

# Terms of Reference

**Consulting Services for: *ENGINEERING DESIGN, TENDER DOCUMENTATION, TENDER MANAGEMENT AND CONSTRUCTION SUPERVISION FOR THE ESWATINI WATER SUPPLY AND SANITATION ACCESS PROJECT***

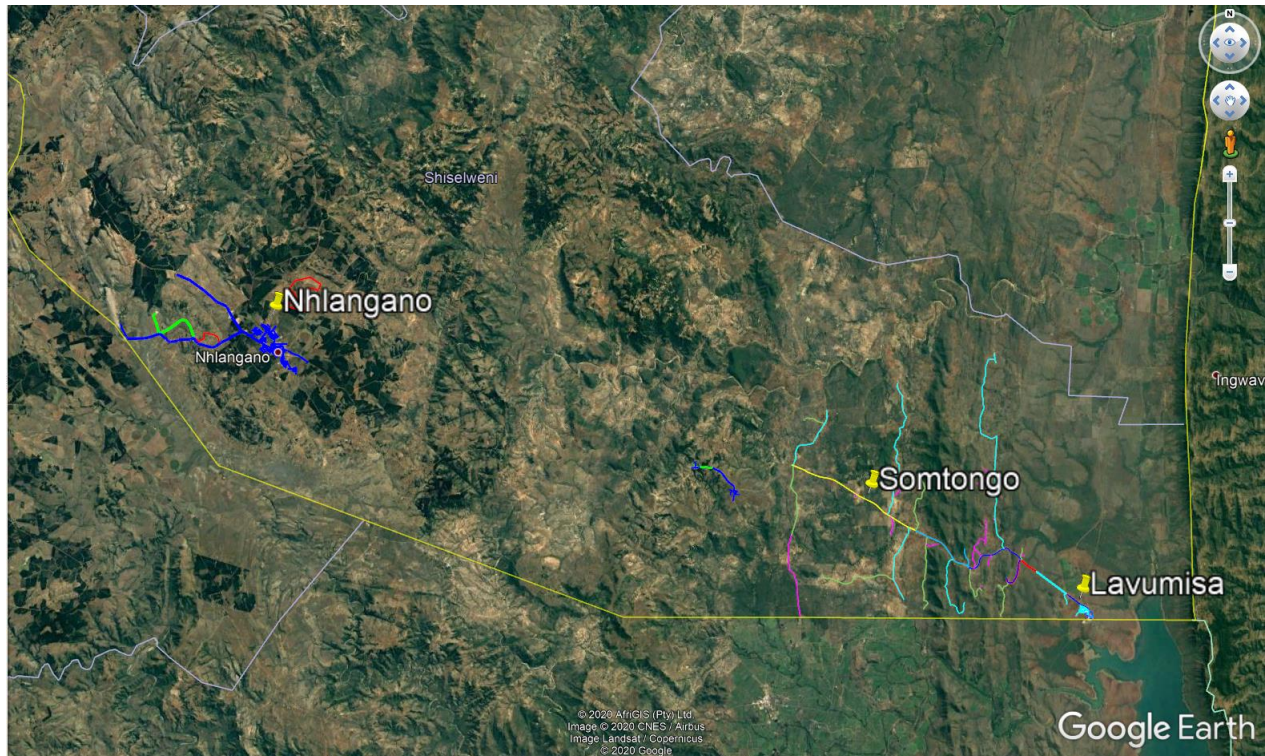
**Client:** *Eswatini Water Services Corporation (EWSC)*

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## 1. Background

The Eswatini Water Supply and Sanitation Access project seeks to increase potable water supply coverage in the Shiselweni region, notably the corridor from Nhlanguano through Matsanjeni-Somtongo to Lavumisa areas, which currently has a high population with limited access to potable water and sanitation. The region has two independent water supply systems operated by the EWSC, the Nhlanguano Water Supply System and the Lavumisa Water Supply System, serving areas around the referred cities. The communities and villages along the road connecting both cities, Road MR 11, rely, mostly, on groundwater, and face recurrent shortages during the dry season.



### *Southern Region Water Supply Systems: Nhlanguano and Matsanjeni-Somtongo-Lavumisa*

This area is characterized by recurrent dry spells and is prone to water scarcity. This proposal is also supported by numerous community requests which have been tabled to the Corporation following the completion of the new plants that have recently been built by EWSC which could be utilized to extend the potable water coverage in the precinct. This project seeks to provide potable water for domestic, institutional and commercial consumption to populaces along the MR11 corridor as well as improving sanitation coverage.

The Corporation in addition to its economic obligation has a social obligation to ensure water supply coverage increase even in financially compromised areas. This system being located in an area with high poverty indices lends itself ideal for grant funding from the Government of eSwatini or bilateral /multilateral funding partners. This document seeks to define the terms of the preparation of the engineering design for implementation of the Nhlanguano – Siphambanweni water supply project.

It is envisaged that the Eswatini Water Services Corporation would be the executing agent and operate and maintain the works as it currently operates the two systems being considered. The sources for the two systems emanate from South Africa in two distinct climatic regions which mitigates risk as it enables the Corporation to make use of two discrete water sources that may have variable flows during dry seasons. This also realizes the ability of the Somtongo –Matsanjeni project to be fed from the Nhlangano project in times of drought or adverse conditions on the Jozini dam source.

Since any water supply needs to ensure that the resulting wastewater is also adequately disposed, the project will also need to look at the prevailing waste water management in the area and adequately address short comings through the use of septic tanks and ventilated improved pit latrines. This will be supported by hygiene education to empower the communities in terms of wastewater disposal means.

Sustainable sanitation is defined as promoting and improving health and hygiene, protecting environmental and natural resources, and being technologically and operationally appropriate, financially and economically viable and socio-culturally and institutionally acceptable (SuSanA, 2008). Access to safe sanitation is a human right that has to be recognized and fulfilled (Stock, 2011). The major challenge to reach the Millennium Development Goal for improved sanitation (MDG 7) is not merely technical nor economic but lies in raising awareness on preventable sanitation-related diseases, changing traditional views and encouraging habits for good hygiene (UNICEF, WHO, 2008).

