

# **Weza Power**

## **BIDDING DOCUMENT**

### **Supply and Installation**

RFB No: BR-VP-WEZA POWER-CW-2024-0001

Supply of MV and LV Line Hardwares, Installation  
and commissioning of MV and LV Lines, Service  
Connection

**Project ASCENT / Weza Power Pilot Project**

**Employer Requirement**

**Volume 2 of 2: Technical Specification**

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## List of Terms and Acronyms

ABC	Aerial Bundled Cable
ACSR	Aluminum Conductor Steel Reinforced
AR	Autorecloser
EIA	Environmental Impact Assessment
GW	Ground Wire
HV	High Voltage
LV	Low Voltage
MCB	Miniature Circuit Breaker
MCCB	Molded Case Circuit Breaker
MV	Medium Voltage
QA	Quality Assurance
O&M	Operation and Maintenance
OH	Overhead
P/S	Power station
S/S	Substation
UG	Underground

## **1 Overview**

### **1.1 Objective**

The design of this project introduces new implementation arrangements to connect at once a set of new customers in a specific area within the peri-urban location aiming to avoid the piecemeal approach that connects each individual household once an individual application is made. This will optimize on procurement of materials in bulk and arrangements to carry out all construction networks hence will maximize the resources and efficiently implement the project with the expectation to reduce cost and reach more customers.

This document is intended to specify the minimum requirements for the detailed design and construction of distribution networks to be carried out by the Contractor under the supervision of Weza Power (Employer). It is not intended to be all-inclusive and may be supplemented as required by practices formulated for specific locations and conditions. The scope of work, datasheets, special and general specifications constitute the complete technical specifications and must be read as a whole.

The Tendering Procedures will be those of a functional procurement, with basic requirements given in this document to be fulfilled by the Bidder.

### **1.2 Project Scope**

The project works for this assignment is divided into 4 Lots; it consists of a supply of MV and LV lines hardware, installation of MV and LV Lines, installation of distribution transformers, and service connection.

The contractor shall be responsible for the following activities:

- The detailed design of the facilities in accordance with the preliminary design included herein, and documentation of units to be installed on staking sheet forms provided by Employer.
- Procurement of those materials not specifically stated as supplied by Employer (mostly line Accessories items).
- Arrange for necessary line clearances and work permits to allow for the installation of project facilities.
- Comply with the terms of any work permits or clearances, including limitations on switching activities.
- Leave facilities in such a condition that service can be restored in accordance with the terms of a work permit or clearance.
- Install all required units necessary to establish a properly functioning system, in accordance with the unit drawings.
- Acquisition and maintenance in force of insurance according to the Conditions of Contract
- Establishment and operation of sites during the construction and defect liability period
- All designs necessary for approval and implementation of the Works including inspections of the sites in order to carry out a detailed design of the Works
- Site surveys and soil investigation, including reporting
- All works necessary for a functional installation
- Liaise with the Employer or their designee during site visits and inspections of the Works
- Co-ordination of the Contract and the Works
- Acceptance Tests and reporting from these tests

- Testing of the Works (commissioning)
- Submission of As-Built drawings and geo-referenced list of connections

Each of the said Lot will be signed as a separate works contract as detailed below:

**Lot 1: Bubanza Province\_ Gahongore Substation.**

**Material to be Supplied by the Bidder and other Services – Bubanza Province\_ Gahongore Substation**

**Supply of complete distribution network materials and accessories, etc**

Item	Designation	Code 1	Unit	Qty.
	<b>30 kV DISTRIBUTION LINES</b>			
<b>A</b>	<b>MV Structures</b>			
A001	30 kV Tangent Assembly 0-5 deg	ZC1	Nos	775.00
A002	30 kV Angle Assembly 5 -20 deg	ZC2	Nos	593.00
A003	30 kV Suspension Angle Assembly 20 - 60 deg	ZC3	Nos	119.00
A004	30 kV Dead End Angle Assembly 60 - 90 deg	ZC4 or DZC7	Nos	238.00
A005	30 kV Dead End Terminal Assembly	ZC7	Nos	400.00
A006	30 kV Dead End Terminal Assembly(Tension Dog Conductor)	ZC7-1	Nos	75.00
A006	30 kV Line Double Deadend Assembly	ZC8	Nos	64.00
A007	30 kV T-Off Assembly Single Pole	ZM29-2	Nos	55.00
A008	30 kV Line Sectionalizer Assembly	ZM3-3	Nos	55.00
<b>B</b>	<b>MV Stays and Strud Pole Assembly</b>			
B001	Single Down Guy Assembly (complete stay)	E 1-2, F2	Nos	356.00
B002	Single Down Guy Assembly (complete stay)	E 1-2S, F2	Nos	1,245.00
B003	Overhead Guy assembly (complete overhead stay)	E 2-2, F2	Nos	178.00
<b>C</b>	<b>Transformer Structures</b>			
C001	30/0.415 kV Accessories for 3 Phase Transformer Structure-Single Pole (Transformer to be supplied by WEZA Power)	ZG3	Nos	29.00
C002	30/0.24 kV Accessories for 1 Phase Transformer Structure Single Pole (Transformer to be supplied by Weza Power)	ZG2	Nos	102.00
C003	30/0.24 kV Accessories for 1 Phase Transformer Structure Single Pole (Transformer to be supplied by Weza Power)	ZG2	Nos	333.00
<b>E</b>	<b>0.4 kV LOW VOLTAGE NETWORK LV Structures complete</b>			
E001	LV Tangent up to 30 Degrees Assembly	J10	Nos	2,425.00
E002	LV Strain Angle Assembly 30-60 deg	J12	Nos	485.00
E003	LV Strain Angle Assembly 60-90 deg	J13	Nos	485.00
E004	LV Phase Cross Intermediate strain Assembly	J15	Nos	243.00

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E005	LV Phase ABC T-Off Assembly	J17	Nos	243.00
E006	LV Phase Dead End ABC Assembly	J19	Nos	970.00
<b>F</b>	<b>LV Stay and Strut Structures Complete</b>			
F001	Single Down Guy Assembly (complete stay)	E1-1. F1	Nos	1,528.00
F002	Single Down Guy Assembly (complete stay)	E1-1s. F1	Nos	655.00
F003	Overhead Guy assembly (complete overhead stay)	E1-2, F1	Nos	219.00
<b>G</b>	<b>LV Distribution Boards Complete as per Specification</b>			
G001	30/0.415 kV 100A 3P Main Breaker (for 50kVA Trf) Transformer Distribution Board and Accessories	TBB3	Nos	29.00
G002	30/0.24 kV 100A 1P Main Breaker (for 25kVA Trf) Transformer Distribution Board and Accessories	TBB1	Nos	102.00
G003	30/0.24 kV 100A 1P Main Breaker (for15kVA Trf) Transformer Distribution Board and Accessories	TBB1	Nos	333.00
<b>H</b>	<b>Additional Accessories for Service Connection</b>			
H001	ABC-1 Phase Service Drop Fittings	K11	Set	9,166.00
H002	ABC-3 Phase Service Drop Fittings	K13	Set	29.00
<b>M</b>	<b>General items</b>	<b>M</b>		
M001	4WD Double Cabin Pick-up		Nos	2.00

**Material to be Installed by the Bidder – Bubanza Province\_ Gahongore Substation**

Item	Designation		Unit	
	<b>30 kV DISTRIBUTION LINES</b>			
<b>A</b>	<b>MV Poles: Planting including Excavation and Backfill</b>			
A001	Wooden / Steel / Concrete Pole 12 mdismantling & return to Weza Power		Nos	351.00
A002	Wooden / Steel / Concrete Pole 12 mtop			2,371.00
A003	Wooden / Steel / Concrete Pole 12 m 220mm top			
<b>B</b>	<b>MV Structures complete</b>			
B001	30 kV Tangent Assembly 0-5 deg	ZC1	Nos	775.00
B002	30 kV Angle Assembly5 -20 deg	ZC2	Nos	593.00
B003	30 kV Suspension Angle Assembly 20 - 60 deg	ZC3	Nos	119.00
B004	30 kV Dead End Angle Assembly 60 - 90 deg	ZC4 or DZC7	Nos	238.00
B005	30 kV Dead End Terminal Assembly	ZC7	Nos	400.00
B006	31 kV Dead End Terminal Assembly(Tension Dog Conductor)	ZC7-1	Nos	75.00
B007	30 kV Line Double Deadnend Assembly	ZC8	Nos	64.00
B008	30 kV T-Off Assembly Single Pole	ZM29-2		55.00
B009	30 kV Line sectionalizer Assembly	ZM3-3	Nos	55.00
<b>C</b>	<b>MV Stays</b>			
C001	Single Down Guy Assembly (complete stay)	E 1-2, F2	Nos	356.00
C002	Overhead Guy assembly (complete overhead stay)	E 1-2S, F2	Nos	1,245.00
C003	Structure pole Assembly	E 2-2, F2	Nos	178.00
<b>D</b>	<b>MV Conductors Installed and Tensioned</b>			
D001	Bare ACSR 100mm <sup>2</sup> , 6/1, Code Dog		Km	28.26
D002	Bare ACSR 50mm <sup>2</sup> , 6/1, Code Rabbit		Km	39.09

