TRANSNET

TRANSNET ENGINEERING

SCOPE OF WORKS FOR A SERVICE PROVIDER TO CONDUCT FEASIBILITY STUDIES AND CONSTRUCT ONE BOREHOLE FOR AN ERMELO MAINTENANCE DEPOTS OF TRANSNET ENGINEERING.

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TRANSNET

Document Authorities

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1. PROJECT SCOPE

1. Compliance Requirements:

a. Occupational Health & Safety Act (Act 85 of 1993) and its Regulations, as amended

b. National Environmental Management Act 107 of 1998

c. National Water Act 36 of 1998(section 21 water uses)

d. Adhere to the Construction Regulation

e. Compensation of Occupational Injuries and Diseases Act (Act 130 of 1993) as amended

f. Transnet Contractor Management Procedure (TRN-IMS-GRP-PROC 014)

g. Transnet Engineering IMS Compliance Policy Statement

h. The contractor shall undergo Safety, Health and Environmental **(SHE) Induction**, and be issued with Induction certificate and valid permits authorising him/her to enter Transnet premises for the duration of the contract.

i. The contractor is required to produce an approved **Compliance File, or SHE File** and **Site Instruction Book** on site at **all times**.

j. All measurements and amounts must be stipulated in quote.

k. Contractor's name board will always be visible.

l. A supervisor will be always on site.

m. Comply with Transnet Engineering Waste Management Standard.

n. The correct PPE must be always worn. (Harnesses ropes, etc.)

o. During and on completion of the project, there will be SHE inspections and Risk assessments done on the site that the supplier/vendor is working on, which will be reported to the project manager.

p. Failure to comply will result in a stop certificate being issued and the supplier will be required to leave the site until the situation is rectified.

q. All scaffolding used to be SANS approved.

r. All employees who will be working at height to have medical fitness certificate and proof of competency training thereof.

s. Valid letter of good standing with Compensation commissioner.

2. Scope of works:

This specification requirement covers all the requirements that will be needed to inform the supplier/vendor/manufacture to carry out what is expected from him/her:

a. This specification states the minimum requirements relating to the work and in no way absolves the contractor from responsibility for sound engineering practice. Any omissions or sub-standard requirements of this specification must be brought to the attention of Transnet Engineering at tender stage and optional prices for addressing such omissions must be provided.

b. The contractor shall supply all the labour, tools, material, equipment, consumables, facilities, testing and supervision required for the supply of the specified equipment at site during erection, pre-commissioning and commissioning activities.

3. Site Inspection

Tenderers must visit the site to familiarize themselves with all the aspects involved relating to the project that must be done. This must be arranged via the Contract Manager. The site inspection certificate will be counter-signed by the Contract Manager on day of the site visit. The tender documents must only be submitted if the site inspection certificate has been signed.

4. Information Required

Tenders shall be in duplicate and will not be considered if full particulars of all relevant equipment and works requested are not submitted at the tender stage, to ensure an objective assessment of the offer can be made. Tenderers shall confirm that the items that they are offering comply at a standard not less than the minimum required requirement asked for in the specifications. Tenderers must comply with these specifications, but alternative offers may, in addition, also be submitted. Such alternative offers must be fully motivated and substantiated.

5. Technical Requirements:

All equipment and installation whether detailed in this specification or not shall comply with the requirements of the Occupational Health and Safety Act 85 of 1993 as amended. Sudden power losses will not have an adverse effect on equipment and shall not unduly delay return to operation after power is restored.

6. Codes of Practice, Regulations & Standards:

The tenderer shall specify which statutory, or industry rules will be applied for the equipment to be working successfully and safely and shall indicate the designed life span.

7. Environment:

The equipment will be required to operating in the climatic conditions of Ermelo.

8. Testing:

The tenderer shall indicate the performance/s standard which the equipment will be subjected to.