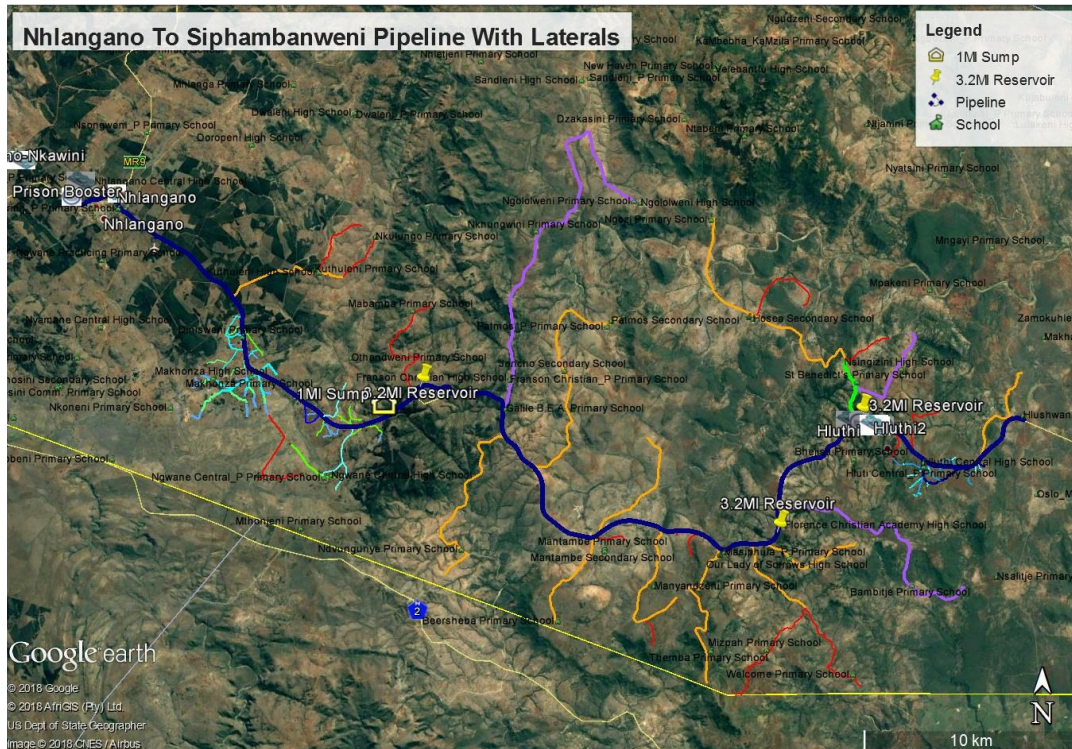
Since behavior is formed during childhood thus education on health and hygiene in schools is vital to improving conditions of people's lives from childhood to adulthood. School sanitation and hygiene programs can have important outreach functions for targeting households. Children have demonstrated that they can be effective agents of change as demonstrated in School-led Total Sanitation programs in Asia, Latin America and Sub-Saharan Africa (Avkopedia, 2016).

Sanitation issues for urban schools tend to differ somewhat from those at rural schools. For example, urban schools often have less space, but sometimes have the possibility to connect to a centralized sewer system. Some technologies like pit latrines might be feasible for rural schools but not for most urban schools. The involvement of parents and the wider community might also have a different intensity at urban schools. Nevertheless, the same guiding principles apply to school sanitation in all settings.

## **2. Proposed Project Scope**

The Nhlangano Water System was conceived to supply the entire area from the city of Nhlangano up to Matsanjeni, including the Hluthi town, encompassing most of the southern portion of the Shiselweni Region. The system was dimensioned to supply approximately 75,000 people. The water supply system to be designed and implemented under this assignment will benefit part of Zombodze, Hosea and Shiselweni Tinkhundla with an estimated population size of 38,233 which translates to 47,463 people in 2047.

*Phase 1 (already constructed) encompassed the* water Intake (Mkhondvo River) with an installed capacity 30,000 m<sup>3</sup>/day (347 l/s); a water Treatment Plant with Installed Capacity of 15,000 m<sup>3</sup>/day (173 l/s); a Water Main connecting the water treatment plant to the first reservoir (450 mm – ductile iron); Reservoir 1 (Mbukwane): Capacity 10,000 m<sup>3</sup>; Water Mains connecting Reservoir 1 to the cities of Maseyisini, Nhlangano and Mathende (current benefited population 18,000).



*The Project scope is the conclusion of the Nhlangano Water Supply System, including the connection of the Nhlangano Water Main to the Matsanjeni-Somtongo-Lavumisa Water Main, aiming to increase the security of the Matsanjeni-Somtongo-Lavumisa area.*

The design includes the connection to the existing Nhlangano water supply system (with its treatment plant at Masibini, drawing from Mkhondvo River) which will be the water source for the scheme; 64 km of mains (Nhlangano to Matsanjeni Main); 3 ground reservoirs (3,200 m<sup>3</sup>); 1 pumping station; 244 km of pipe network.

To allow for accessibility of water to low income groups, the design must plan water kiosks in various areas of the development so that even those segments of society with no house connections can still have access to an affordable potable water distribution point (public standpipe) at reasonable walking distances. In as much as this is not based on a cost recovery model given the low cost of the water tariffs, it improves greatly the access to potable water as people find it more affordable. The design must include provision for additional kiosks that can be added incrementally depending on water needs in the various areas and locations must be determined based on feedback from community members, particularly women who are commonly the ones responsible for carrying water for their households.

The project scope is summarized in the following table:

No.	Component name	Details
1	<b>Project Design and Management</b>	<ul style="list-style-type: none"> <li>• Detailed surveys and design of pipeline</li> <li>• Detailed design for solar energy plant and power banks for 10'000kWh per day</li> <li>• Management of Project Construction</li> </ul>
2	<b>Water Supply</b>	<ul style="list-style-type: none"> <li>• Construction of an 21km 400mm Ductile Iron gravity, 3km 400mm Ductile pumping and 41km 250mm ductile iron gravity mains with isolation, air, scour valves and are supply tee junctions</li> <li>• Construction of 3 x 3.2MI Reservoirs at key strategic places</li> <li>• Construction of pump house and 1MI sump at strategic place</li> <li>• Construction of 244km Lateral networks</li> <li>• Construction of additional distribution networks</li> <li>• Construction of 24 water kiosks in peri-urban and adjacent rural areas.</li> </ul>

The water system will only be one way as the area with high supply risks is Somtongo –Matsanjeni and there is still ample capacity at the Nhlango water works. The Consultant is to design the system such that in the event it is required that a project in the future is to be implemented in order to reverse flow from Lavumisa to Nhlango, the placement of the infrastructure would easily allow for that.