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D003	Bare ACSR 25 mm <sup>2</sup> , 6/1, Code Gopher		Km	123.83
	<b>Transformer Structures</b>			-
<b>E</b>	<b>Complete Transformer Structures (including all items not separately mentioned in this schedule as per the attached drawings)</b>			
E001	30 kV 3 Phase Transformer Structure 50kVA Single Pole	ZG3	Nos	29.00
E002	30 kV 1- Phase Transformer Structure 25kVA Single Pole	ZG2		102.00
E003	31 kV 1- Phase Transformer Structure 15kVA Single Pole	ZG2		333.00
<b>F</b>	<b>Transformers</b>			
F001	33/0.415kV Transformer 50kVA		Nos	29.00
F002	30/0.24kV Transformer 25kVA			102.00
F003	30/0.24kV Transformer 15kVA			333.00
<b>G</b>	<b>LV Distribution Boards Complete as per Specification</b>			
G001	Board with 100A 3P Main Breaker (75kVA Trf)	TBB3	Nos	29.00
G002	Board with 100A 1P Main Breaker (25kVA Trf)	TBB1		101.00
G003	Board with 100A 1P Main Breaker (15kVA Trf)	TBB1		331.00
	<b>LOW VOLTAGE NETWORK</b>			
<b>H</b>	<b>Poles: Planting including excavation and Backfill</b>			
H001	9m Wooden / Steel / Concrete Poles		Nos	5,943.73
<b>I</b>	<b>LV Structures complete</b>			
I001	LV Tangent up to 30 Degrees Assembly	J10	Nos	2,425.00
I002	LV Strain Angle Assembly 30-60 deg	J12	Nos	485.00
I003	LV Strain Angle Assembly 60-90 deg	J13	Nos	485.00
I004	LV Phase Cross Intermediate strain Assembly	J15	Nos	243.00
I005	LVPhase ABC T-Off Assembly	J17	Nos	243.00
I006	LVPhase Dead End ABC Assembly	J19	Nos	970.00
<b>J</b>	<b>LV Stay and Strut Structures Complete</b>			
J001	Single Down Guy Assembly (complete stay)	E1-1. F1	Nos	1,528.00
J002	Overhead Guy assembly (complete overhead stay)	E1-1s. F1	Nos	655.00
J003	Structure pole Assembly	E1-2, F1	Nos	219.00
<b>K</b>	<b>LV Conductors ( ABC)</b>			
K001	600V ABC Cable 4x50mm <sup>2</sup>		Km	29.65
K002	600V ABC Cable 2x50mm <sup>2</sup>		Km	227.83
<b>M</b>	<b>LV Service connections complete (Service cables to be supplied by Weza Power)</b>			
M001	ABC-1 Phase Service Drop Fittings	K11	Nos	9,166.00
M002	ABC-3 Phase Service Drop Fittings	K13	Nos	29.00
M004	Installation of ABC 2X10 for Single phase service drops	SVC1	Nos	9,166.00
M005	Installation of ABC 4X16 for three phase service drops	SVC3	Nos	29.00
<b>N</b>	<b>Metering</b>			
N001	Single phase meter, prepaid		Nos	9,166.00
N002	Three phase meters, prepaid		Nos	29.00
<b>O</b>	<b>General items</b>			-



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O001	Site Establishment and provision of Facilities as per the Specifications		Lot	1.00
O002	Survey and Pegging of MV and LV lines		Lot	1.00
O003	General Bush Clearing for Distribution Lines		Lot	1.00
<b>P</b>	<b>Commissioning and Testing on Site</b>			
P001	Commissioning and Testing 30 kV Network		Lot	1.00
P002	Commissioning and Testing PMTs		Lot	1.00
P003	Commissioning and Testing 0.4 kV Network		Lot	1.00

**Lot 1: Bubanza Province\_ Gahongore Substation Summary Scope**

Lot Name	Location	Summary of Scope of Work			Completi on Period
<b>01</b>	Bubanza Province (1 No. Warehouse In Bubanza Province_ Gahongore Substation)	Reconstruction of 30 kV Line, including supply of MV Accessories;	km	28.26	
		Construction of 30 kV Line, including supply of MV Accessories;	km	171.50	
		Construction of 81 km of LV (0.4KV) Lines, including supply of LV Accessories;	km	244	8 months
		Installation of pole-mounted distribution transformers;	Nos.	464	
		Connection of household (AB Cable 2X10mm <sup>2</sup> and AB Cable 4X16mm <sup>2</sup> will be supplied by Weza Power	Nos	9,195	
		Supply of 2 Double Cabin Pick-up	Nos.	2	

**Lot 2: Musasa Province \_ Musasa Substation**

**Material to be Supplied by the Bidder and other Services – Musasa Province \_ Musasa Substation**

**Supply of complete distribution network materials and accessories, etc.**

Item	Designation	Code 1	Unit	Qty.
	<b>30 kV DISTRIBUTION LINES</b>			
<b>A</b>	<b>MV Structures</b>			
A001	30 kV Tangent Assembly 0-5 deg	ZC1	Nos	1,039.00
A002	30 kV Angle Assembly 5 -20 deg	ZC2	Nos	781.00
A003	30 kV Suspension Angle Assembly 20 - 60 deg	ZC3	Nos	157.00
A004	30 kV Dead End Angle Assembly 60 - 90 deg	ZC4 or DZC7	Nos	313.00

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Item	Designation	Code 1	Unit	Qty.
A005	30 kV Dead End Terminal Assembly	ZC7	Nos	550.00
A006	31 kV Dead End Terminal Assembly(Tension Dog Conductor)	ZC7-1	Nos	75.00
A006	30 kV Line Double Deadend Assembly	ZC8	Nos	102.00
A007	30 kV T-Off Assembly Single Pole	ZM29-2	Nos	55.00
A008	30 kV Line Sectionalizer Assembly	ZM3-3	Nos	55.00
<b>B</b>	<b>MV Stays and Strud Pole Assembly</b>			
B001	Single Down Guy Assembly (complete stay)	E 1-2, F2	Nos	469.00
B002	Single Down Guy Assembly (complete stay)	E 1-2S, F2	Nos	1,640.00
B003	Overhead Guy assembly (complete overhead stay)	E 2-2, F2	Nos	235.00
<b>C</b>	<b>Transformer Structures</b>			
C001	30/0.415 kV Accessories for 3 Phase Transformer Structure-Single Pole (Transformerto be supplied by Weza Power)	ZG3	Nos	30.00
C002	30/0.24 kV Accessories for 1 Phase Transformer Structure Single Pole (Transformer to be supplied by Weza Power)	ZG2	Nos	105.00
C003	30/0.24 kV Accessories for 1 Phase Transformer Structure Single Pole (Transformerto be supplied by Weza Power)	ZG2	Nos	393.00
<b>E</b>	<b>0.4 kV LOW VOLTAGE NETWORK LV Structures complete</b>			-
E001	LV Tangent up to 30 Degrees Assembly	J10	Nos	3,717.00
E002	LVStrain Angle Assembly 30-60 deg	J12	Nos	744.00
E003	LV Strain Angle Assembly 60-90 deg	J13	Nos	744.00
E004	LV Phase Cross Intermediate strain Assembly	J15	Nos	372.00
E005	LVPhase ABC T-Off Assembly	J17	Nos	372.00
E006	LVPhase Dead End ABC Assembly	J19	Nos	1,487.00
<b>F</b>	<b>LV Stay and Strut Structures Complete</b>			
F001	Single Down Guy Assembly (complete stay)	E1-1. F1	Nos	3,372.00
F002	Single Down Guy Assembly (complete stay)	E1-1s. F1	Nos	-
F003	Overhead Guy assembly (complete overhead stay)	E1-2, F1	Nos	372.00
<b>G</b>	<b>LV Distribution Boards Complete as per Specification</b>			
G001	30/0.415 kV 100A 3P Main Breaker (for 50kVA Trf) Transformer Distribution Board and Accessories	TBB3	Nos	30.00
G002	30/0.24 kV 100A 1P Main Breaker (for 25kVA Trf) Transformer Distribution Board and Accessories	TBB1	Nos	105.00
G003	30/0.24 kV 100A 1P Main Breaker (for15kVA Trf) Transformer Distribution Board and Accessories	TBB1	Nos	393.00
<b>H</b>	<b>Additional Accessories for Service Connection</b>			
H001	ABC-1 Phase Service Drop Fittings	K11	Set	10,831.00
H002	ABC-3 Phase Service Drop Fittings	K13	Set	30.00
<b>M</b>	<b>General items</b>	<b>M</b>		
M001	4WD Double Cabin Pick-up		Nos	2.00

