware's used to be submitted</p>		
	<p>Total duration of the service is 15 months (450calendar days)</p>		

8. CONSULTANT TEAM COMPOSITION

- The Consultant shall be legally established firm and committed to put together a team of highly qualified experts with direct experience and excellent understanding of technical, economic, financial and environmental and social issues related to water supply and sewerage services of major cities in the country or other country experience.
- The team will also need to have experience in conducting such studies under the conditions and regulations, which exist in major similar cities.
- Resumes of the qualifications and experience of the key members of the team will be the key criteria used to evaluate proposals.
- The Consultants Key Staffs shall be at the project cities throughout the entire time, proposed for each professional
- Offices shall be well organized with appropriate staffs and facilities at each town.

Table: Composition of the Consultant's Core Staff

S/No.	Position	No. of Person	General Qualifications (General Education and Experience)	Adequacy for the Assignment (Relevant Experience in the sector/ similar Assignments)	Relevant Experience in the Region	Estimated Person Month
1	Team Leader	One for each Lot	M.Sc. Degree in Civil / Sanitary/ Hydraulic/ Wastewater/ Water supply Engineering. 15years' international managerial experience and adequate experience in city wide of strategic sanitation and drainage planning, and in designing of sanitation facilities including onsite sanitation.	(i) Practical experience as Team Leader for minimum 5 years (ii) Should have good computer knowledge, report writing and communication skills including at least 10 years' experience in design and construction supervision or project management of large water supply / wastewater network	Experience in sub-Sahara region in similar project	15
2	Wastewater/ Sanitary Specialist	One for each town	M.Sc. Degree in Civil/ Sanitary/ Hydraulic/ Wastewater/ Water Supply Engineering and related fields, with 10 years' experience.	six year specific experience in assessing sanitation options in relation to institutional and physical factors, and in engineering design and	Experience in sub-Sahara region in	3*12 for lot 1&3

S/No.	Position	No. of Person	General Qualifications (General Education and Experience)	Adequacy for the Assignment (Relevant Experience in the sector/ similar Assignments)	Relevant Experience in the Region	Estimated Person Month
			Specifically, large scale sewer network planning and hydraulic modeling, interceptor planning and design and associated flow diversion structures, large and small diameter siphon river crossing planning and detailed design and related hydraulics, sewer pump station design, detailed design of water supply or sewers in confined spaces in crowded core areas and management and supervision, surveys for pipe construction including significant involvement in sanitation strategy and plan development	tender documentation of sanitation infrastructure (both conventional waste water systems and on-site systems).The Expert shall have extensive knowledge of regulatory compliance issues in wastewater treatment including EPA policies	similar project	4*12 for lot 2

S/No.	Position	No. of Person	General Qualifications (General Education and Experience)	Adequacy for the Assignment (Relevant Experience in the sector/ similar Assignments)	Relevant Experience in the Region	Estimated Person Month
3	Solid Waste Management Specialist	One for each Lot	B.Sc. Degree in /Environmental health or public health and related fields with 10 years' experience including at least 2 years' experience in planning and design of solid waste management projects, including significant involvement in sanitation strategy and plan development	With 4 years' experience in planning and design of solid waste management projects, including significant involvement in sanitation strategy and plan development Specific experience of assessing sanitation options in relation to institutional and physical factors, and in engineering design and tender documentation of sanitation infrastructure (both conventional waste water systems and on-site systems). The Expert shall have extensive knowledge of regulatory compliance issues in solid waste management including EPA policies.	Experience in sub-Sahara region in similar project	3*3 for lot 1&3 4*3 for lot 2

S/No.	Position	No. of Person	General Qualifications (General Education and Experience)	Adequacy for the Assignment (Relevant Experience in the sector/ similar Assignments)	Relevant Experience in the Region	Estimated Person Month
4	Electro - Mechanical Engineer	One for each Lot	B.Sc. Degree or above in Mechanical / Electrical / Instrumentation Engineering and related fields 10 years' experience in the field of Mechanical / Electrical/ Instrumentation Engineering, related with water or wastewater treatment plants;	Five years specific experience in design and installation of electro-mechanical equipment related to wastewater, in power generation through sludge are required and experience in install operational control systems (SCADA), including monitoring devices, monitoring and database systems knowledge of biological process, chemical and physical process, management of plants, system optimization	Experience in sub-Sahara region in similar project	3*3 for lot 1&3 4*3 for lot 2