### 3. Objective(s) of the Assignment

The objective of the assignment is to undertake:

- (i) Preliminary Engineering Design and Detailed Engineering Design;
- (ii) Update the environmental and social impact assessment and ESMP based on the detailed engineering designs;
- (iii) Tender document preparation and tender management;
- (iv) Supervision of the construction of the works, as well as management of the defect's liability period;

The successful consultant shall provide its services in cost effective manner and compliance to EWSC's requirements. The EWSC policy supports design that has a low operation and maintenance cost. The consultant shall successfully complete the assignment:

- a) in compliance with the conditions of contract.
- b) in compliance with the laws of Eswatini, and in particular those relating to environmental protection.
- c) taking into consideration the World Bank Environmental and Social Framework requirements.
- d) Observing the World Bank Group Environmental, Health, and Safety Guidelines.
- e) within the time allocated for the contract.
- f) within the contract price.

**Knowledge building:** The project is expected to generate considerable knowledge and experiences that will add value and build up lessons for the design and management of similar projects that may be replicated in the country. The Corporation's operational performance will be enhanced by the institutional support in the form of staff training provided by the consulting engineer under the project.

#### **4. Scope of Services, Tasks and Deliverables**

The services shall be developed in 2 phases, including 7 tasks. Phase 1 comprises topographical surveys, geotechnical investigation, engineering design and tendering assistance. Phase 2 encompass construction Supervision and Defect Liability Support, as summarized below:

Phase 1: (Lump Sum Contract)

- Stage/Task 1 – Inception Report
- Stage/Task 2 - Preliminary Engineering Design
- Stage/Task 3 – Environmental and Social Impact Assessment
- Stage/Task 4 - Detail Engineering Design
- Stage/Task 5- Tender Documentation and Procurement Assistance

Phase 2: (Time Based Contract)

- Stage/Task 6 – Construction Supervision and Contract Administration
- Stage/Task 7 - Defect Liability Supervision

Contract for Phase 2 will be subject to the satisfactory completion of Phase 1

#### **4.1 Phase 1 Services – Design & Tendering Assistance (Lump Sum Contract)**

##### **4.1.1 Stage/Task 1 - Inception Report**

This stage of the scope requires the consultant to establish the client requirements and preferences, refining user needs and options, mobilizing necessary key staff, establishing the project brief including project objectives, priorities, constraints, assumptions, aspirations, strategies, consultants observations, updated work plans and recommendations on the way forward.

At this stage of the works, the Consultant is expected to carry out the following activities:

- (a) Facilitate development of a clear project brief.
- (b) Attending project initiation meetings to establish Client's requirements, preferences and needs.
- (c) Advise on procurement policy for the project.
- (d) Advise on rights, constraints, consents and approvals.
- (e) Define the services and scope of work required.
- (f) Conclude the terms of the agreement with the client.
- (g) Inspection of site and agreeing on necessary surveys, analyses, geotechnical investigation, tests and other investigations where such information will be required for the preliminary phase of the project.
- (h) Determine the availability of data, drawings and plans relating to the project.

- (i) Advise on criteria specific to own scope of work that could influence the project life cycle costs significantly.
- (j) Provide necessary information within the agreed scope of the project to other consultants involved.
- (k) Preparing and setting out particulars and calculations in a form required by any relevant authority.

The key deliverable at this stage will be the inception report highlighting the following aspects:

- Agreed services and scope of work.
- Report on project, site and functional requirements.
- Options to be considered: Agree on the pipeline routes and location of reservoirs and pump station to be assessed.
- Schedule of required surveys, tests, analyses, site and other investigations.
- Schedule of consents and approvals.
- The development and submission of a final design criteria.
- Basic planning report. Agree on work schedule.

#### **4.1.2 Stage/Task 2 - Preliminary Engineering Design**

This stage will prepare and finalize the project concept in accordance with the brief, including project scope, scale, character, form and function, plus preliminary program and viability of the project. The preliminary design of the water supply scheme should be prepared with the accuracy required to evaluate possible location alternatives, (mainly location alternatives for the main route, reservoir and pump station siting), and preliminary cost estimates with an accuracy consistent to this design phase. The final preliminary design report will be informed by the existing environmental and social impact assessment.

The alternative location analysis must consider technical, social, environmental, economic and regulatory aspects, recommending the preferred alternative to be detailed. This analysis must consider in detail involuntary resettlement requirements and economic displacement issues, beside technical and environmental aspects.

The preliminary phase shall consist of the following activities, but not limited to:

- (a) Carry out detailed surveys and production of plans showing land acquisitions required for the implementation of the works in a form suitable for submission to Land authorities or other relevant authorities.
- (b) The Consultant shall submit these drawings and relevant information to the Land authority and obtain the necessary servitude and way leave for routing of pipelines once approved by the client.
- (c) Consultant appointing or conducting the necessary geotechnical and foundation investigations for all proposed project components.
- (d) Topographical and environmental surveys, analyses, tests and site or foundation or other investigations, model tests, laboratory tests and analyses carried out.
- (e) Setting out or staking out the works and indicating any boundary beacons and other reference.
- (f) Advising the client on any regulatory or statutory requirements, including the need for any further surveys, analyses, tests and site or other investigations, as well as approvals, which may be required and arranging for these to be carried out. This advice is to be conducted by the consulting engineer with the interpretation of the results of these tests and investigations, including geotechnical and/or foundation investigations, together with a report containing recommendations to be applied to and incorporated in the design.