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Item	Designation	Code 1	Unit	Qty.
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**Material to be Installed by the Bidder –Musasa Province \_ Musasa Substation**

Item	Designation		Unit	
	<b>30 kV DISTRIBUTION LINES</b>			
<b>A</b>	<b>MV Poles: Planting, including Excavation and Backfill</b>			
A001	Wooden / Steel / Concrete Pole 12 mdismantling & return to Weza Power		Nos	891.00
A002	Wooden / Steel / Concrete Pole 12 mtop			3,155.00
A003	Wooden / Steel / Concrete Pole 12 m 220mm top			
<b>B</b>	<b>MV Structures complete</b>			
B001	30 kV Tangent Assembly 0-5 deg	ZC1	Nos	1,039.00
B002	30 kV Angle Assembly5 -20 deg	ZC2	Nos	781.00
B003	30 kV Suspension Angle Assembly 20 - 60 deg	ZC3	Nos	157.00
B004	30 kV Dead End Angle Assembly 60 - 90 deg	ZC4 or DZC7	Nos	313.00
B005	30 kV Dead End Terminal Assembly	ZC7	Nos	550.00
B006	31 kV Dead End Terminal Assembly(Tension Dog Conductor)	ZC7-1	Nos	75.00
B007	30 kV Line Double Deadnend Assembly	ZC8	Nos	102.00
B008	30 kV T-Off Assembly Single Pole	ZM29-2		55.00
B009	30 kV Line Sectionalizer Assembly	ZM3-3	Nos	55.00
<b>C</b>	<b>MV Stays</b>			
C001	Single Down Guy Assembly (complete stay)	E 1-2, F2	Nos	469.00
C002	Overhead Guy assembly (complete overhead stay)	E 1-2S, F2	Nos	1,640.00
C003	Structure pole Assembly	E 2-2, F2	Nos	235.00
<b>D</b>	<b>MV Conductors Installed and Tensioned</b>			
- D001	Bare ACSR 100mm <sup>2</sup> , 6/1, Code Dog		Km	71.84
D002	Bare ACSR 50mm <sup>2</sup> , 6/1, Code Rabbit		Km	23.87
D003	Bare ACSR 25 mm <sup>2</sup> , 6/1, Code Gopher		Km	156.19
	<b>Transformer Structures</b>			-
<b>E</b>	<b>Complete Transformer Structures (including all items not separately mentioned in this schedule as per the attached drawings)</b>			
E001	30 kV 3 Phase Transformer Structure 50kVA Single Pole	ZG3	Nos	30.00
E002	30 kV 1- Phase Transformer Structure 25kVA Single Pole	ZG2		105.00
E003	31 kV 1- Phase Transformer Structure 15kVA Single Pole	ZG2		393.00
<b>F</b>	<b>Transformers</b>			
F001	33/0.415kV Transformer 50kVA		Nos	30.00
F002	30/0.24kV Transformer 25kVA		Nos	105.00
F003	30/0.24kV Transformer 15kVA		Nos	393.00
<b>G</b>	<b>LV Distribution Boards Complete as per Specification</b>			
G001	Board with 100A 3P Main Breaker (75kVA Trf)	TBB3	Nos	30.00
G002	Board with 100A 1P Main Breaker (25kVA Trf)	TBB1	Nos	105.00
G003	Board with 100A 1P Main Breaker (15kVA Trf)	TBB1	Nos	393.00
	<b>0.4 kV LOW VOLTAGE NETWORK</b>			

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Item	Designation	Code 1	Unit	Qty.
<b>H</b>	<b>Poles: Planting, including excavation and Backfill</b>			
H001	9m Wooden / Steel / Concrete Poles		Nos	9,069
<b>I</b>	<b>LV Structures complete</b>			-
I001	LV Tangent up to 30 Degrees Assembly	J10	Nos	3,717.00
I002	LV Strain Angle Assembly 30-60 deg	J12	Nos	744.00
I003	LV Strain Angle Assembly 60-90 deg	J13	Nos	744.00
I004	LV Phase Cross Intermediate strain Assembly	J15	Nos	372.00
I005	LV Phase ABC T-Off Assembly	J17	Nos	372.00
i006	LV Phase Dead End ABC Assembly	J19	Nos	1,487.00
<b>J</b>	<b>LV Stay and Strut Structures Complete</b>			
J001	Single Down Guy Assembly (complete stay)	E1-1. F1	Nos	3,372.00
J002	Overhead Guy assembly (complete overhead stay)	E1-1s. F1	Nos	-
J003	Structure pole Assembly	E1-2, F1	Nos	372.00
<b>K</b>	<b>LV Conductors ( ABC)</b>			
K001	600V ABC Cable 4x50mm2		Km	31.
K002	600V ABC Cable 2x50mm2		Km	363.
<b>M</b>	<b>LV Service connections complete (Service cables to be supplied by Weza Power)</b>			
M001	ABC-1 Phase Service Drop Fittings	K11	Nos	10,831.00
M002	ABC-3 Phase Service Drop Fittings	K13	Nos	30.00
M004	Installation of ABC 2X10 for Single phase service drops	SVC1	Nos	10,831.00
M005	Installation of ABC 4X16 for three-phase service drops	SVC3	Nos	30.00
<b>N</b>	<b>Metering</b>			
N001	Single phase meter, prepaid		Nos	10,831.00
N002	Three phase meter, prepaid		Nos	30.00
<b>O</b>	<b>General items</b>			-
O001	Site Establishment and provision of Facilities as per the Specifications		Lot	1.00
O002	Survey and Pegging of MV and LV lines		Lot	1.00
O003	General Bush Clearing for Distribution Lines		Lot	1.00
<b>P</b>	<b>Commissioning and Testing on Site</b>			-
P001	Commissioning and Testing 30 kV Network		Lot	1.00
P002	Commissioning and Testing PMTs		Lot	1.00
P003	Commissioning and Testing 0.4 kV Network		Lot	1.00

**Lot 2: Musasa Province \_ Musasa Substation Summary Scope**

Lot Name	Location	Summary of Scope of Work			Completion Period
2	Musasa Province (2 No. Warehouse In Musasa Province _ Musasa Substation)	Reconstruction of 30 kV Line including supply of MV Accessories;	km	71.84	8 months
		Construction of 30 kV Line, including supply of MV Accessories;	km	180.06	
		Construction of 81 km of LV (0.4KV) Lines including supply of LV Accessories;	km	371.63	
		Installation of pole mounted distribution transformers;	Nos.	528	
		Connection of households (AB Cable 2X10mm <sup>2</sup> and AB Cable 4X16mm <sup>2</sup> will be supplied by Weza Power	Nos	10,863	
		Supply of 2 Double Cabin Pick-up	Nos.	2	

### Lot 3: Ijenda \_ Sud Substation

#### Material to be Supplied by the Bidder and other Services – Ijenda \_ Sud Substation

#### Supply of complete distribution network materials and accessories, etc

Item	Designation	Code 1	Unit	Qty.
	<b>30 kV DISTRIBUTION LINES</b>			
<b>A</b>	<b>MV Structures</b>			
A001	30 kV Tangent Assembly 0-5 deg	ZC1	Nos	740.00
A002	30 kV Angle Assembly 5 -20 deg	ZC2	Nos	568.00
A003	30 kV Suspension Angle Assembly 20 - 60 deg	ZC3	Nos	114.00
A004	30 kV Dead End Angle Assembly 60 - 90 deg	ZC4 or DZC7	Nos	228.00
A005	30 kV Dead End Terminal Assembly	ZC7	Nos	380.00
A006	31 kV Dead End Terminal Assembly (Tension Dog Conductor)	ZC7-1	Nos	75.00
A006	30 kV Line Double Deadend Assembly	ZC8	Nos	59.00
A007	30 kV T-Off Assembly Single Pole	ZM29-2	Nos	55.00
A008	30 kV Line Sectionalizer Assembly	ZM3-3	Nos	55.00
<b>B</b>	<b>MV Stays and Strud Pole Assembly</b>			
B001	Single Down Guy Assembly (complete stay)	E 1-2, F2	Nos	341.00
B002	Single Down Guy Assembly (complete stay)	E 1-2S, F2	Nos	1,192.00
B003	Overhead Guy assembly (complete overhead stay)	E 2-2, F2	Nos	171.00
<b>C</b>	<b>Transformer Structures</b>			
C001	30/0.415 kV Accessories for 3 Phase Transformer Structure-Single Pole (Transformer to be supplied by Weza Power)	ZG3	Nos	31.00
C002	30/0.24 kV Accessories for 1 Phase Transformer Structure Single Pole (Transformer to be supplied by Weza Power)	ZG2	Nos	95.00