9. PROJECT SCOPE

a) **Phase 1 :** Desktop Studies (7 Sites)

b) **Phase 2 :** Installation of 1 x borehole with complete purification system (one site)

A. Phase 1

This phase is for Geohydrological Desktops study, physical survey (instruments) and siting of borehole including water harvesting but not limited to:

1) Geohydrological services are to confine to the standards detailed in the "Criteria for ground-water development for the community water supply and sanitation programme" by the department of water affairs and forestry 1996. The supplier/organisation must be recognized for their proficiency in hydro-geological services.
2) Study and interpretation of published geological and hydro-geological maps.
3) Study and interpretation of available remotely sensed information (aerial photography, ortho-photos and / or satellite imagery).
4) Interrogation of existing databases – National groundwater archive (NGA) and the groundwater resource information project (GRIP).
5) Siting is to be conducted utilizing at least one geophysical technique (preferably two) by a hydro-geological consultant/ team.
6) More than one potential position is required per project, based on whether the geophysical results show good potential for ground water. The minimum requirement are as follows:
7) Production application: a minimum of two (2) potential positions (pegs) required per site.
8) Geophysical techniques include but are not limited to:
    a. Magnetic surveys
    b. Frequency domain electromagnetic surveys
    c. Gravimetric surveys
    d. Seismic refraction surveys

9) Study for water harvesting methods is a type of harvest in which the rain water are collected and stored for the future use, instead of allowing them to run off. This study shall include methods and consist of various options but not limited to:
    a. Surface runoff harvesting and
    b. Rooftop rainwater harvesting
    c. Wet/Dry System

B. Phase 2

During this phase, the service provider is expected to carry out the following activities, to meet the intended objectives of the project:

Drill boreholes

a) Based on the study report, The successful bidder shall be responsible for the design, and working drawings including submission to the local authority for approval and Transnet approval.
b) Conduct 48Hr step/constant pump test and sustainable yield modelling.
c) Conduct drinking water quality testing report through an accredited water testing authority.
d) Install suitably sized pumps and connections to the borehole(s).
e) Install required piping and holding tanks installations.
f) Install suitable filtration system to ensure water complies with SANS241:1:2015.
g) Finalize applications and registrations of boreholes with Department of Water and Sanitation.
h) Obtain permission and certification for all activities.

10. Other information – Application Stage (Viability and License registration including permits)

a. Crucially, for any supplies greater than 20m³/day*, the feasibility study must consider whether it will be possible to obtain an abstraction licence. This is not always possible or may not be straightforward.
b. Where there are complex regulatory issues, a higher level of input is warranted as part of the project feasibility to define a suitable pathway to secure a licence. If the outcome of the feasibility study is favourable, then the next stage is to formally begin the regulatory process.

11. PRICING INSTRUCTIONS

11.1 Method of Tendering

Summary of applicable cost per phase.

Task	Description	Rand
a	**Phase 1**- Desktop Studies (7 sites)	
	I. Electrical out service depot	R
	II. Diesel (in-service & out service)	R
	III. Inservice direct current (dc) voltage	R
	IV. Inservice alternating current (ac) voltage preparation depot	R
	V. Out service depot	R
	VI. GFB in-service depot	R
	VII. Export in-service depot	R
b	**Phase 2**- Installation of 1 x borehole with complete purification system (1 site)	
	I. Electrical out service depot	R
	P 's & G's	**R**
	Contingencies of 10%	**R**
	Sub-Total exclusive of VAT	**R**
	Total inclusive of VAT	**R**

Signature of Bidder/s: _____ Date: _____

12. OTHER REQUIREMENT SPECIFICATIONS

12.1 Technical Requirements

This specification states the minimum requirements relating to the work and in no way absolves the Tenderers from responsibility for sound engineering practice. Any omissions or sub-standard requirements of this specification must be brought to the attention of Transnet Engineering at tender stage and optional prices for addressing such omissions must be provided. No variation orders will be allowed.

With the current water crisis in Ermelo Region, Transnet Engineering requires the installation of boreholes to provide water supply at its 7 x various plants for both domestic and industrial and sustainable for a long-term period.