- (g) Preparation and submission to the client of any preliminary plans, drawings and estimates for seeking the approval of statutory authorities and the client.
- (h) Consultation of any technical matters to the client, authorities and interested parties other than those having rights or powers of authorization and making modifications to the preliminary design of the works arising out of these consultations.
- (i) Preparing and setting out particulars and calculations in a form required by any relevant authority.
- (j) The preliminary engineering design must include a detailed description, preliminary layout maps, and preliminary estimates of capital and recurrent costs up to the design horizon. The capital costs shall not only include the cost of materials and labor, but also overheads, preliminaries and general and contingencies. A summary of advantages and disadvantages of the various options where applicable.
- (k) Preliminary design of all project components such as pump works, concrete works, pipelines, reservoirs etc., mechanical and electrical elements and monitoring and control equipment.
- (l) The key deliverable from this stage will be the preliminary design report containing:
  - Lay-outs showing all the components of the project i.e. (pipelines, reservoirs, pump stations, etc.) indicating existing and proposed works.
  - Identification of any land acquisition requirements and economic displacements (if any).
  - Plans depicting the overall dimensions of the main components of the system.
  - Design calculations to determine the main dimensions of the system components;
  - Schedule of additional surveys, tests and other investigations and related reports.
  - Preliminary Cost estimates.

#### **4.1.3 Stage/Task 3 – Update the Environmental and Social Impact Assessment**

The engineering design must include an update of the existing environmental and social assessment addressing the following items which will in turn inform Task 2- Preliminary engineering design (not necessarily in the order shown):

- Project description. Concisely describes the proposed works and its geographic, ecological, social, and temporal context, including any offsite investments that may be required (e.g., dedicated pipelines, access roads, housing, and raw material and product storage facilities). Indicates the need for any resettlement plan. Should include maps and lay-outs showing the project site and the project's area of influence.
- Baseline data. Assesses the dimensions of the study area and describes relevant physical, biological, and socioeconomic conditions, including any changes anticipated before the project commences. Also takes into account current and proposed development activities within the project area but not directly connected to the project. Data should be relevant to decisions about project location, design, operation, or mitigatory measures. The section indicates the accuracy, reliability, and sources of the data. This section will be informed by the ESIA.
- Perform effective and efficient public consultation process following the principles set out in the ESF (Standard 10). A proper communication plan should be prepared and specific actions to be taken to ensure good representation and good attendance of affected communities and stakeholders in the planned Public consultation events including incorporation of their feedback, where reasonable, into project design.
- Simplified environmental and social impact assessment (ESIA). Predicts and assesses the project's likely positive and negative impacts, in quantitative terms to the extent possible. Identifies mitigation measures and any residual negative impacts that cannot be mitigated. Explores opportunities for environmental and social enhancement. Identifies and estimates the extent and quality of available data, key data gaps, and uncertainties associated with predictions, and specifies topics that do not require further attention.



- Prepare a comprehensive Environmental and Social Management Plan (ESMP), informed by the standards of the ESF, providing a description of mitigation measures including monitoring program; institutional arrangements and capacity building program to ensure successful implementation of the mitigation and monitoring program; and a budget for the proposed mitigation measures. Define feasible and cost-effective measures that may reduce potentially significant adverse environmental and social impacts to acceptable levels. May include compensatory measures if mitigation measures are not feasible, cost-effective, or sufficient.

Overall the updated ESIA and related ESMP should be of a quality that allows their immediate integration into tender package(s) for construction.

The consultancy services shall take into consideration the requirements of the eSwatini environmental legislation, the World Bank Environmental and Social Framework and the World Bank Group Environmental, Health and Safety Guidelines.

#### **4.1.4 Stage/Task 4 - Detailed Engineering Design**

The Consultant shall proceed with the “Detailed Design” and produce the “Final Design Report” including all requisite designs, drawings, specifications, reports, after the approval by the EWSC of the preliminary design, taking into consideration the updated environmental and social impact assessment and management plan. The Design of the water and sanitation system must be inclusive of all its components such as, processes, plants, pumping plants, equipment, conveyance systems, power supply, storage systems, control systems, monitoring systems, security systems, implementation strategies etc. To transfer water to the desired destinations in the most efficient and cost-effective manner. The Consultant shall also produce operations and maintenance manuals for the scheme. The preparation of the detailed engineering design may include the following activities:

- a) Carry out detailed surveys and production of plans and profiles, as well as the precise siting of all installations including but not limited to various elements of connections and pipe routes.
- b) Complementary topographical and environmental surveys, analyses, tests and site or foundation or other investigations, model tests, laboratory tests and analyses carried out.
- c) Produce detailed drawings for the proposed transfer scheme, which will be the property of the client and can be used anywhere else without authority and further payment to the consultant.
- d) These drawings shall typically include but not be limited to:
  - ✓ Plans of existing Water supply system,
  - ✓ Key plans, showing location, general arrangement and schematic layout of the recommended proposal,
  - ✓ Plans and longitudinal sections of the pipelines, pipe trenching and bedding details,
  - ✓ Plans indicating locations where electrical power is required.
  - ✓ Detailed setting out and construction drawings for all project components including details of pipe connections, bar bending schedules,
  - ✓ Details of road, railway and river crossings of pipelines,
  - ✓ Various chamber details and connections for different types of fittings,
  - ✓ Auxiliary items such as culverts, anchor and thrust blocks, marker posts, fences etc.
- e) All materials, pipes, valves, fittings, pumps, etc., used in the scheme, shall meet the requirements of the relevant eSwatini Standards, South African Bureau of Standards (SABS), British Standards (BS) or any other internationally recognized specifications, and test certificates shall be produced as proof of compliance.

- f) All pumps that are provided in the process should be electrically driven and must have a specific guarantee period, and the system shall have diesel power generator sets on stand-by.
- g) Approval of the design of the scheme by the client shall not relieve the Consultant of his liability to ensure that the scheme delivers required amount of water from the sources to all designated areas.
- h) Setting out or staking out the works and indicating any boundary beacons and other reference.
- i) Preparing and setting out particulars and calculations in a form required by any relevant authority.
- j) Incorporate client's and authorities' detailed requirements into the design.
- k) Prepare design development drawings including draft technical details and specifications.
- l) Prepare detailed estimates of construction cost
- m) Accommodate any service and auxiliary facility design.