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C003	30/0.24 kV Accessories for 1 Phase Transformer Structure Single Pole (Transformer to be supplied by Weza Power)	ZG2	Nos	374.00
<b>E</b>	<b>0.4 kV LOW VOLTAGE NETWORK LV Structures complete</b>			
E001	LV Tangent up to 30 Degrees Assembly	J10	Nos	2,540.00
E002	LV Strain Angle Assembly 30-60 deg	J12	Nos	508.00
E003	LV Strain Angle Assembly 60-90 deg	J13	Nos	508.00
E004	LV Phase Cross Intermediate strain Assembly	J15	Nos	254.00
E005	LV Phase ABC T-Off Assembly	J17	Nos	254.00
E006	LV Phase Dead End ABC Assembly	J19	Nos	1,016.00
<b>F</b>	<b>LV Stay and Strut Structures Complete</b>			
F001	Single Down Guy Assembly (complete stay)	E1-1. F1	Nos	1,600.00
F002	Single Down Guy Assembly (complete stay)	E1-1s. F1	Nos	686.00
F003	Overhead Guy assembly (complete overhead stay)	E1-2, F1	Nos	229.00
<b>G</b>	<b>LV Distribution Boards Complete as per Specification</b>			
G001	30/0.415 kV 100A 3P Main Breaker (for 50kVA Trf) Transformer Distribution Board and Accessories	TBB3	Nos	31.00
G002	30/0.24 kV 100A 1P Main Breaker (for 25kVA Trf) Transformer Distribution Board and Accessories	TBB1	Nos	95.00
G003	30/0.24 kV 100A 1P Main Breaker (for 15kVA Trf) Transformer Distribution Board and Accessories	TBB1	Nos	374.00
<b>H</b>	<b>Additional Accessories for Service Connection</b>			
H001	ABC-1 Phase Service Drop Fittings	K11	Set	10,780.00
H002	ABC-3 Phase Service Drop Fittings	K13	Set	31.00
<b>M</b>	<b>General items</b>	<b>M</b>		
M001	4WD Double Cabin Pick-up		No s	2.00

**Material to be Installed by the Bidder – Ijenda \_ Sud Substation**

Item	Designation		Unit	
	<b>30 kV DISTRIBUTION LINES</b>			
<b>A</b>	<b>MV Poles: Planting including Excavation and Backfill</b>			
A001	Wooden / Steel / Concrete Pole 12 m dismantling & return to Weza Power		Nos	361.00
A002	Wooden / Steel / Concrete Pole 12 m top		Nos.	2,293.00
<b>B</b>	<b>MV Structures complete</b>			
B001	30 kV Tangent Assembly 0-5 deg	ZC1	Nos	740.00
B002	30 kV Angle Assembly 5 -20 deg	ZC2	Nos	568.00
B003	30 kV Suspension Angle Assembly 20 - 60 deg	ZC3	Nos	114.00
B004	30 kV Dead End Angle Assembly 60 - 90 deg	ZC4 or DZC7	Nos	228.00
B005	30 kV Dead End Terminal Assembly	ZC7	Nos	380.00
B006	31 kV Dead End Terminal Assembly (Tension Dog Conductor)	ZC7-1	Nos	75.00
B007	30 kV Line Double Dead-end Assembly	ZC8	Nos	59.00
B008	30 kV T-Off Assembly Single Pole	ZM29-2	Nos	55.00
B009	30 kV Line Sectionalizer Assembly	ZM3-3	Nos	55.00

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<b>C</b>	<b>MV Stays</b>			
C001	Single Down Guy Assembly (complete stay)	E 1-2, F2	Nos	341.00
C002	Overhead Guy assembly (complete overhead stay)	E 1-2S, F2	Nos	1,192.00
C003	Structure pole Assembly	E 2-2, F2	Nos	171.00
<b>D</b>	<b>MV Conductors Installed and Tensioned</b>			-
D001	Bare ACSR 100mm <sup>2</sup> , 6/1, Code Dog		Km	29.04
D002	Bare ACSR 50mm <sup>2</sup> , 6/1, Code Rabbit		Km	34.21
D003	Bare ACSR 25 mm <sup>2</sup> , 6/1, Code Gopher		Km	119.82
	<b>Transformer Structures</b>			-
<b>E</b>	<b>Complete Transformer Structures (including all items not separately mentioned in this schedule as per the attached drawings)</b>			
E001	30 kV 3 Phase Transformer Structure 50kVA Single Pole	ZG3	Nos	31.00
E002	30 kV 1- Phase Transformer Structure 25kVA Single Pole	ZG2	Nos	95.00
E003	31 kV 1- Phase Transformer Structure 15kVA Single Pole	ZG2	Nos	374.00
<b>F</b>	<b>Transformers</b>			
F001	30/0.415kV Transformer 50kVA		Nos	31.00
F002	30/0.24kV Transformer 25kVA		Nos	95.00
F003	30/0.24kV Transformer 15kVA		Nos	374.00
<b>G</b>	<b>LV Distribution Boards Complete as per Specification</b>			
G001	Board with 100A 3P Main Breaker (75kVA Trf)	TBB3	Nos	31.00
G002	Board with 100A 1P Main Breaker (25kVA Trf)	TBB1	Nos	95.00
G003	Board with 100A 1P Main Breaker (15kVA Trf)	TBB1	Nos	374.00
	<b>0.4 kV LOW VOLTAGE NETWORK</b>			
<b>H</b>	<b>Poles: Planting including excavation and Backfill</b>			
H001	9m Wooden / Steel / Concrete Poles		Nos	6,208.91
H002				
<b>I</b>	<b>LV Structures complete</b>			
I001	LV Tangent up to 30 Degrees Assembly	J10	Nos	2,540.00
I002	LV Strain Angle Assembly 30-60 deg	J12	Nos	508.00
I003	LV Strain Angle Assembly 60-90 deg	J13	Nos	508.00
I004	LV Phase Cross Intermediate strain Assembly	J15	Nos	254.00
I005	LV Phase ABC T-Off Assembly	J17	Nos	254.00
i006	LV Phase Dead End ABC Assembly	J19	Nos	1,016.00
<b>J</b>	<b>LV Stay and Strut Structures Complete</b>			
J001	Single Down Guy Assembly (complete stay)	E1-1. F1	Nos	1,600.00
J002	Overhead Guy assembly (complete overhead stay)	E1-1s. F1	Nos	686.00
J003	Structure pole Assembly	E1-2, F1	Nos	229.00
<b>K</b>	<b>LV Conductors ( ABC)</b>			
K001	600V ABC Cable 4x50mm <sup>2</sup>		Km	27.36
K002	600V ABC Cable 2x50mm <sup>2</sup>		Km	226.59

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<b>M</b>	<b>LV Service connections complete (Service cables to be supplied by Weza Power)</b>			
M001	ABC-1 Phase Service Drop Fittings	K11	Nos	10,779.00
M002	ABC-3 Phase Service Drop Fittings	K13	Nos	31.00
M004	Installation of ABC 2X10 for Single phase service drops	SVC1	Nos	10,779.00
M005	Installation of ABC 4X16 for three phase service drops	SVC3	Nos	31.00
<b>N</b>	<b>Metering</b>			
N001	Single phase meter, prepaid		Nos	10,779.00
N002	Three phase meter, prepaid		Nos	31.00
<b>O</b>	<b>General items</b>			-
O001	Site Establishment and provision of Facilities as per the Specifications		Lot	1.00
O002	Survey and Pegging of MV and LV lines		Lot	1.00
O003	General Bush Clearing for Distribution Lines		Lot	1.00
<b>P</b>	<b>Commissioning and Testing on Site</b>			
P001	Commissioning and Testing 30 kV Network		Lot	1.00
P002	Commissioning and Testing PMTs		Lot	1.00
P003	Commissioning and Testing 0.4 kV Network		Lot	1.00

**Lot 3: Ijenda \_ Sud Substation Summary Scope**

<b>Lot</b>	<b>Location</b>	<b>Summary of Scope of Work</b>			<b>Completion Period</b>
<b>03</b>	<b>Bujumbura Mairie</b>  (1 No. Warehouse In Bujumbura Mairie _ Sud Substation)	Reconstruction of 30 kV Line including supply of MV Accessories;	km	29.04	8 months
		Construction of 30 kV Line including supply of MV Accessories;	km	154.03	
		Construction of 81 km of LV (0.4KV) Lines including supply of LV Accessories;	km	253.95	
		Installation of pole mounted distribution transformers;	Nos.	500	
		Connection of households (AB Cable 2X10mm <sup>2</sup> and AB Cable 4X16mm <sup>2</sup> will be supplied by Weza Power	Nos	10,810	
		Supply of 2 Double Cabin Pick-up	Nos.	2	



