

## **Watershed 132kV lines deviations Scope of work**

### **A. Executive summary scope of work**

It entails following BUSH CLEARING, Foundations, Tower Earthing, Erecting of Structures, Stay Rod assemblies, Dressing, Documentation, LABELLING, STRINGING and REGULATION. Dismantle the following items and remove from site Steel poles including foundations and Conductor including hardware. Lowering of earthwire attachment point for Zeerust line(lower earthwire on lattice structure to correct Zeerust line clearance).

#### **1. Contractor's fixed-charge items:**

Contractual requirements must include following Establishment of construction camp, Establishment of facilities in construction camp such as plant, sheds, water, electricity, lighting, etc. Other fixed-charges (Specify) must include Establishment of construction plant and Removal of site establishment, etc.

#### **2. Contractor's time related items:**

Contractual requirements must include following Operation & maintenance of facilities, Supervision, Company & head office overhead costs. Other (Specify) must include 1) Accommodation, Personnel transport and Cost of water supply for construction purposes, etc.

#### **3. Contractor's expenses regarding Health and Safety**

Contractor's cost to comply to the Construction Regulation (Volume 5, Annexure F) and the Health and Safety Specification (Volume 5, Annexure E). Cost for workers to undergo safety and induction programs for the purpose to work on the property where necessary. Cost to comply to the Environmental management Plan.

#### **4. Test Joint**

Supply all material and perform tests at an approved body as indicated below. Refer to Volume-4 for the required material. Should the Test Joint fail, the Contractor will re-test at his own cost. Before construction commences, the crimper/s to be used on the line shall be used to crimp the test pieces by an authorised person who shall perform joints on the line. This must be witnessed by Eskom Clerk of Works/construction site supervisor and test certificates to be provided as part of the Hand Over Documentation. Supply all material and test complete Kingbird assembly in accordance with Eskom technical bulletin 04TB-040. Supply all material and test complete Wolf assembly in accordance with Eskom technical bulletin 04TB-040. Supply all material and test complete 19/2.65 wire stay assembly to 115kN

#### **5. BUSH CLEARING**

Bush clearing needed and quote to do bush clearing on the whole line in accordance with the standard as identify the extent by Project Engineer. Install Farm Gates (for fences crossed by line) if required and agreed with project engineer.

#### **6. LINE CONSTRUCTION OF FOUNDATIONS**

Note: Costs are based on Soil type 3 for quotation purposes. Contractor invoices must be based on the foundation soil nomination done by the civil engineer. Soil nominations to be confirmed by the contractor and Project manager to be immediately consulted should the excavation vary from the nomination done by the geotechnical engineer. Excavate, barricade, supply and transport to pole position imported material, dispose excavated material, supply, and install complete foundation. Nominations of foundation types to be done on site by Civil Engineer. Civil Engineer to specify which of the foundation types must be used for each structure. Note: Design calculations are done on 120% of the structures (80% type 3, 20% rock). Nomination of foundation type as determined by registered civil engineer and signed off by him/her in Volume 5, Annexure D, Construction Report.

Excavate, barricade, dispose of excavated material, transport to pole position imported material, supply and install complete foundations for soil type 2 on the following structures:

- Intermediate 3 pole Structures D-DT-7617 and D-DT-7850s2 "Pole, St 132kV Int 3 pole 16m,18m,16m 23kN (Bottom Att 13.4 m) foundation.
- Intermediate 3 pole Structures D-DT-7617 and D-DT-7850s2 Pole "Pole, St 132kV Int 3 pole 18m,20m,18m 23kN (Bottom Att 15.8 m) foundation"
- Stayed Strain Planted Structures D-DT-7618 (2x7618c and 1x7618d) "D-DT-7851s3" "Pole, St 132kV Str 3 pole 16m,18m,16m 23kN (Bottom Att 13.4 m) foundation"
- Stayed Strain Planted Structures D-DT-7618 (2x7618c and 1x7618d) "D-DT-7851s3" "Pole, St 132kV Str 3 pole 20m,22m,20m 23kN (Bottom Att 17.4 m) foundation"
- Self support Strain Structures (non-stock items) "D-WC-7602s2" "Pole, St 132kV Strain (2 degrees 18 m) (Bottom Att 11 m) self support foundation"
- Self support Strain Structures (non-stock items) "D-WC-7602s2" "Pole, St 132kV Strain (45 degrees 18 m) (Bottom Att 11 m) self support foundation"
- Self support Strain Structures (non-stock items) "D-WC-7602s2" "Pole, St 132kV Strain (90 degrees 18 m) (Bottom Att 11 m) self support foundation"
- Self support Strain Structures (non-stock items) "D-WC-7602s2" "Pole, St 132kV Str 3 pole 16m,18m,16m 23kN (Bottom Att 13.4 m) foundation"