The key deliverables for this stage will be the detailed design report incorporating the functional and system requirements, design parameters and approach, drawings and specifications, and the Bill of Quantity and engineering cost estimate report.

The preparation of draft and approved Final Construction Drawings. Approved Final Construction Drawings shall be prepared in reproducible form on approved permanent material and electronically. The drawings shall be dimensioned in metric units.

#### **4.1.5 Stage/Task 5- Tender Documentation and Procurement Assistance**

The Consultant shall progress to Preparation of Tender Documents only after Client's written approval of the Final Design Report and after receiving specific direction to proceed to the next stage. At this stage the consultant must compile specifications and preambles for the works, prepare tender document for contractor procurement, compile designs, drawings and schedules for the tender document, assist the client in addressing comments from the World Bank, assist in clarifications, site visits and preparation of addendums, assist in evaluation of tenders, assist in the process of award of contracts and prepare contract document for signature.

The Consultant shall be responsible for tender documentation, tendering, support during tender evaluation, including recommendations for award. Any such direction stated above, may include special instructions which shall be complied with Draft and Final Tender documents, consisting of:

- a) Instructions to tenderers, which shall not form part of the contract documents, should among others include:
  - (i) Details of documents to be submitted with tenders, including a program and a general description of the arrangements and methods of construction together with tenderers' legal and financial status, technical experience, key personnel and equipment available for use on the contract,
  - (ii) The place, date and time for the delivery of tenders,
  - (iii) Instructions and arrangements for visiting site,
  - (iv) Instructions on whether tenders on alternative designs will be considered, and if so the conditions under which they may be submitted,
  - (v) Notes drawing attention to any special Conditions of Contract, materials and methods of construction to be used and unusual site conditions,
  - (vi) Instructions on completion of the Bill of Quantities,
  - (vii) Production of performance bonds.

- b) Form of tender and Conditions of Contract comprising:
- ✓ Part I - Bank Harmonized Edition of the Conditions of Contract for Construction prepared and copyrighted by the International Federation of Consulting Engineers (*Fédération Internationale des Ingénieurs-Conseils*, or FIDIC), FIDIC 1999-All rights reserved.
  - ✓ Part II - Conditions of Particular Application,
- c) Specifications comprising:
- ✓ Standardized South African Bureau of Standards Specifications SABS 1200,
  - ✓ Project Specifications which set out: Variations and additions to the relevant Standardized Specifications that are applicable to the Works / Scheme,
  - ✓ Specifications for sections for which no Standard Specification exists,
  - ✓ Any other relevant or additional clauses.
  - ✓ Bill of Quantities (BOQ)
  - ✓ Complete construction drawings.
  - ✓ Data affecting the execution of works such as site investigation reports available to the Employer, details of access etc.
  - ✓ The Form of Agreement.
  - ✓ The Performance Bond.

Typical deliverables will include:

- Tender documents,
- Tender evaluation report
- Signed works contract documents
- Design and tendering assistance completion report.

## **4.2 Phase 2 of Services – Construction Supervision and Defect Liability Support (Time Based contract)**

### **4.2.1 Stage/Task 6 – Supervision and Contract Administration**

The Consultant shall carry out the day-to-day administration and co-ordination of the execution of the Works at site in accordance with the Contracts including the following:

- i. Examine and approve the contractors' (design) proposals and (shop) drawings for compliance with the Contract (specifications), Also attend factory tests/ pre-shipment inspection for major equipment as required.
- ii. Issue pre-shipment inspection certificate for major equipment.
- iii. Approve the contractor's environmental, health and safety plans (notably the C-ESMP) and monitor the same;
- iv. Approve specifications for items to be procured by the contractor as well as tracking progress of procurements.
- v. Organize and chair site meetings (on behalf of the client) along with preparation of minutes.
- vi. Undertake site supervision, inspection, approval and certification of construction, installation, testing and commissioning of the project components.

- vii. Undertake regular site supervision to monitor contractor compliance with all relevant provisions of Labour Management Plan that applies to the contractor and includes monitoring the effective functioning of a grievance redress system as set out under the Labour Management Plan.
- viii. Prepare detailed site reports, during the execution of the contract. The reports shall include on site/off site activities, weather conditions, ground and traffic conditions, number of contractor's staff on site including key staff, records of visitors to the site, status of procurement and key materials and equipment, construction materials delivered, plant or equipment used or idling at site, daily works recording, quality inspections, delays, photographic and video recording of important activities at site etc.
- ix. Monitor the progress and prepare monthly progress reports and take necessary actions to ensure that the contractor adheres to the construction program.
- x. In collaboration with the client and environmental expert, supervise environmental and social matters in accordance with the stipulation of the ESMP. Any additional and unexpected environmental incidences should be noted, and necessary adjustments recommended and amended accordingly.
- xi. Assess and incorporate confidential delay contingencies, should delays become unavoidable and advise the client with regard to the target practical completion dates for the Project components.
- xii. Ensure that quantity control is maintained. The consultant shall therefore monitor the quantity of the materials, works and the performance management of the contractor. The consultant shall maintain a daily record of work done and shall verify this through measurement. The quality control shall be updated as necessary during the construction supervision taking into account requirements from the Client<sup>1</sup>.
- xiii. Undertake cost management for the client. The Consultant shall monitor details of breakdown of work items as in the Contract, variation and escalation contingencies within the budget, status of sub-packages, anticipated variations etc.
- xiv. Prepare actual and forecast monthly/yearly cash flows to assist the client in cash flow management.
- xv. Maintain an updated program of works based in the contractor's inputs
- xvi. Check contractor's invoice and recommend progress payment certificates and Final payment certificates.
- xvii. Review and recommend any variation orders to the client if required.
- xviii. Ensure the contractor works within contract all the time and as appropriate evaluate and recommend any proposals of extension of time to be given to the contractor.
- xix. Evaluate and recommend substantial completion certificate to the contractor for each contract.
- xx. Ensure that conditions/ recommendations made by all statutory and approval authorities are met without incurring loss of time and money on the Project.
- xxi. Prepare a comprehensive monthly report for the client which includes achievements during the month including work done, current status against program, current expenditures against expected cash flow, an analysis of any cost changes or variations, report on any significant problem areas

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<sup>1</sup> Quality assurance (QA) during construction refers to the engineering activities that are implemented to assure the client that **works** are highly likely to meet the requirements. This is achieved through a combination of the quality control processes that are put in place by the **contractor** to control its outputs and the inspection and acceptance testing that is carried out by the **Engineer** to confirm conformance prior to certification. While the **contractor** takes the ultimate responsibility for quality and meeting the design requirements, the purpose of **quality assurance plan** and related **construction monitoring** is to inspect and satisfy the client and the **Consultant** that the risk of these requirements not being met, is acceptable.