**Lot 4: Gitega Province\_ Zege Substation****Material to be Supplied by the Bidder and other Services – Gitega Province\_ Zege Substation****Supply of complete distribution network materials and accessories, etc**

Item	Designation	Code 1	Unit	Qty.
	<b>30 kV DISTRIBUTION LINES</b>			
<b>A</b>	<b>MV Structures</b>			
A001	30 kV Tangent Assembly 0-5 deg	ZC1	Nos	1,158.00
A002	30 kV Angle Assembly 5 -20 deg	ZC2	Nos	867.00
A003	30 kV Suspension Angle Assembly 20 - 60 deg	ZC3	Nos	174.00
A004	30 kV Dead End Angle Assembly 60 - 90 deg	ZC4 or DZC7	Nos	347.00
A005	30 kV Dead End Terminal Assembly	ZC7	Nos	618.00
A006	31 kV Dead End Terminal Assembly (Tension Dog Conductor)	ZC7-1	Nos	75.00
A006	30 kV Line Double Deadend Assembly	ZC8	Nos	119.00
A007	30 kV T-Off Assembly Single Pole	ZM29-2	Nos	55.00
A008	30 kV Line sectionalizer Assembly	ZM3-3	Nos	55.00
<b>B</b>	<b>MV Stays and Strud Pole Assembly</b>			
B001	Single Down Guy Assembly (complete stay)	E 1-2, F2	Nos	520.00
B002	Single Down Guy Assembly (complete stay)	E 1-2S, F2	Nos	1,819.00
B003	Overhead Guy assembly (complete overhead stay)	E 2-2, F2	Nos	260.00
<b>C</b>	<b>Transformer Structures</b>			
C001	30/0.415 kV Accessories for 3 Phase Transformer Structure-Single Pole (Transformer to be supplied by Weza Power)	ZG3	Nos	31.00
C002	30/0.24 kV Accessories for 1 Phase Transformer Structure Single Pole (Transformer to be supplied by Weza Power)	ZG2	Nos	130.00
C003	30/0.24 kV Accessories for 1 Phase Transformer Structure Single Pole (Transformer to be supplied by Weza Power)	ZG2	Nos	412.00
<b>E</b>	<b>0.4 kV LOW VOLTAGE NETWORK LV Structures complete</b>			
E001	LV Tangent up to 30 Degrees Assembly	J10	Nos	2,992.00

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E002	LV Strain Angle Assembly 30-60 deg	J12	Nos	599.00
E003	LV Strain Angle Assembly 60-90 deg	J13	Nos	599.00
E004	LV Phase Cross Intermediate strain Assembly	J15	Nos	300.00
E005	LV Phase ABC T-Off Assembly	J17	Nos	300.00
E006	LV Phase Dead End ABC Assembly	J19	Nos	1,197.00
<b>F</b>	<b>LV Stay and Strut Structures Complete</b>			
F001	Single Down Guy Assembly (complete stay)	E1-1. F1	Nos	1,885.00
F002	Single Down Guy Assembly (complete stay)	E1-1s. F1	Nos	808.00
F003	Overhead Guy assembly (complete overhead stay)	E1-2, F1	Nos	270.00
<b>G</b>	<b>LV Distribution Boards Complete as per Specification</b>			
G001	30/0.415 kV 100A 3P Main Breaker (for 50kVA Trf) Transformer Distribution Board and Accessories	TBB3	Nos	31.00
G002	30/0.24 kV 100A 1P Main Breaker (for 25kVA Trf) Transformer Distribution Board and Accessories	TBB1	Nos	130.00
G003	30/0.24 kV 100A 1P Main Breaker (for15kVA Trf) Transformer Distribution Board and Accessories	TBB1	Nos	412.00
<b>E</b>	<b>Additional Accessories for Service Connection</b>			
E001	ABC-1 Phase Service Drop Fittings	K11	Set	10,751.00
H002	ABC-3 Phase Service Drop Fittings	K13	Set	31.00
<b>M</b>	<b>General items</b>	<b>M</b>		
M001	4WD Double Cabin Pick-up		Nos	2.00

**Material to be Installed by the Bidder – GitegaProvince\_ ZegeSubstation**

Item	Designation		Unit	
	<b>30 kV DISTRIBUTION LINES</b>			
<b>A</b>	<b>MV Poles: Planting including Excavation and Backfill</b>			
A001	Wooden / Steel / Concrete Pole 12 m dismantling & return to Weza Power		Nos	1,065.00
A002	Wooden / Steel / Concrete Pole 12 m top		Nos	3,499.00
<b>B</b>	<b>MV Structures complete</b>			
B001	30 kV Tangent Assembly 0-5 deg	ZC1	Nos	1,158.00
B002	30 kV Angle Assembly 5 -20 deg	ZC2	Nos	867.00
B003	30 kV Suspension Angle Assembly 20 - 60 deg	ZC3	Nos	174.00
B004	30 kV Dead End Angle Assembly 60 - 90 deg	ZC4 or DZC7	Nos	347.00
B005	30 kV Dead End Terminal Assembly	ZC7	Nos	618.00
B006	31 kV Dead End Terminal Assembly (Tension Dog Conductor)	ZC7-1	Nos	75.00
B007	30 kV Line Double Dead-end Assembly	ZC8	Nos	119.00

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B008	30 kV T-Off Assembly Single Pole	ZM29-2	Nos	55.00
B009	30 kV Line sectionalizer Assembly	ZM3-3	Nos	55.00
<b>C</b>	<b>MV Stays</b>			
C001	Single Down Guy Assembly (complete stay)	E 1-2, F2	Nos	520.00
C002	Overhead Guy assembly (complete overhead stay)	E 1-2S, F2	Nos	1,819.00
C003	Structure pole Assembly	E 2-2, F2	Nos	260.00
<b>D</b>	<b>MV Conductors Installed and Tensioned</b>			-
D001	Bare ACSR 100mm <sup>2</sup> , 6/1, Code Dog		Km	85.88
D002	Bare ACSR 50mm <sup>2</sup> , 6/1, Code Rabbit		Km	37.02
D003	Bare ACSR 25 mm <sup>2</sup> , 6/1, Code Gopher		Km	156.49
	<b>Transformer Structures</b>			
<b>E</b>	<b>Complete Transformer Structures (including all items not separately mentioned in this schedule as per the attached drawings)</b>			
E001	30 kV 3 Phase Transformer Structure 50kVA Single Pole	ZG3	Nos	31.00
E002	30 kV 1- Phase Transformer Structure 25kVA Single Pole	ZG2	Nos	130.00
E003	31 kV 1- Phase Transformer Structure 15kVA Single Pole	ZG2	Nos	412.00
<b>F</b>	<b>Transformers</b>			
F001	33/0.415kV Transformer 50kVA		Nos	31.00
F002	30/0.24kV Transformer 25kVA		Nos	130.00
F003	30/0.24kV Transformer 15kVA		Nos	412.00
<b>G</b>	<b>LV Distribution Boards Complete as per Specification</b>			
G001	Board with 100A 3P Main Breaker (75kVA Trf)	TBB3	Nos	31.00
G002	Board with 100A 1P Main Breaker (25kVA Trf)	TBB1	Nos	130.00
G003	Board with 100A 1P Main Breaker (15kVA Trf)	TBB1	Nos	412.00
	<b>0.4 kV LOW VOLTAGE NETWORK</b>			
<b>H</b>	<b>Poles: Planting including excavation and Backfill</b>			
H001	9m Wooden / Steel / Concrete Poles		Nos	7,372
<b>I</b>	<b>LV Structures complete</b>			
I001	LV Tangent up to 30 Degrees Assembly	J10	Nos	2,992.00
I002	LV Strain Angle Assembly 30-60 deg	J12	Nos	599.00
I003	LV Strain Angle Assembly 60-90 deg	J13	Nos	599.00
I004	LV Phase Cross Intermediate strain Assembly	J15	Nos	300.00
I005	LV Phase ABC T-Off Assembly	J17	Nos	300.00
i006	LV Phase Dead End ABC Assembly	J19	Nos	1,197.00

