Eskom National Transmission Company South Africa ™	**Scope of work for Alpha and Zeus substations borehole**	**North East Grid**

Title: Alpha and Zeus substation boreholes: surveying, drilling, supply and equip with required equipment needed to extract from borehole to fill the storage tanks

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1. Introduction

The project involves the survey, drilling, supply and equip water system at Alpha and Zeus Substations. Currently the borehole is located outside the perimeter fence and supplies the substation through a pump. The borehole infrastructure is old, and it is currently facing significant challenges due to criminal activities because of its current location. The project is initiated to provide a long-term solution to the substation, to eliminate the security threats and to prevent tempering with the system by having it relocated inside the perimeter of the substation. This project includes a borehole installation to access groundwater, to provide water supply throughout the substation. The project scope entails the following:

1.1 Preliminary assessment and survey

1. Borehole position
2. Depth of borehole,
3. Water table height,
4. Estimated yield of water per day
5. Recommended submersible pump to be used and depth of installation
6. Water test results and recommendations. This will determine if additional water treatment is required

1.2 Drilling Operations:

1. Site Setup - Clear access roads, secure working area, and establish a safe working environment.
2. Pilot Hole Drilling
3. Full Borehole Drilling
4. Sample Collection,

1.3 Borehole Construction:

1. Casing Installation: Insert steel or PVC casing to prevent borehole collapse.
2. Screen Placement: Install screens at the aquifer zone to allow water inflow and filter debris.
3. Gravel Packing: Place gravel around the screen to enhance filtration.
4. Grouting/Sealing: Seal the annular space above the screen to prevent surface contamination.
5. Select Suitable Pump
6. Install Pump System
7. Construct Apron and Drainage
8. Install Discharge Pipe or Standpipe

2. Scope

Alpha and Zeus substation boreholes entails surveying, drilling, supply and equip with the system with required equipment needed to extract from borehole to fill storage tank and supply buildings and the entire substation

2.1 Site Visit, Survey and Assessment

- A contractor will be appointed to conduct surveys and site investigations on suitable area for borehole in site the substation
- They will drill the borehole and provide information of the borehole and coordinates.
- Determine the accessibility of the site and identify any potential obstacles or challenges.
- Appointed contractor will provide the depth of borehole.
- Pilot Hole Drilling and full borehole drilling
- Sample Collection,
- Appointed contractor will provide the height of the water table.
- Appointed contractor will provide estimated yield of water per day.
- Appointed contractor will provide water test results and recommendation, this will determine if additional water treatment is required.

2.2 Pump and Equipment Procurement

- Appointed contractor will provide a recommended submersible pump to be used and depth of installation.
- Acquire the necessary connectors, adaptors, and additional pipe lengths required for the installation.

2.3 Installation of Submersible Pump

- Prepare the site for installation, ensuring safety measures are in place.
- Casing Installation: Insert steel or PVC casing to prevent borehole collapse
- Screen Placement: Install screens at the aquifer zone to allow water inflow and filter debris
- Gravel Packing: Place gravel around the screen to enhance filtration
- Grouting/Sealing: Seal the annular space above the screen to prevent surface contamination
- Lower the submersible pump into the borehole to the recommended inlet depth of 60 m.
- Connect the pump to the power supply and ensure proper electrical grounding.
- Securely fasten the pump and ensure it is properly aligned and cantered in the borehole.
- Construct Apron and Drainage
- Install Discharge Pipe or Standpipe

2.4 Connection to Water Tank

- Install a trench for the water pipe across the gravel road to connect the borehole to the existing tank.
- Lay and secure the water pipe along the trench, ensuring proper alignment and appropriate depth.

- Connect the water pipe to the submersible pump outlet and extend it to the existing tank location.
- Install necessary connectors and adaptors to connect the pipe to the tank's inlet.

2.5 Reticulation System Integration

- Assess the existing reticulation system and its compatibility with the new submersible pump installation.
- Make any required modifications or additions to the reticulation system to ensure seamless integration.
- Test the system for proper water flow and pressure, conduct adjustments if necessary.
- Ensure the system is functioning correctly and delivering water to the desired locations.

2.6 Electrical installation

- Supply and install new supply cable from existing pump house DB to new PHDB located withing the pump house.
- Supply and install equipped Distribution Board PHDB in the pumphouse according to the drawing.
- Supply and install supply cable from PHDB to borehole pump.
- Supply and install isolator switch at borehole for bore hole pump.
- Supply and install Float switches in the Head tank for control of the borehole pump.
- Commission and issue C.O.C.

2.7 Testing and Commissioning

- Conduct a thorough testing of the submersible pump, water pipe connections, and reticulation system.
- A suitable purification reverse osmosis system will be installed at the kitchens of the office and control building where drinking water is available.
- Check for any leaks, malfunctions, or irregularities in the system.
- Make necessary adjustments and repairs to ensure optimal performance.
- Commission the installation and provide operational instructions to the client.

3. Pump and Equipment Procurement

Equipment Description	Units	Quantity
Surveys and site assessment	ea	2
New borehole	ea	2
Borehole Pump/Wet End	ea	2
Motor	ea	2
Control Box (dry run protection	ea	2
HDPE Pipe	m	
Submersible cable	m	
Scotch cast	ea	4
Baseplate	ea	4
Safety rope	m	
Fittings and valves	ea	2
Pump Protection Box	ea	2

4. References

[1] (240-55922824) - Substation Layout Design Guideline

[2] (240-109644476) - Standard for Implementation of Substation Layouts for Transmission Substations

[3] South African Grid Code

[4] Occupational Health and Safety Act (OHS Act) 85 of 1993

[5] (32-1205) - Eskom Maintenance Management Policy

[6] (TST41-794) - Substation and Facility Maintenance

[7] (32-727) - Eskom Safety, Health, Environment and Quality policy

[8] (SANS 1200) – General Civil

[9] (240-1001183119) - Standard for Fences in Eskom Transmission Stations

[10] Guidelines for Human Settlement Planning and Design Vol 2 – CSIR

[11] SANS 10142 – Wiring code

5. Acceptances

This document has been seen and accepted by:

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6. Revisions

Date	**Rev**	**Compiler**	**Remarks**
04 September 2025	0	Marks Mathelele	First issue
19 January 2026	01	Marks Mathelele	Scope updated

7. Development team

Name	Designation
Marks Mathelele	Senior Advisor

8. Acknowledgements

No applicable