- (a) This means that the **Consultant** should make a well elaborated proposal to satisfy the **construction monitoring** that suits the scale and complexity of this work. It should detail on the regular presence of the Consultant on site.
- (b) The client will assign trainee technical staff to work along with the Consultants' staff for transfer of skills and capacity building.

and the action being undertaken to resolve them. The reports shall include a summary program showing the current status, together with the trend graphs of key activities and a photographic & video record of work on site. The reports shall incorporate individual reports prepared by others as required. This report should also include status of payments and disbursement, status of procurement of key materials and equipment, contractor's key staff and equipment, challenges and proposed solutions. The report should also highlight the current expected completion date and cost. Plan for the next quarter along with program of works. Connections made in each sub-project area and estimated beneficiaries.

- xxii. Provide comprehensive Annual Report covering the same aspects as the monthly reports, but in a comprehensive format in particular for technical and financial matters including consultant's work plan for the next twelve months.
- xxiii. Prepare a consolidated database of the environmental monitoring activities, land acquisition and compensations paid to affected persons.
- xxiv. The consultant shall be responsible for ensuring that the contractor maintains at the site a complete set of 'as-built' drawings for the contract as the work proceeds. To this end the contractor shall maintain a continuous reproducible 'as-built' record of the actual alignments, levels, dimensions etc. to which the works have been constructed. On completion of the construction of each structure, transfer all records changes to a CAD file, or prepare new CAD drawings as required.
- xxv. The consultant should ensure that the contractor submits as-built drawings for all works at the end of the construction.
- xxvi. The consultant shall ensure the contractor provides all manufacturers operation manuals, instructions and technical details for the installations.
- xxvii. The consultant shall also ensure that the contractor trains the client's relevant staff in operation of the infrastructure and equipment installed under the contract.
- xxviii. The consultant shall review any detailed Operation and Maintenance manuals prepared by the contractor and shall be responsible for ensuring the manuals are complete and submitted to the client.
- xxix. The consultant shall register any problems encountered during construction which may have a bearing on the future safe operation and decommissioning of the facilities.
- xxx. The consultant must consolidate the operating instructions for all systems including those supplied by the manufacturers; drawings, diagrams, charts, notices etc. to facilitate understanding of safe operation and maintenance including trouble shooting guide of electro-mechanical equipment.
- xxxi. The consultant must consolidate a maintenance schedule and consumables required to give reliable operation of the facilities. The consultant shall prepare formats for reporting and record keeping of O&M activities.
- xxxii. Facilitate and approve as-built drawings and documentation.
- xxxiii. Conclude the final accounts where relevant.
- xxxiv. During Construction Supervision, the following shall apply on ESHS reporting:
  - (a) "The Consultant shall provide immediate notification to the Client should any incident in the following categories occur while carrying out the Services. Full details of such incidents shall be provided to the Client within the timeframe agreed with the Client.
    - (i) confirmed or likely violation of any law or international agreement;
    - (ii) any fatality or serious (lost time) injury;
    - (iii) significant adverse effects or damage to private property (e.g. vehicle accident); or
    - (iv) any allegation of gender-based violence (GBV), sexual exploitation or abuse (SEA), sexual harassment or sexual misbehavior, rape, sexual assault, child abuse or defilement, or other violations involving children,
  - (b) Ensure that contractor immediate notifications on ESHS aspects are shared with the Client immediately;

- (c) Immediately inform and share with the Client any immediate notification related to ESHS incidents provided to the Consultant by the Contractor, and as required of the Contractor as part of the Progress Reporting;
- (d) Share with the Client in a timely manner the Contractor’s ESHS metrics, as required of the Contractor as part of the Progress Reports.”

The consultant findings must be consolidated in the monthly regular reports and construction closeout report.

**4.2.2 Stage/Task 7: Provision of Services during Defects Liability Period**

This stage will fulfil and complete the project close-out through defect liability period support and preparing necessary documentation to facilitate effective completion, handover and operation of the project. The specific activities will include:

- (a) Supervise the Project during Defects Liability Period stipulated in the Contract and ensure that all technical problems and defects are resolved.
- (b) Inspect and verify the rectification of defects including and during the defect liability period
- (c) Facilitate final operations and maintenance manuals, guarantees and warranties.
- (d) Recommend final acceptance certificate at the end of the defect’s liability period.
- (e) Prepare a comprehensive final Project Completion Report at the end of the contract. This report shall summarize the methods of construction, targets versus achievements, lessons learn, and experience gained in project implementation, problems encountered and resolved, and environmental and social issues.

**5. Team Composition & Qualification Requirements for the Key Experts (and any other requirements which will be used for evaluating the Key Experts under Data Sheet 21.1 of the ITC)**

**5.1 Consultants Professional Staff – Design & Procurement**

It is anticipated that the following key and other staff will be required for the successful completion of the Design and Procurement stage (Phase 1) of the services:

Table: Key Staff for Design and Procurement Stage – Phase 1

<b>Key Experts</b>	<b>Person Month input</b>	<b>Requirement</b>
1. Team Leader	8	Minimum of a Bachelor Degree in Civil Engineering, Water Supply or related field with minimum of 15 years’ experience performing similar work and at least at team leader position for 5 similar complex works. He/She should preferably be professionally registered with a recognized professional society
2. Structural Engineer	4	Minimum of a Civil/Structural Engineering Bachelor Degree and 15 years design experience of which ten years has been in hydraulic structure design. He/She should preferably be professionally registered with a professional society
3. Geotechnical Engineer	3	Minimum of a Civil/Structural Engineering Bachelor Degree and 15 years design experience of which ten years has been in similar design. He/She should preferably be professionally registered with a professional society