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<b>J</b>	<b>LV Stay and Strut Structures Complete</b>			
J001	Single Down Guy Assembly (complete stay)	E1-1. F1	Nos	1,885.00
J002	Overhead Guy assembly (complete overhead stay)	E1-1s. F1	Nos	808.00
J003	Structure pole Assembly	E1-2, F1	Nos	270.00
<b>K</b>	<b>LV Conductors ( ABC)</b>			
K001	600V ABC Cable 4x50mm <sup>2</sup>		Km	27.36
K002	600V ABC Cable 2x50mm <sup>2</sup>		Km	271.78
<b>M</b>	<b>LV Service connections complete (Service cables to be supplied by Weza Power)</b>			
M001	ABC-1 Phase Service Drop Fittings	K11	Nos	10,751.00
M002	ABC-3 Phase Service Drop Fittings	K13	Nos	31.00
M004	Installation of ABC 2X10 for Single phase service drops	SVC1	Nos	10,751.00
M005	Installation of ABC 4X16 for three phase service drops	SVC3	Nos	31.00
<b>N</b>	<b>Metering</b>			
N001	Single phase meter, prepaid		Nos	10,751.00
N002	Three phase meter, prepaid		Nos	31.00
<b>O</b>	<b>General items</b>			-
O001	Site Establishment and provision of Facilities as per the Specifications		Lot	1.00
O002	Survey and Pegging of MV and LV lines		Lot	1.00
O003	General Bush Clearing for Distribution Lines		Lot	1.00
<b>P</b>	<b>Commissioning and Testing on Site</b>			
P001	Commissioning and Testing 30 kV Network		Lot	1.00
P002	Commissioning and Testing PMTs		Lot	1.00
P003	Commissioning and Testing 0.4 kV Network		Lot	1.00

**Lot4: Gitega Province\_ Zege Substation Summary Scope**

<b>Lot Name</b>	<b>Location</b>	<b>Summary of Scope of Work</b>			<b>Completi on Period</b>
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<b>04</b>	<b>Gitega Province</b>  (4 No. Warehouse In <b>Gitega Province_ Zege Substation</b> )	Reconstruction of 30 kV Line including supply of MV Accessories;	km	85.88	8 months
		Construction of 30 kV Line including supply of MV Accessories;	km	193.50	
		Construction of 81 km of LV (0.4KV) Lines including supply of LV Accessories;	km	299.14	
		Installation of pole mounted distribution transformers;	Nos.	573	
		Connection of households (AB Cable 2X10mm <sup>2</sup> and AB Cable 4X16mm <sup>2</sup> will be supplied by Weza Power	Nos	10,782	
		Supply of 2 Double Cabin Pick-up	Nos.	2	

The Contract shall comprise of but is not limited to the clearing of all working areas, quality assurance management, manufacture, supply, delivery to site, erection, testing at site, commissioning and trial operation, complete in every respect and suitable for reliable operation in the respective environmental and climatic conditions, including and/or adjustment of defective material and workmanship for duration of the Defects Liability Period of the distribution lines and transformers described in detail in the Specifications and Schedules.

All work not expressly called for in the Specification and/or Schedules but are necessary to complete and proper supply, erection, operation and maintenance of the Works shall be performed and furnished by the Contractor at no additional cost to the Employers.

Where the new line shares the route with existing lines, the scope of work shall include all the necessary works/modifications that will be required to accommodate the lines along the same route.

#### 1.2.1 Material to be supplied by the Employer:

The Goods supplied by the Employer include;

- i. Distribution Transformers
- ii. Treated Wooden Poles/ Steel Poles / Concrete Poles
- iii. ABC Cables and Conductor
- iv. Insulators
- v. Energy Meters
- vi. Service cable

#### 1.2.2 Conditions the Project Area

The sites are located in different parts of Burundi.

**Table 1.1: Climatic conditions for Design in Burundi**

Max. Outside air temperature	+ 31°C
Min. Outside air temperature	+16C
Average temperature, the hottest month	31 °C
Average annual temperature	23 °C
Monthly Average Relative humidity	85 %
Average Rainfall	850 mm per year
Isokeraunic level	70 thunder days per year
Maximum solar radiation	1,200 W/m <sup>2</sup>
Maximum wind speed at 10m above ground	35 m/s or 120km/h
Altitude above sea level	Between 700 and 2,700 m

**Soil Conditions**

Soil conditions within the project area are variable. The presentation of a proposal by the Bidder shall be considered sufficient evidence that the Bidder has investigated the soil conditions of the project areas and has taken the presence of rock or other issues into account in their proposals. Employers will not consider any claims arising from ignorance of soil or geotechnical issues as a justification for any modification of the schedule or unit pricing for completion of the work.

**Transport and Logistics**

Employer furnished materials will be delivered to the Employer’s warehouse in Gitega, and contractors will collect them from there. Any additional transportation or movement of goods, equipment or personnel shall be the responsibility of the Contractor. Special attention shall be made to the planning of transport during the rainy seasons, when it may be impossible to reach certain areas.

**Communications**

A telephone connection to the sites is the Contractor's responsibility if deemed necessary by him. Mobile phone coverage exists in major cities.

**Supplies**

Food supply and beverages required for personal use are obtainable in the towns and are the responsibility of the Contractor

**Electricity**

The Contractor shall provide his own supply of electricity at his own cost if needed. There is some public supply of electricity in the project area but it is the responsibility of the Contractor to make necessary arrangements.

**Water**

Water for Contractor's use on the site must be provided by himself at his own cost.

## **2 General Requirements**

### **2.1 Responsibility of the Contractor for Materials**

Weza Power shall supply materials as listed in section 1.2.1. Weza Power has determined through preliminary engineering that the types and quantities of Employer Furnished Materials are adequate to complete the construction, with the exception of line construction hardware items required to create a finished and workmanlike product. The contractor shall be responsible for supplying hardware materials per the construction structure drawings required to create such a finished and workmanlike final product. In the event that the Employer Furnished major materials supplied by Weza Power are not adequate either in type or quantity to complete installation of the project facilities, the Contractor shall advise Weza Power and shall work in good faith to resolve such deficiencies, including alteration of the construction schedule if required.

The contractor shall supply equipment, tools, qualified workers and safety equipment as required to construct the project facilities in accordance with the specifications. The contractor shall be responsible for warehousing and security of all materials and equipment, including Employer Furnished Materials once delivered, and for the safeguarding of project works until the same are delivered to Weza Power. The contractor shall not substitute materials from other sources for Employer Furnished Materials without the express written concurrence of Weza Power. Any differences between the value of materials delivered by Weza Power to the Contractor and that installed in the project, as determined by a final inventory, shall be for the Contractor's account. Weza Power will not provide equipment or transport, tools, workers, or any other service for the execution of the project except as noted or clarified in writing.

### **2.2 Storage at Site**

Contractor shall establish storage facilities at the construction site and shall be responsible for security and safekeeping of all materials, both those of the Contractor and those Employer Furnished materials provided to the Contractor. The contractor shall be responsible for returning all materials not installed or dismantled in the project to Employer stores. The value of any materials delivered by the Employer to the Contractor or dismantled by the contractor that is neither installed in the project nor returned shall be deducted from the Contractor's final payment.

Contractor shall establish and maintain an inventory of all Employer Furnished materials during the construction period, e.g. by using a Cardex system or similar system.

Manufacturer's instructions for storage must be followed. Materials that are either not inherently weatherproof or are stored in non-weatherproof containers, such as cardboard boxes, shall be stored indoors. For electrical/electronic parts special attention must be paid to temperature and humidity requirements.

### **2.3 Supervision:**

Weza Power may at any time carry out inspections of the Project for which purpose it will designate suitable personnel to inspect the quality of construction as specified. Weza Power or Weza Power designated Consultant shall not exercise any supervision of Contractor staff, and the presence of Weza Power or its designated Consultant does not relieve Contractor of its responsibility for constructing the project in accordance with the specifications, including maintaining on-site sufficient supervisory personnel of its own to ensure an acceptable result.

## **2.4 Period of Performance**

The maximum period allowed by Weza Power for the conclusion of the construction specified herein is three hundred (300) days from the date of completion of the Facilities (or any part thereof) or one year from the date of Operational Acceptance of the Facilities (or any part thereof), whichever first occurs.

The Bidder shall include in their proposal, a work timetable (Gantt chart) to comply with the dates mentioned in this RFP.

In addition to the Bidder's work timetable, the Bidder may indicate other deadlines deemed necessary for the execution of the project.