The scope of works includes, but is not limited to, the minimum following requirements of the area:

12.2 Borehole

a. To survey the relevant area and locate potential water extraction points where borehole can be drilled to provide sufficient quantity and quality of water in a sustainable manner for up to 20 years or more,
b. Drill and install borehole/s at Electrical out service depot area, complete with all associated and required equipment, pumps, piping, valves, connections and infrastructure to extract water from boreholes. Installations to include for electronic recording and monitoring devices and sampling points for ongoing water sample testing after conclusion of contract.
c. Electrical installation shall fully comply with SANS 10142 latest edition.
d. The electrical design drawings for the system shall be handed over to the project manager that shall take it to the plant engineer/relevant person for counter signature.

e. No works shall start before the electrical drawings are not counter signed by the Plant engineer/relevant person from Transnet Engineering. This shall in no way absolve the contractor from professional responsibility.

The drawing shall indicate the following:

I. Main isolator to control panel.
II. Size of main overload protected circuit breaker/fuses in control panel.
III. All cable/wire sizes.
IV. Cable lengths.
V. All short circuit protection. (Circuit breaker/fuse size).
VI. All overload protection.
VII. All motor sizes.
VIII. All equipment used in the control panel.
IX. All wire numbering and all cable numbers.

f. The control panel shall be wired according with the wiring diagram.

g. In each sites water found, is to be tested and test reports of quality of water and sustainability of supply to be provided as part of the contract by a suitably accredited and competent authority

h. The scope of work is to include for all required designs pertaining to plant in accordance with relevant SABS design standards and regulations and in accordance with sound ECSA engineering practices and principles.

i. The water extracted from each borehole/s is required to be filtered at each site to comply with SANS 241: 2015, and any other applicable standards and regulations, to ensure compliance and provision of suitable potable water. To this end a suitable filtration system is to be provided at the borehole or alternatively centralized filtration plant is to be installed.

j. The filtration systems provided should consider the volume and quality of water to be processed.

k. Included in the scope, the extracted and filtered water is required to be fed into the existing domestic water supply lines and is to be fitted with changeover controls valves to select between municipal and filtered groundwater supplies.

l. Different options of feeding or installing water purification system shall be provided for consideration during tender evaluation with the costing.

m. All equipment, piping and auxiliary equipment required to make installation complete is to be supplied and installed as part of the scope of work.

n. Borehole installation will ensure independency of Municipal supply for water services while preserving nature. The boreholes will be used for both industrial and domestic activities based on the results from a feasibility study provided by appointed service provider which includes relevant licenses and treatment of the boreholes by appointed supplier.
o. Qualifying Suppliers will be required to present their proposal to the adjudication panel.

12.3 Tanks

p. Installation and supply of Tanks (same as JoJo tanks or equivalent product) will serve as contingency.
q. Water shall be automatically filled to tanks, always water shall be full in the tanks.
r. Float switches / sensors shall trigger the filling of tanks when water levels are low.
s. There shall be enough water pressure to enable flush masters to flush toilets.
t. All installations shall be done and completed by the contractor.
u. The electrical installation of pumps shall be fixed / permanent, power cables from the pumps shall be connected to the nearest distribution boxes and correctly rated breakers shall be installed to protect the pumps. Show how the rating and cable sizes were calculated.
v. The contractor shall work out the power cable sizes for 230V 40l/m operating at 400kpa.
w. The booster pumps shall have enclosures to protect them from dust and water.
x. The booster pumps shall comply to EFF1 and be suitable for coastal conditions.
y. Sizes of tanks shall be determined by result of feasibility study done by the supplier.

12.4 Treatment plant shall comply with the following requirements:

a. The plant is expected to have enough capacity to accommodate the business.
b. Water output the plant must be pH balanced and disinfected with Chlorine at a set dosing.
c. Treated water must comply with the SANS 241:2015 requirement for Physical and Aesthetic Determinands, Chemical Determinands – Macro, micro and Organic Determinands and microbiological determinands.
d. South African water quality guidelines Volume 1: Domestic Water Use Second Edition, 1996 or whichever latest standard or volume.
e. The system shall be at ground level.
f. All civil work will be provided by the appointed service provider.