<b>Key Experts</b>	<b>Person Month input</b>	<b>Requirement</b>
4. Social Specialist	4	Background in social science with minimum of 8 years' experience in management of social issues on development projects, in particular in social impact assessments; public consultations and participation process; resettlement and compensation issues and GBV or gender issues. Proven experience in operationalizing environmental and social standards, social safeguard policies of major donor agencies.
5.Environmental Specialist	2	Must have at least a Bachelor's Degree in environmental science/engineering with minimum of 6 years' experience in environmental impact assessment of infrastructure projects
6. Network/ Hydraulics Engineer	8	Minimum of Bachelor Degree in civil engineering, hydraulics or related discipline and 10years water systems design experience. He/She should preferably be professionally registered with a professional society.
7.Electrical Engineer	2	Minimum of a Bachelor Electrical Engineering Degree or related field and 10 years' experience in electrical designs for water systems. He/She should preferably be professionally registered with a professional society
8.Mechanical Engineer	2	Minimum of a Bachelor Mechanical Engineering Degree or related field and 10 years' experience in mechanical designs of water systems. He/She should preferably be professionally registered with a professional society
9. Instrumentation and Control Engineer	2	Minimum of a Bachelor's Degree in relevant qualification and 10 years' experience in similar works. He/She should preferably be professionally registered with a professional society
<b>Other Key Experts</b>		
9. Procurement and Contract Specialist	2	Minimum requirement of Bachelor degree in civil engineering with expertise in procurement and contract management of at least 10 years. He/She should preferably be professionally registered with a professional society
10. Land Surveyor	3	An advanced professional Diploma in Land Survey qualification and minimum of 10 years relevant experience.

## 5.2 Consultants Professional Staff – Construction Supervision

It is anticipated that the following key and other staff will be required for the successful completion of the services:

Table: Key Staff for Supervision of the project – Phase 2

<b>Key Experts</b>	<b>Person Month input</b>	<b>Requirement</b>
1. Resident Engineer	18	Minimum of a Bachelor Degree in Civil Engineering, Water Supply or related field with minimum of 15 years' experience performing similar work and at least a lead resident engineer for five years in a similar complex works. He/She should preferably be professionally registered with a recognized professional society
2. Civil Structural Engineer	6	Minimum of a Civil/Structural Engineering Bachelor Degree and 10 years design experience of which five years has been in hydraulic structure design. He/She should preferably be professionally registered with a professional society
3. Network/hydraulic Engineer	6	Minimum of Bachelor Degree in civil engineering, hydraulics or related discipline and 10years water systems design experience. He/She should preferably be professionally registered with a professional society.
5. Electrical Engineer	2	Minimum of a Bachelor Electrical/mechanical Engineering Degree or related field and 10 years experience in electrical designs of water systems. He/She should be professional registered with a professional society
6.Mechanical Engineer	2	Minimum of a Bachelor Electrical/mechanical Engineering Degree or related field and 10 years experience in electrical designs of water systems. He/She should be professional registered with a professional society
7. Instrumentation and Control Engineer	3	Minimum of a Bachelor Degree in relevant qualification and 10 years experience in similar works. He/She should preferably be professionally registered with a professional society
8. Environmental Specialist	18	Background in environmental science/engineering with minimum of 6 years' experience in environmental management and monitoring in construction projects. Health and Safety [ESHS] oversight shall be required.
9. Social Specialist	18	Background in social science with a minimum of 6 years' experience in management of social issues on development projects, in particular public consultations and participation process; resettlement and compensation issues and GBV or gender issues. Specific experience with projects in Eswatini and local languages (SiSwati and English) is necessary.
<b>Other Key Experts</b>		
10. Procurement and Contract Specialist	2	Minimum requirement of Bachelor's degree in civil engineering with expertise in procurement and contract management of at least 10 years. He/She should preferably be professionally registered with a professional society



<b>Key Experts</b>	<b>Person Month input</b>	<b>Requirement</b>
11. Clerk of Works (Inspectors)	18	Minimum of diploma in civil engineering or related discipline and experience of 5 years in works inspection of water works.

Note: the consultant shall include in its estimate a total of six person months input for defect liability period.

## **6. Reporting Requirements and Time Schedule for Deliverables**

The Consultant shall comply with the following schedule for submitting the required deliverables/reports:

<b>No.</b>	<b>Report Type</b>	<b>Submission Time in weeks from Commencement</b>	<b>Number of Copies</b>
1	Draft Inception Report	+4 weeks	4 hard copies + Electronic Copy (CD ROM)
2	Final Inception Report	+8 weeks	4 hard copies + Electronic Copy (CD ROM)
3	Draft Preliminary Design Report	+12 weeks	4 hard copies + Electronic Copy (CD ROM)
4	Final Preliminary Design Report	+16 weeks	4 hard copies + Electronic Copy (CD ROM)
5	Update the Environmental and Social Impact Assessment	+20 weeks	4 hard copies + Electronic Copy (CD ROM)
6	Draft Detailed Design Report	+24 weeks	4 hard copies + Electronic Copy (CD ROM)
7	Final Detailed Design Report	+28 weeks	4 hard copies + Electronic Copy (CD ROM)
8	Draft Bill of Quantity and Engineering Estimate Report	+24 weeks	4 hard copies + Electronic Copy (CD ROM)
9	Final Bill of Quantity and Engineering Estimate Report	+28 weeks	4 hard copies + Electronic Copy (CD ROM)
10	Draft Tender Document	+28 weeks	4 hard copies + Electronic Copy (CD ROM)
11	Final Tender Document	+32 weeks	4 hard copies + Electronic Copy (CD ROM)

No.	Report Type	Submission Time in weeks from Commencement	Number of Copies
12	Design and Tendering Assistance Completion Report	+48 weeks	4 hard copies + Electronic Copy (CD ROM)

## 7. Client's Input and Counterpart Personnel

The Client will;