## **7. LINE CONSTRUCTION TOWER EARTHING:**

Supply, install and bond tower earthing for the following structures:

- Boulder excavation - Class A
- Test footing resistance and share results with Engineer before installing the TPS(refer SCSASABF9)
- Excavate, supply and install complete 3 point star earth electrode (incl. rocky terrain). Please note that this item is a re-measurable based on footing resistance results(refer "D-DT-0642" )
- Bond the Terminal structures to the substation earth mat by using 50 x 3mm flat Cu strap buried 1m deep, including excavation, supply, installation and backfilling(refer SCSASABF9).

## **8. LINE CONSTRUCTION ERECTING OF STRUCTURES**

NOTE: The cost to supply the structures should include the cost to design the structures in accordance with 0501KR-01 rev 1. CIS or Structurecom can be approached for this. The design and full set of drawings to be submitted to the Engineer 2 weeks after the contract award. Assemble and erect the steel pole for the following structures at specified positions,

including backfilling. Costs to include the connection of the stay wire to the stay rod assembly for the strain structures:

- Intermediate 3 pole Structures D-DT-7617 D-DT-7617"Pole, St 132kV Int 3 pole 16m,18m,16m 23kN(Bottom Att 13.4 m) "
- Intermediate 3 pole Structures D-DT-7617 D-DT-7617"Pole, St 132kV Int 3 pole 18m,20m,18m 23kN (Bottom Att 15.8m) "
- Stayed Strain Planted Structures D-DT-7618 (2x7618c and 1x7618d) "D-DT-7618" "Pole, St 132kV Str 3 pole 16m,18m,16m 23kN (Bottom Att 13.4 m) "
- Stayed Strain Planted Structures D-DT-7618 (2x7618c and 1x7618d) "D-DT-7618" "Pole, St 132kV Str 3 pole 20m,22m,20m 23kN(Bottom Att 17.4 m) "
- Self support Strain Structures (non-stock items) strsce0218kw110 "Pole, St 132kV Strain (2 degrees 18 m) (Bottom Att 11 m) self support "
- Self support Strain Structures (non-stock items) strsce4518kw110 "Pole, St 132kV Strain (45 degrees 18 m) (Bottom Att 11 m) self support "
- Self support Strain Structures (non-stock items) strsce9018kw110 "Pole, St 132kV Strain (90 degrees 18 m) (Bottom Att 11 m) self support "
- Self support Strain Structures (non-stock items) str3psce3518kw158 "Pole, St 132kV Str 3 pole 16m,18m,16m 23kN(Bottom Att 15.8 m) "

## 9. LINE CONSTRUCTION STAY ROD ASSEMBLIES

Proof Load Testing of Stays: Contractor to do proof load test on a sample of stays. Contractor to supply proof loading specification (approved by professional engineer) to the Project Engineer 2 weeks after contract award. Proof load testing of 19/2.65 permanent stay assemblies. The soil types for each stay position shall be nominated by a professional civil engineer or suitably qualified person in accordance with DSP-34-1657 Please Note: Stays based Type 3 soil. Installation of 113kN, 19/2.65 stay rod assemblies:

- "D-DT-7325s2" Excavate and transport imported material, barricade and dispose of excavated material, supply & install complete stay rod assembly for type 2 soil.