12.5 Water harvesting

Water harvesting is **direct rainwater collection**. Rain is primary water source while lakes, groundwater and rivers are the secondary water source. Rainwater harvesting is a type of harvest in which the rainwater is collected and stored for the future use, instead of allowing them to run off. This study shall include methods and consist of various options but not limited to:

c. Surface runoff harvesting and
d. Rooftop rainwater harvesting
e. Wet/Dry System

12.6 Techniques of Rainwater Harvesting

The collection of rainwater can be done in various methods depending on a few factors. A few common methods include the following:

12.7 Rain barrels

It is the easiest and affordable method of rainwater harvesting, especially at home. It is where barrels or water tanks installed below the downspouts of the rooftops guttering system. The water is then funnelled/directed into the tanks. The tank can be connected to provide backup water to your current plumbing system, or it can be attached to a pipe for drip irrigation. The use of barrels or tanks is ideal since it can store significant amounts of water.

12.8 Dry System

It is like the barrel's system, but with the dry system, a larger storage container is used. The container is usually a few meters away from the property. The gutter is redesigned so that water is diverted to the large storage tank. It is a quick and cheap method to implement but has significant rewards.

12.9 Wet System

It is a technique that is entirely different from the dry system. Here, the collection pipes will always have water in them. It is because they will be situated underground. In the wet system, many collection pipes are connected to the downspouts of a building and diverted into a storage tank, which is also underground. The pipes need to be secure and well maintained to ensure there is no leakage into the soil.

12.10 Green Roof

This method of harvesting does not need the use of storage tanks. Instead of storing the water in a reservoir, the water is channelled straight to the garden. The process will require installing a drainage system on a building's roof straight to the backyard. It is a very low maintenance method.

12.11 Solar system

- The study shall consider other electrical/energy serving including solar system for all electrical power connection.
- The study should have all details.

12.12 Operation and Maintenance Service Contract

In addition to the design, and installation, the Supplier shall give TE a five (5) years MSC for ensuring adequate operational control, monitoring and maintenance of the plant/borehole.

13. Documentation:

a. Bidders shall supply the following documentation at tender stage:
b. Suppliers, electrical contractor's registration with Department of Labour as electrical contractor.
c. The accredited person's wiremen's licence. (Installation Electrician)
d. A copy of the accredited person's ID.
e. Professional mechanical engineers' qualification and registration with ECSA.
f. Professional civil engineers' qualification and registration with ECSA.

14. Documentation on day of commissioning:

a. sets off hard copies each with a disc containing documentation in PDF Format:
b. Design drawing regarding the borehole, water purification and water harvesting system.
c. Design drawings regarding civil works.
d. Design drawings for control panels and electrical installations.
e. Operating Manual.
f. Maintenance Manual.
g. Electrical Schematics.
h. Mechanical Drawings.
i. Parts List.
j. Hard copy of Parameters of all systems including PLC, CNC, and Drives.
k. Setup guides for Software on Computer.
l. Passwords for all software.
m. Backup of PLC Program.
n. COC for the Electrical installation. (Original only).
o. Test results for water test samples.
p. Test results for water flow rate at outlet site and system pressure.
q. Calibration certification for all instruments used to issue electrical COC and instrument for measuring wind speed.

15. Training:

a. The supplier shall offer formal training to Operators and maintenance artisans according to the training manuals of the equipment supplied. Supplier shall indicate the period required.
b. Supplier shall supply all training material.

16. Spares.

The supplier shall indicate detail spare parts list of the equipment.

The supplier shall indicate the critical maintenance spares.

The supplier shall indicate if consignment spares will be readily available in South Africa and the average lead time.

The supplier shall describe in detail the main components and how they operate.

A guarantee of spares availability for a minimum period of 10 years.

17. Maintenance

The supplier shall indicate the maintenance requirements and frequency of the equipment.