S/No.	Position	No. of Person	General Qualifications (General Education and Experience)	Adequacy for the Assignment (Relevant Experience in the sector/ similar Assignments)	Relevant Experience in the Region	Estimated Person Month
5	GIS & Remote Sensing Specialist	One for each Lot	B.Sc. Degree or above in GIS or related fields with 6 years' experience in the water supply and sanitation sub-sector with a high credit experience in data preparing and managing similar nature projects	The Expert shall have specific experience in water/ sanitation and involved in the study/ design with specific experience of three years	Experience in sub-Sahara region in similar project	3*4 for lot 1&3 4*4 for lot 2
6	Socio-Economist	one for each town	M.Sc. Degree or above in Economics with at least 10 years' with experience in projects on quality social data collection and analysis; designing affordability and cost recovery; financial analysis, and program planning. The Expert shall have the experience in effective management of safeguard measures and redressing procedures	The Expert shall have four year's experience in sanitation projects in quality social data collection and analysis; designing affordability and cost recovery; financial analysis, and program planning	Experience in sub-Sahara region in similar project	3*10 for lot 1&3 4*10 for lot 2

S/No.	Position	No. of Person	General Qualifications (General Education and Experience)	Adequacy for the Assignment (Relevant Experience in the sector/ similar Assignments)	Relevant Experience in the Region	Estimated Person Month
7	Environmental Expert	One for each Lot	M.Sc. Degree in Environmental Science/ Engineering or related field of studies with 10 years' relevant experience. The Expert shall have the experience in effective management of safeguard measures and redressing procedures; especially experience in resettlement; good understanding of Bank safeguard procedures and guidelines including EPA policies	The Expert shall have five years experience in effective management of safeguard measures and redressing procedures; especially experience in resettlement; good understanding of safeguard procedures and guidelines including EPA policies	Experience in sub-Sahara region in similar project	3*6 for lot 1&3 4*6 for lot 2
8	Public Health and Hygiene Specialist	One for each Lot	M.Sc. Degree or above in Public Health or related field with 8 years' experience in sanitation and related infrastructure projects	The Expert shall have four year similar experience experience in the sanitation situation assessment, hygiene promotion especially exeperince in preparing guideline in public health and hygiene	Experience in sub-Sahara region in similar projects	3*3 for lot 1&3 4*3 for lot 2

S/No.	Position	No. of Person	General Qualifications (General Education and Experience)	Adequacy for the Assignment (Relevant Experience in the sector/ similar Assignments)	Relevant Experience in the Region	Estimated Person Month
9	Structural Engineer	One for each Lot	M.Sc. Degree or above in Civil/ Structural Engineering. At least 10 years' experience in designing of water and sanitation structures, stability design and analysis, layout/ geotechnical formation stability, and settlement checking in designing of sanitation facilities, including on-site sanitation and off site.	<p>1. Practical 6 years experience in structural design in water supply treatment plants as a lead or senior structural designer or</p> <p>2. Practical 4 years experience in structural design in FSM or waste water treatment plants as a lead or senior structural designer</p>	Experience in sub-Sahara region in similar projects	<p>3*3 for lot 1&3</p> <p>4*3 for lot 2</p>

S/No.	Position	No. of Person	General Qualifications (General Education and Experience)	Adequacy for the Assignment (Relevant Experience in the sector/ similar Assignments)	Relevant Experience in the Region	Estimated Person Month
10	Urban Planner	One for each Lot	At least B.Sc. Degree in Architecture and Urban Planning and related fields with 10 years' experience in town planning and urban development projects related with sanitation. The Expert shall involve in the design of two wastewater projects and have extensive knowledge of regulatory compliance issues in waste treatment including EPA policies.	The Expert shall have 5 years experience in the planning ,design of fecal sludge ,wastewater projects and have extensive knowledge of regulatory compliance issues in waste treatment including EPA policies.	Experience in sub-Sahara region in similar projects	3*3 for lot 1&3 4*3 for lot 2
11	Geotechnical Specialist	One for each Lot	MSc. or above in Civil/ Geotechnical Engineering and related fields with 8 years' experience in soil map/ catalogue development and soil bearing capacity for major water and civil structures, pipe line routes and	The Expert shall have four year experience in the design of at least two wastewater projects and have extensive knowledge of regulatory compliance issues in waste treatment including EPA policies	Experience in sub-Sahara region in similar.	3*3 for lot 1&3 4*3 for lot 2