## 10. LINE CONSTRUCTION DRESSING

**\*\*ESKOM SHALL SUPPLY INSULATORS AND CONDUCTOR ONLY. THE CONTRACTOR SHALL SUPPLY ALL OTHER MATERIAL. ALL MATERIAL TO BE IN ACCORDANCE WITH THE RELEVANT ESKOM STANDARDS AND SPECIFICATIONS. ONLY ESKOM APPROVED SUPPLIERS TO BE UTILISED\*\***

Dressing must include the supply, transport to specific pole position and installation of complete hardware assemblies including shieldwire hardware and bird perching brackets for the following structures:

- Intermediate 3 pole Structures D-DT-7617, D-DT-7321 & 2NT 627 "Pole, St 132kV Int 3 pole 16m,18m,16m 23kN(Bottom Att 13.4 m) foundation"
- Intermediate 3 pole Structures D-DT-7617, D-DT-7321 & 2NT 627 "Pole, St 132kV Int 3 pole 18m,20m,18m 23kN(Bottom Att 15.2 m) foundation"
- Stayed Strain Planted Structures D-DT-7618 (2x7618c and 1x7618d), "D-DT-7311 & D-DT-7321 & 2WT 1421-1" "Pole, St 132kV Str 3 pole 16m,18m,16m 23kN(Bottom Att 13.4 m) foundation"
- Stayed Strain Planted Structures D-DT-7618 (1x7618d), "D-DT-7311 & D-DT-7321 & 2WT 1421-1" "Pole, St 132kV Str 3 pole 20m,22m,20m 23kN(Bottom Att 17.4 m) foundation"

- Self support Strain Structures (non-stock items), "D-DT-7311 & D-DT-7321 & 2WT 1421-1" "Pole, St 132kV Strain (2 degrees 18 m)(Bottom Att 11 m) self support foundation"
- Self support Strain Structures (non-stock items), "D-DT-7311 & D-DT-7321 & 2WT 1421-1" "Pole, St 132kV Strain (45 degrees 18 m)(Bottom Att 11 m) self support foundation"
- Self support Strain Structures (non-stock items), "D-DT-7311 & D-DT-7321 & 2WT 1421-1" "Pole, St 132kV Strain (90 degrees 18 m)(Bottom Att 11 m) self support foundation"
- Self support Strain Structures (non-stock items), "D-DT-7311 & D-DT-7321 & 2WT 1421-1" "Pole, St 132kV Str 3 pole 16m,18m,16m 23kN(Bottom Att 13.4 m) foundation"

## 11. LINE CONSTRUCTION DOCUMENTATION

Complete all parts of the Construction Handbook that applies to the construction of the line (Volume 5, Annexure D)

## 12. LINE CONSTRUCTION STRINGING and REGULATION

### 12.1. STRINGING

**"Please Note:** Phase conductor shall be ordered by Eskom.

**Please Note:** Contractor to ensure the necessary strength and size of Pilot wire for the purpose of stringing. Cost to include temporary stays required for stringing purposes."

String the following (length is for all three phases) in according to refer TRMSCAAC1:

- Phase conductor - Single Kingbird
- Closing spans - Single Kingbird
- shield wire - wolf conductor

### 12.2. Line and Road Crossings

"Prepare temporary structures and do stringing for the following type of crossings refer TRMSCAAC1:

- Allow for all HV and MV lines, roads, telcom, rail, etc. crossing as per the profile"

### 12.3. Joints

Supply and install the following compression joints refer D-ST-34 1207:

- Midspan joint - kingbird

### 12.4. Damage Repair

Install repair sleeves for damaged conductors:

- Mid span repair sleeve(refer D-ST-34 1207)

### 12.5. Making Off and Regulation

- D-ST-34 1207 Making off phase conductor - Kingbird

- D-ST-34 1207 Making off shield wire - wolf
- D-ST-34 1207 Regulating - Kingbird
- D-ST-34 1207 Regulating – wolf

#### **12.6. Clamping In**

- D-ST-34 1207 Clamping-in phase conductor Kingbird
- D-ST-34 1207 Clamping-in shield wire conductor wolf

#### **12.7. Vibration Dampers**

D-ST-34 1207 Supply and install asymmetrical dampers on the phase conductors as indicated in Volume 2

#### **13. LABELLING("ESKASAANO Rev 12-WT/1148")**

Pole Identification Labels(D-DT-5050 s1)Supply and install for:

- Pole identification label

#### **14. Phase Disks**

- D-DT-5050 s2 Supply and install on terminal structures
- Substation Terminal structure

#### **15. DISMANTLING**

Dismantle the following items and remove from site the following:

- Steel poles including foundations
- Conductor including hardware
- Lowering of earthwire attachment point(lower earthwire on lattice structure to correct Zeerust line clearance)