 Eskom	Scope of Work – Substation Engineering	Technology
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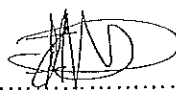
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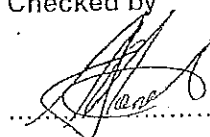
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1. INTRODUCTION

In the event of an emergency when the 275kV cannot be supplied from Esselen to Jupiter, a contingency supply of the 88kV needs to be sourced. The supply will be taken from the 88kV Feeder 11 (SAR Modder 2 Tee) which will be interrupted during this emergency, which will connect on to the incoming 275kV line from Apollo. The Apollo 2 line will be isolated at the Apollo end for the duration of emergency. Section 2 of 275kV Busbar 2 will be dedicated for the 88kV supply. Which is then fed through the 275kV Feeder 3 (Jupiter 1) to Jupiter MTS.

Work has been initiated in this regard. The purpose of this document is to outline the scope of work that is outstanding or remaining that is required to complete the project.

The Scope of Work involves the following design aspects:

- Foundations
- Erection of steelwork
- Erection of Equipment
- Installation of Tubular Busbar
- Stringing
- Earthing
- Trenching
- Fencing
- Paving

2. REFERENCES

- [1] (240-55922824) - Substation Layout Design Guideline
- [2] (240-109644476) - Standard for Implementation of Substation Layouts for Transmission Substations
- [3] (240-55921217) - Substation Engineering Product Realisation
- [4] South African Grid Code
- [5] Occupational Health and Safety Act (OHS Act) 85 of 1993
- [6] (32-1205) - Eskom Maintenance Management Policy
- [7] (TST41-794) - Substation and Facility Maintenance
- [8] (240-43008621) - Eskom Generation and Wires Operating policy
- [9] (32-727) - Eskom Safety, Health, Environment and Quality policy
- [10] O(32-846) - Operating Regulations for High Voltage Systems
- [11] T(SANS 10400-XA) - The application of the National Building Regulations
- [12] (SANS 204) - Energy efficiency in buildings
- [13] (SANS 1200) - Standardized Specification for Civil Engineering Construction
- [14] (IEEE std 80) - IEEE Guide for Safety in AC Substation Grounding

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- [15] (TSP41-1009) - Standard for Labelling Outdoor High Voltage Equipment within Eskom Transmission
- [16] (240-53459042) - Process Control Manual (PCM) for Perform Substation Engineering
- [17] (240-46977482) - Process Control Manual (PCM) for Perform Technical Assessment
- [18] (240-96393507) - Soil Resistivity Testing For Substation Applications
- [19] (240-101940513) - Earth Electrode Resistance Measurement standard
- [20] (240-95773230) - The Transmission Substation Earth Fault Application Guide
- [21] (240-53113685) Design Review Procedure
- [22] (240-606480018) - Terms of Reference for Design Review Teams presiding over Power Delivery Infrastructure Designs in Eskom
- [23] (240-109589380) - Direct Lightning Stroke Protection of Substations
- [24] (240-82736997) - Stringing, Cabling, Earthing & erection Specification for Transmission Substations.
- [25] (240-1001183119) - Standard for Fences in Eskom Transmission Stations
- [26] (240-108982466) - Standard for HV Yard Stone in Eskom Substations
- [27] DST_34-1245 – Substation Earthing
- [28] Asset Spec
- [29] Technical Tender Evaluation Strategy for Stringing, Earthing & Erection at Esselen
- [30] Technical Tender Evaluation Strategy for Tubular Conductor

3. SCOPE OF WORK

Designs are in accordance with [1] – [26] & subsequent scope of work /construction/erection/installation must be done in accordance with [5], [13]-[14], [18]-[19] & [24]-[27-28].

The Scope of Work is as follows:

3.1 FOUNDATIONS

- Cast 3 x new Column foundation in accordance with 0.54/5612 Rev 1.

3.2 ERECTION OF STEELWORK

- Erect the main steelwork, columns and beams.0.54/330 Rev 3 & 0.54/331 Rev 3.
- Erect the Isolator supports 1 x 0.54/7664 (275kV) & 1 x 0.54/7683 (132kV)
- Reduce the 8 x 6m PI supports (0.54/5573) already erected on site by half a meter for the clearance under the 275kV line in accordance with drawing 0.18/33561

3.3 ERECTION OF EQUIPMENT

- Install the 275kV Bypass Isolator
- Install the 132kV Isolator

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- Install the 12 x 275kV PI's
- Install the 9 x 132kV PI's

3.4 INSTALLATION OF TUBULAR BUSBAR

- Install the Ø200 x 6WT Tubes as per the drawing 0.18/17324 Sheet 3 Rev 3 and 0.18/17324 Sheet 4 Rev 2.

Item	Tube Length	Quantity
1	5000	3
2	4500	1
3	8000	1
4	11600	1
5	18100	1
6	19600	1
7	20600	1

- Install 130m Damping Conductor 1 x Centipede (1 x 400mm²)

3.5 STRINGING

- Complete all the stringing from Apollo 2 275kV line dropping down to tubes and from the 275kV Bypass Isolator to tubes. Refer to drawing 0.18/17324 Sheet 3 Rev 3, Sections A-A, B-B, C-C, D-D, E-E, F-F, G-G, H-H, I-I & J-J.
- Complete the stringing from the 88kV Feeder 11 (SAR Modder 2 TEE) Gantry to 275kV Apollo 2 1st Inline Strain Steel H-Pole.
- Re-string the 88kV Feeder 11 (SAR Modder 2 TEE) as per 0.18/17320 Sheet 45, Rev 5 using twin Bull (2 x 800mm²).

3.6 EARTH TAILS IN HV YARDS

Where missing, not installed or installed incorrectly:

- Install Earth Connections (2 x 10mm Copper Rods) as per 0.18/17324 Sheet 4 Rev 2.

3.7 TRENCH

- The new trench to be extended by ±35m as per the drawing 0.18/17324 Sheet 4 Rev 2.
- Install the cable Sleeve as per the drawing 0.18/17324 Sheet 4 Rev 2.

3.8 FENCE

- The remaining fence to be installed in accordance with drawing 0.18/17324 Sheet 3 Rev 3.

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3.9 PAVING

- The existing paving is not completely laid in a small area between safety fence and kerbing
- Use same paving blocks to match existing paving.

4. LIST OF DRAWINGS

Drawing Title	Drawing Number
Esselen 88 kV National EPP Bypass Layout & Details	0.18/17324 Sht 3 Rev 3
Esselen 88 kV National EPP Bypass Layout & Details, Schedules & Notes	0.18/17324 Sht 4 Rev 2
Esselen 88kV Feeder Bay 11	0.18/17320 Sht 45, Rev 5
Esselen 275/132kV Yard Key Plan	0.18/17324 Sht 2 Rev 4

5. REVISION CONTROL

Rev No	Description	Compiler	Date
1	Remaining Scope of Work	Fredda Molusi	September 2018
2	Remaining Scope of Work – The number of the column foundations changed from one to three. The fence that was to be temporarily removed to remain.	Fredda Molusi	December 2018

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