- (a) Assist the Consultants in obtaining licenses and permits needed to carry out the services.
- (b) Make available all relevant project data within its possession.
- (c) Make available Corporation staff to assist the Consultant, where necessary.
- (d) Provide an Environmental and Social Consultant reporting to the PIU to work closely with appointed Consultant by the contractor

## 8. Scope - Environmental, Social, Health and Safety Aspects

### 8.1 Phase 1 – Engineering Design & Tendering Assistance

The Consulting engineer must observe the World Bank Environmental and Social Framework requirements, and the World Bank Group Environmental, Health, and Safety Guidelines during the engineering design phase, notably the following Environmental and Social Standards:

- ✓ Environmental and Social Standard 1: Assessment and Management of Environmental and Social Risks and Impacts;
- ✓ Environmental and Social Standard 2: Labor and Working Conditions;
- ✓ Environmental and Social Standard 3: Resource Efficiency and Pollution Prevention and Management;
- ✓ Environmental and Social Standard 4: Community Health and Safety;
- ✓ Environmental and Social Standard 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement;
- ✓ Environmental and Social Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- ✓ Environmental and Social Standard 8: Cultural Heritage;
- ✓ Environmental and Social Standard 10: Stakeholder Engagement and Information Disclosure.

### 8.2 Phase 2 – Construction Supervision and Defect Liability Support

During construction supervision, the Consulting Engineer must ensure that the contractor provide documentary evidence of compliance with all requirements of the Eswatini Occupational Health & Safety (OHS) Act No.9 of 2001. The Consulting Engineer ESHS related services include but are not limited to:

1. review and approve the Contractor's Environment and Social Management Plan (C-ESMP), including all updates and revisions (not less than once every 6 months);
2. review and approve ESHS provisions of method statements, implementation plans, GBV/SEA prevention and response action plan, drawings, proposals, schedules and all relevant Contractor's documents;

3. review and consider the ESHS risks and impacts of any design change proposals and advise if there are implications for compliance with ESIA, ESMP, consent/permits and other relevant project requirements;
4. undertake audits, supervisions and/or inspections of any sites where the Contractor is undertaking activities related to the Works, to verify the Contractor's compliance with ESHS requirements including its GBV/SEA obligations, with and without contractor and/or client relevant representatives, as necessary, but not less than once per month
5. undertake audits and inspections of Contractor's accident logs, community liaison records, monitoring findings and other ESHS related documentation, as necessary, to confirm the Contractor's compliance with ESHS requirements;
6. agree remedial action/s and their timeframe for implementation in the event of a noncompliance with the Contractor's ESHS obligations;
7. ensure appropriate representation at relevant meetings including site meetings, and progress meetings to discuss and agree appropriate actions to ensure compliance with ESHS obligations;
8. check that the Contractor's actual reporting (content and timeliness) is in accordance with the Contractor's contractual obligations and specifications;
9. review and critique, in a timely manner, the Contractor's ESHS documentation (including regular reports and incident reports) regarding the accuracy and efficacy of the documentation;
10. undertake liaison, from time to time and as necessary, with project stakeholders to identify and discuss any actual or potential ESHS issues;
11. establish and maintain a grievance redress mechanism including types of grievances to be recorded and how to protect confidentiality e.g of those reporting allegations of GBV/SEA.
12. ensure any GBV/SEA instances and complaints that come to the attention of the consultant are registered in the grievance redress mechanism
13. Implement the Code of Conduct, to be signed by all persons involved in the construction works. A code of conduct template is presented in annex.

## Appendix 1 - Code of Conduct Template

### For supervision of civil works contracts:

A Code of Conduct document shall be prepared by the Client and issued to the Consulting Engineer as a guideline for supervision of the Contractor during construction. The Code of Conduct shall include, but not limited to:

1. Compliance with applicable laws, rules, and regulations
2. Compliance with applicable health and safety requirements to protect the local community (including vulnerable and disadvantaged groups), the Consultant's Experts, the Client's personnel, and the Contractor's personnel, including sub-contractors and day workers (including wearing prescribed personal protective equipment, preventing avoidable accidents and a duty to report conditions or practices that pose a safety hazard or threaten the environment)
3. The use of illegal substances
4. Non-Discrimination in dealing with the local community (including vulnerable and disadvantaged groups), the Consultant's Experts, the Client's personnel, and the Contractor's personnel, including sub-contractors and day workers (for example, on the basis of family status, ethnicity, race, gender, religion, language, marital status, age, disability (physical and mental), sexual orientation, gender identity, political conviction or social, civic, or health status)
5. Interactions with the local community(ies), members of the local community (ies), and any affected person(s) (for example to convey an attitude of respect, including to their culture and traditions)
6. Sexual harassment (for example to prohibit use of language or behavior, in particular towards women and/or children, that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate)
7. Violence, including sexual and/or gender-based violence (for example acts that inflict physical, mental or sexual harm or suffering, threats of such acts, coercion, and deprivation of liberty)
8. Exploitation including sexual exploitation and abuse (for example the prohibition of the exchange of money, employment, goods, or services for sex, including sexual favors or other forms of humiliating, degrading behavior, exploitative behavior or abuse of power)
9. Protection of children (including prohibitions against sexual activity or abuse, or otherwise unacceptable behavior towards children, limiting interactions with children, and ensuring their safety in project areas)
10. Sanitation requirements (for example, to ensure workers use specified sanitary facilities provided by their employer and not open areas)
11. Avoidance of conflicts of interest (such that benefits, contracts, or employment, or any sort of preferential treatment or favors, are not provided to any person with whom there is a financial, family, or personal connection)
12. Respecting reasonable work instructions (including regarding environmental and social norms)
13. Protection and proper use of property (for example, to prohibit theft, carelessness or waste)
14. Duty to report violations of this Code
15. Non-retaliation against personnel who report violations of the Code, if that report is made in good faith

The Code of Conduct should be written in plain language and signed by each Expert to indicate that they have:

1. received a copy of the code;

2. had the code explained to them;
3. acknowledged that adherence to this Code of Conduct is a condition of employment; and
4. understood that violations of the Code can result in serious consequences, up to and including dismissal, or referral to legal authorities.

A copy of the code shall be displayed in the Consulting Engineer's office. It shall be provided in appropriate languages.