## **2.5 Health, Safety, Environmental and Social Requirements**

Contractor is required to comply with the below Environmental, Occupational Health & Safety, Labour and Social requirements (E&S Reference Framework):

- All applicable E&S regulations of Burundi;
- All applicable Occupational Health and Safety regulations of Burundi;
- The ESMF and its associated E&S Management Plans;
- 2012 IFC Performance Standards (PS1 to 8) and applicable WB EHS Guidelines (including General EHS Guidelines and the Electric Power Transmission and Distribution Guidelines);
- World Bank Environmental and Social Safeguards (ESS) 1-10. World Bank. (2016). Environmental and Social Framework;
- Reference guides published by IFC (e.g. Stakeholder Dialogue, Resettlement Action Plan Handbook);

The Anzana Group ESG policies, including:

- Anzana Group Code of Conduct and Business Ethics (VP-ES-POL-009)
- Anzana Group Equal Employment Opportunity Policy (VP-ES-POL-002)
- Anzana Group Gender Based Violence & Harassment Policy (VP-ES-POL-003)
- Anzana Group E&S Policy & Exclusion list (VP-ES-POL-001)
- Anzana Group Anti-corruption & Integrity policy (VP-ES-POL-010)
- Anzana Group Whistle Blowing Policy- (VP-ES-POL-008)

The Weza Power Environmental and Social Management System (ESMS) including:

- Weza Power E&S policy;
- Weza Power OHS Policy
- Weza Power Management of change procedure;
- Weza Power Cultural Heritage Management Plan;
- Weza Power Code of Conduct for Contractors

The Contractor will allocate the appropriate level of resources and appoint key E&S personnel to manage all environmental, occupational health and safety, labour and social aspects of the contract. The E&S organogram of the Contractor shall be submitted to Weza Power for approval and shall form an integral part of this contract. Any change to the E&S organogram (change of personnel, change of reporting line, etc.) should be agreed and validated with the Weza Power.



The Contractor grants the right to the Weza Power or to the Weza Power's appointed consultant to carry out E&S inspections to assess the effective implementation of the E&S requirements of this contract. This includes, but is not limited to, annual E&S performance reviews.

The Contractor shall ensure that all sub-contractors adhere to the E&S Requirement for the project.

The Contractor shall notify the Client within 24 hours in case of any of the below incidents occur:

- a. Worker strikes;
- b. Civil unrest, community protest, etc.;
- c. Environmental damage such as large fuel spills, contamination of water bodies; etc.;
- d. Fines, violation notice, injunction from any E&S authority;
- e. Significant personnel or third-party accident resulting in a fatality or hospitalization of more than three (3) days; and
- f. Adverse media (including social media) or communication in relation to poor E&S performance, allegation of human rights breach, etc.

Within five (5) working days after the incident, the Contractor shall issue a comprehensive report to the Client detailing the circumstances of the incident, the root cause and corrective actions taken (immediate and medium terms action).

The Contractor's failure to meet the E&S requirements, detailed herein, in such a way as to prevent significant impacts to workers, local communities and/or individuals, and/or environmental resources, and on the contractor's failure to correct such deficiencies upon receiving proper notice, the Client has the right to appoint and pay another party to repair damages or otherwise remedy the impacts and reduce payment to the contractor in the amount paid to the third party.

The Contractor shall adhere to the HSES specifications Appended hereto as Appendix A.

## **2.6 :**

Contractor shall present a health and safety plan to Weza Power within 30 days of the commencement date of the contract. All safety and environmental requirements are detailed in Appendix 12. However, the Contractor's Health and Safety plan shall, at a minimum, cover the following items :

- List the number and type of personal protective equipment issued to each installation crew member
- Specify the procedure for de-energizing lines for work and for tagging de-energized lines and facilities to prevent accidental energization
- Specify procedures for grounding and rendering safe LV and MV lines when work is going on.
- Procedures for loading, transportation, and unloading of materials to prevent injury to staff.
- Procedures for aerial work to prevent injuries from falls or dropped objects
- Procedures for transportation of staff that prevent injuries due to vehicular accidents
- Availability and means for contacting emergency medical services

All installation crew members shall wear hard hats at all times while working, whether or not aerial work is underway.

All installation crew members shall wear boots. Sandals are not permitted on the job site

All installation crews shall use work gloves at all times

Contractor is prohibited from performing work on any energized facilities, including LV lines or meters. All equipment and lines shall be de-energized and tested with the voltage tester before the installation crew is allowed to work.

In the event of a lost-time accident (an accident severe enough that it causes an injury requiring medical attention, including first aid, to one or more employees) Contractor shall prepare a report detailing the circumstances of the accident, any injuries and their resolution, and a plan for preventing a recurrence of similar events.

## **2.7 Environmental Requirements:**

Weza Power is committed to carrying out all projects in an environmentally friendly and safe manner in compliance with all Burundi laws. The Environmental Considerations for this project are described below. Contractor acceptance and observance of these guidelines is a requirement of the contract.

Contractor shall have an Environmental Management Plan showing all his activities including time schedule and reporting of status. The Environmental Management Plan shall be submitted to the Engineer for review. During the project, Contractor shall report the status of the activities and how the requirements in the management plan are fulfilled. The following requirements are not all-inclusive but shall be taken into account in the preparation of the Environmental Management Plan.

- Contractor shall construct facilities so as to maintain required clearances to energized equipment.
- Contractor shall not work on any energized facilities as part of this contract.
- Contractor shall not prune, cut or otherwise damage any trees without authorization in accordance with prevailing law.
- Contractor shall ensure, by means of barriers, dams or other means that soil unavoidably disturbed by construction activities will not be washed into streams, water courses, or ponds during the heaviest rains likely to occur during the construction period. If such dams or barriers are breached, Contractor shall forthwith repair them to minimize siltation of water courses or ponds
- Contractor shall exercise caution in the movement of equipment to minimize damage to roads, pastures, and cultivated or fallow lands, especially during wet conditions. Any damage or rutting caused by or exacerbated by the passage of Contractor's equipment shall be repaired at Contractor's expense when conditions permit.
- Contractor shall maintain their equipment such that it does not leak oil, hydraulic fluid, coolant or other contaminants, and in the event spills of such materials occur, shall remove contaminated soil from the job site and dispose of it in an approved manner.
- All waste materials, including construction debris, packaging, pieces of wire, broken concrete or bricks, etc. shall be removed from the site and disposed of in a landfill designated for such purposes.

## **2.8 Contractor's Quality Assurance (QA)**

### **2.8.1 General**

For the services to be rendered in connection with this project, a project quality manual based on ISO 9000 shall be prepared. This manual shall contain all the procedures, which are relevant and necessary to perform the activities. Contractor shall prior to commencement of any work follow the quality requirements specified in these Tender Documents and his own Quality Assurance Manual.

### **2.8.2 Planning of QA**

The contractor shall plan all QA activities for the entire period of the Contract. The planning includes time, responsible person and extent of check of each main item of equipment and works to be inspected and/or tested. The inspection certificates, form, etc. shall verify and document that production and installation procedures comply with the requirements according to Contractor's Quality System and Approval Certificates.

### **2.8.3 Execution of QA**

Contractor shall plan, execute and document quality assurance throughout the project according to the project quality manual. Contractor's supervision activities are part of the quality assurance.

The quality assurance is to be specified in the tender.

When installation is complete Contractor shall provide a completion certificate to which is attached an inspection certificate to confirm that the completed work has been inspected and tested for compliance with the requirements. The inspection certificate shall list all items inspected and/or tested.

If the results of a subsequent inspection by Weza Power or its designee show that the installation or equipment does not comply with the requirements, the variation shall be noted, and such noncompliance remedied at Contractor's cost and within the project time schedule.

Contractor shall render any assistance requested by Weza Power or its designee to facilitate inspection of the work. This assistance may comprise labor, materials and measuring equipment. Such assistance shall be included in the offer.

### **2.8.4 Documentation of QA**

Contractor shall document the results of the quality assurance activities. The documentation shall at a minimum consist of:

- Completion Certificates
- Check forms
- Nonconformity reports

The QA documentation shall at any time be available to the Engineer and shall be handed over to the Employer at the final commissioning.

## **2.9 Reports**

Contractor shall prepare monthly reports including:

- The progress and status of all activities (in %)
- Summary of the works planned for the upcoming month
- List of claims, if any
- Accident reports

- List of invoices
- Summary of payments received
- Quality Assurance issues
- Environmental Protection issues

The reports shall show the percentage completed works as per day 1 of every month. Weza Power or its designee shall receive the report within 10 days at the utmost.

### **3 Contractor Staffing:**

Contractor shall be responsible for providing qualified design, installation, inspection, and supervisory staff necessary to complete the project in the time frame specified. Weza Power accepts no responsibility for supervision or scheduling of Contractor staff.

#### **3.1 Key Personnel**

Contractor shall identify in the tender the following Key Personnel. Contractor shall document the qualifications of the Key Personnel by providing curriculum vitae for the individual, attesting to their experience in the area listed. Contractor shall provide evidence with the tender, in the form of a letter of commitment that the Key Personnel identified therein are available and committed to the project. Contractor shall not change Key Personnel without notification to the Employer, who shall have the right of approval of any replacement Key Personnel.