Maintenance/servicing of the equipment during guarantee period shall be included in the price.

18. Guarantee:

The supplier shall guarantee for a period 12 months after successful commissioning of the borehole, water purification and water harvesting System that all components, plant equipment and material are new and fit for the specific purpose which they are purchased, and free from any defects in design, workmanship, and material, and are in strict accordance with the contract, unless otherwise agree in writing.
The supplier shall agree to replace at his/her cost any defective items discovered within the guaranteed period.

The supplier shall clearly stipulate the nature of the guarantee and how long it will take their maintenance staff to be on site. Transnet Engineering requires a response time of no more than 24 hours.

Should the supplier fail, when called upon, to make good or remedy a defect (under guarantee or declared inherent) within a reasonable time, Transnet Engineering may affect the repair and thereafter recover from the supplier all cost and expenses associated with the supplier.

19. Handover: (Testing and commissioning).

The tenderer shall indicate the performance/s standard which the equipment will be subjected to.

a. Commissioning and testing of the newly installed borehole, water purification and water harvesting system shall be done by the service provider and a commissioning certificate shall be issued and be accepted by Transnet Engineering.
b. The service provider shall be fully responsible for any damage caused to all supplied equipment and to Transnet Engineering's assets during the installation, testing and commissioning. The service provider shall conduct a risk assessment as to identify anything that might hinder the installation of extraction system.
c. Bidders are regarded as subject matter expert and assume full responsibility of the whole design and installation.
d. As this project is "Turn-Key" the successful tenderer is responsible for the design, installation, testing and commissioning of the extraction system. The complete project team, local business, risk Department and PEMM responsible persons will participate in final commissioning.

20. General:

a. Certificate of compliance for the equipment supplied.
b. All work in all aspects shall be of high standard.
c. All rubble to be removed on a daily base.
d. All measurements regarding any lengths or dimensions shall be taken on site by bidders.

21. CONSTRUCTION INDUSTRY DEVELOPMENT BOARD (CIDB) REGISTRATION

CIDB required is ~~3CE~~ 3CE or Higher

22. COMPLIANCE TO THE SPECIFICATION VERIFICATION

ITS IS MANDATORY FOR ALL THE SUPPLIERS/BIDDERS TO COMPLETE THIS FORM. AN INCOMPLETE FORM WILL RESULT IN DISQUALIFICATION.

No.	Heading/Subsection	Comply			Comment
		Yes	No	N/A	
1.	Project scope				
2.	Phase 1 (studies)				
3.	Phase 2 (implementation & closeout)				
4.	Other				
5.	Method of tendering				
6.	Total cost				
7.	Technical requirements				
8.	Borehole				
9.	Tanks				
10.	Treatment Plant				
11.	Water harvesting				
12.	Maintenance Contract (5yrs)				
13.	CIDB				

TENDERERS: PLEASE NOTE THAT YOUR TENDER WILL BE REJECTED IF ANY OF THE ABOVE ITEMS ARE OMITTED OR NOT FILLED.

Signature of Bidder/s: _____ Date: _____

23. TECHNICAL TEAM

SCOPE OF WORKS FOR A SERVICE PROVIDER TO CONDUCT FEASIBILITY STUDIES AND CONSTRUCT ONE BOREHOLE FOR AN ERMELO MAINTENANCE DEPOTS

- The personnel listed below are members of technical team, overseeing this project.
- Signing below indicates the satisfaction of technical team members for inclusion of all requirements for this project.
- Signing below indicates that the technical team members have read and satisfied themselves that this specification includes all technical parameters to ensure inclusion of all requirements for this project.

Name and Surname	Signature	Designation
_____	_____	_____
Name and Surname	Signature	Designation
_____	_____	_____
Name and Surname	Signature	Designation
_____	_____	_____
Name and Surname	Signature	Designation
_____	_____	_____
Name and Surname	Signature	Designation
_____	_____	_____

Signature of Bidder/s: _____ Date: _____