S/No.	Position	No. of Person	General Qualifications (General Education and Experience)	Adequacy for the Assignment (Relevant Experience in the sector/ similar Assignments)	Relevant Experience in the Region	Estimated Person Month
			crossings of sanitary systems of similar nature projects			

- In addition to the above core staff, the Consultant might use as needed input from relevant Experts such as Hydrologist/ Hydraulic Engineer, Structural Engineer, Electromechanical Engineer, Statisticians, Safeguard Specialist, Topographic and quantity Surveyor, Wastewater Quality Analyst, Financial and Economic Analysts, CAD Technician and others. Note that these staffs shall have B. Sc. Degree or above with a minimum of 10 years and above experience in their respective discipline. This needs to be clearly reflected in the technical as well as financial proposal of the Consultant. The Consultant is also required to assign required logistic for field and office and have office furnished with appropriate equipment for the duration of the study starting from the contract signature date. Moreover, the Consultant is expected to assign permanently at least one Wastewater/ Sanitary Engineer in each town until the completion date of the project but the rest of the staff may be assigned alternatively at each town as per the consultant work methodology.

7. Client's input for the service

The Ministry of Water and Energy (MoWE) is the Client of this Project, and conduct the procurement and contract management. During the study and design period, deliverables of the Consultants will be reviewed by the Ministry, as well as Utilities and Town-level Stakeholders. Regional Water Bureaus and Town Utilities shall facilitate the Consultants to collect relevant data, statistics and documents (including urban development master plan) as requested for the implementation of the project and give technical support as required. But any request of date fees is the responsibility of the consultant.

Utilities shall deploy counterpart staff to intensively involve during the study period. They shall provide administrative support and liaison to support the field survey of Consultant team, during data collection from various regional and town level offices. Utilities are responsible to facilitate town level workshops; establish technical committees for appraising the study documents. Following the workshops, city administrations must sign off and accept the result on the report before the consultant proceeds to the next stage.

The Client (Ministry of Water and Energy in conjunction with Regional Water Bureaus and the towns under consideration under this ToR) will:

- a. Facilitate to the Consultant to have access to data and documents available in the Municipality and related Government offices.
- b. Assign counterpart staff which work together with the Consultant from region and Utilities
- c. Facilitate appraisal workshop for inception report, Task I , Task II , task III and task IV draft reports and organize stakeholder's presentation before stepping to the final service stage.

8. Consultant's input for the service mode of work/transfer of technology

The consultant shall carry out the work in direct day-to-day co-operation with Ministry of Water, & Energy (MoWE) personnel. The Consultant's personnel shall exert their best efforts in involving the MoWE and each town personnel in all aspects of the investigations, planning and design work to be carried out.

- The consultant has the responsibility and obligation to conduct on job training and delivery report presentation of each task.
- For each task there will be a workshop after the client and towns technical experts review the document and gave the comment and feedback to the consultant

Note; all the workshops, and on job training expenditure and related cost will be covered by the consultant.

9. Modality of payment fee

The modality of payment for the Consultancy services shall be in accordance with the terms and conditions of the contract document to be signed between the Ministry of Water, & Energy (MoWE) and the consultant following negotiation.

- **10%** (Ten percent) of the contract amount upon submission and approved and accepted final inception report.
- **20 %** (Twenty percent) of the contract amount up on submission and approved accepted final sanitation situation assessment Study Report.
- **30%** (thirty percent) of the contract amount upon submission and approved accepted final Feasibility report
- **10%** (ten percent) of the contract amount up on submission and approved final of CWIS plan
- **30%** (Thirty percent) of the contract amount up on submission and approved final detail Study Report.