##### **3.1.1 Project Supervisor**

Contractor's installation teams shall be under the direct supervision of a Project Supervisor who shall be an engineer with experience in the construction of electric distribution facilities. The Project Supervisor shall be present at the project site at all times that work is being carried out.

##### **3.1.2 Design Engineer**

Contractor shall provide a Design Engineer for the duration of the design activity. The Design Engineer shall have demonstrated experience in the development of design computations for the detailed design of distribution lines. The Design Engineer may be a consultant, but their consulting contract shall provide that they are required to review and certify the as-staked detailed design for compliance with the calculations

##### **3.1.3 Staking Engineer/Surveyor**

Contractor shall provide a Staking engineer/Surveyor for the duration of the field staking activity. The Staking Engineer/Surveyor shall have demonstrated experience in the surveying, field layout, and documentation of electric distribution systems. The Staking Engineer/Surveyor shall provide the field design to the Design Engineer for review.

##### **3.1.4 Material Manager**

Contractor shall employ an experienced Material Manager for the duration of the contract. The Material Manager shall be responsible for oversight and supervision of Contractor's warehouses and for the process of issuance and inventory of all project materials. The Material Manager shall be present in the project warehouses at any time that materials are being issued.

### 3.1.5 Construction Inspection Supervisor

Contractor shall employ a Construction Inspection Supervisor for the duration of the Contract. The Construction Inspection Supervisor shall have demonstrated experience in the oversight of inspection teams and in verification of quality of construction with respect to specifications and drawings. The Construction Inspection Supervisor shall be responsible for the management of Contractor’s inspection teams and for the preparation of the quality control and inspection plan. The Construction Inspection Supervisor shall be in the field at all times that construction work is underway.

## 3.2 Construction Staff and Tools

Contractor field installation teams may be composed of up to four installation crews. Each installation team shall be supervised by a line superintendent with experience in the construction of electric distribution systems who shall be on the site at any time that any of the assigned installation crews is doing work.

Each installation crew shall include at least two certified linemen who shall be directly engaged in carrying out the work, supported by such other ancillary personnel as may be required to efficiently perform the work. All overhead work and all work involving the making of connections shall be carried out by the crew linemen. Ancillary personnel, such as apprentices or helpers shall not be employed in overhead line work.

Each installation crew shall have the minimum complement of tools as follows, all in like-new condition:

**Table 3.1: Lineman minimum tools requirement**

Sr. No.	Description	Quantity per Installation Crew
1.	Lineman’s extension ladder, whose fully extended length is adequate to reach the tops of poles safely good for 90kg load.Or:	One for each climbing lineman
1.	Lineman’s climbers and associated straps and equipment to enable linemen to climb wood poles	One set for each climbing lineman
2.	Lineman’s safety belt and safety strap	One for each climbing lineman
3.	Grounding set	One
4.	Insulated Lineman’s pliers	One for each member of the crew
5.	Screwdrivers flat and Philips	3 of each type of varying sizes
6.	Open and box end wrenches	3 each for bolts and nuts 6mm, 12mm and 16mm dia.
8.	Hammer	One
9.	Voltage tester	One
10.	Chain hoist, ¾ ton for use in tensioning conductor	One
11.	Manual compression connector installation tool suitable for installing the connectors used on the project	One

Sr. No.	Description	Quantity per Installation Crew
12.	Stringing sheaves for installing conductor with groove diameter appropriate for Hare conductor at least	50 for use by each crew installing conductors
13.	Hand lines, ropes and tackle for installing transformers	One
14.	Work Gloves and lineman’s rubber gloves	One pair of work gloves for each crew member. One pair of rubber gloves per crew
15..	Hard hats	One for each crew member

In addition, Contractor shall possess or obtain such lifting vehicles, carrying vehicles, and personnel transport vehicles as may be required for the efficient performance of the work. Such vehicles shall be in good repair, shall not leak oil or other fluids, and shall be reliable for regular use. If in the opinion of Weza Power or its designee, a Contractor’s vehicle is inadequate to perform the required task or represents a hazard to the environment or to personnel, Weza Power or its designee may order such a vehicle removed from the project and replaced with an acceptable vehicle. The action or inaction of Weza Power or its designee with respect to a particular vehicle does not relieve the contractor from any of their responsibilities under the contract.

Installation crew tools shall not be shared between crews. Major equipment such as vehicles may be shared between teams. Tools shall be available for inspection by the Employer at all times work is being performed.

The contractor shall further provide a separate inspection team composed of qualified personnel with experience in line construction who shall be charged with inspecting the work performed by the installation crews and determining whether it conforms to the Specifications.

Contractor shall be responsible for keeping installation teams supplied with materials and parts for construction and shall provide for necessary temporary stores as required.

## **4 Facilities for the Client/Site Engineer (consultant)**

### **4.1 Site Office**

The Contractor shall provide for each lot office space of at least 45m<sup>2</sup> for use by the Project Manager/ Site engineers. The office shall be fully furnished complete with communication equipment and any other necessary facility.

The contractor shall provide 24-hour, 7/7 days security to the office facilities for the entire duration of the Contract.

## 4.2 Transport

The Contractor shall provide project vehicles as per the price schedule for use by the employer and Consultant in site supervision for the entire contract period. The type of vehicle should be as specified in the technical specifications below. Each contractor shall provide vehicles as per the Price Schedule within one month after the effective date of the contract.

The cost shall also include the provision of:

- Third-party insurance

The running costs (fuel, lubricants, spare and full maintenance) will be paid by the user's company.

## 4.3 Warehouse

The major material of the project will be handed to the contractors by Weza Power through suppliers and will directly be offloaded at the contractors' warehouse. So, the contractors are required to prepare a warehouse to accommodate the material. The quantity of material to be stored per Lot and per warehouse is as per schedule 4 of the price list. All the warehouses' related costs must be incorporated in the price schedule as requested. The project locations and dimensions of warehouse are as follow:

Identification of Lot	Location of Warehouse	Minimum Dimensions per warehouse
Lot 1	<ul style="list-style-type: none"> <li>• Bubanza Province_ Gahongore Substation</li> </ul>	100X100 m
Lot 2	<ul style="list-style-type: none"> <li>• Musasa Province _ Musasa Substation</li> </ul>	100X100 m
Lot 3	<ul style="list-style-type: none"> <li>• Bujumbura Mairie _ Sud Substation - Ijenda</li> </ul>	100X100 m
Lot 4	<ul style="list-style-type: none"> <li>• Gitega Province_ Zege Substation</li> </ul>	100X100 m

- The warehouses must have a building or containers to keep the indoor materials.
- There must be a protecting fence or a wall against intrusions
- The warehouse must have insurance covering the loss or any accident over the stored materials
- The contractor will comply with the E&S framework in Section 2.5 above related to acquisition of land and HSES measures for all activities related to warehousing of materials.

## 5 Scope of Works

The scope of work (hereafter called the "Works") covered by this Specification includes the detailed design, field staking, and installation of all items, whether mentioned in detail or not, to complete the installation and put it into operation according to the requirements of this specification.

The scope of the Works shall include but not be limited to the following items:

1. Preliminaries

- a) Acquisition and maintenance in force of insurance according to the Conditions of Contract
  - b) Establishment and operation of sites during the construction and defect liability period
  - c) All designs necessary for approval and implementation of the Works including inspections of the sites in order to carry out a detailed design of the Works
  - d) Site surveys and soil investigation, including reporting
  - e) Transportation to and within Burundi
  - f) Participation in site meetings
  - g) Status reporting
  - h) Quality control of works including reporting
2. All works necessary for a functional installation
  3. Liaise with the Employer or their designee during site visits and inspections of the Works
  4. Co-ordination of the Contract and the Works
  5. Acceptance Tests and reporting from these tests
  6. Testing of the Works

The scope of works is aimed to give a functional installation from the point of storage during the construction period, staking design, and installation of the new 30 kV overhead lines, and to provide electrical power to the consumers in the areas as specified in this Document.

The contractor shall make his own survey and propose a routing and staking design to be reviewed by the Engineer and the Employer. The contractor shall also quantify the Works out of the requirements in this document and his design.

The Works consist mainly of:

- Secure storage of material delivered by the supplier
- Detailed design including calculation of conductor sag and tension, and structure limits, preparation of staking tables and submittal of all detailed design calculations for approval by Employer
- Field staking and implementation of the approved detailed design and preparation of staking sheets documenting the actual units to be constructed. Staking sheets shall be submitted for approval by the Employer
- Issue all material needed for a fully functional installation
- Installation of 30 kV overhead lines
- Installation of distribution transformers as specified in this document
- Installation of LV network, including service connection
- Installation of consumers energy meters
- Register the location of all installed energy meters by means of UTM Coordinates.
- Test and Commissioning of the distribution networks
- Conduct proper inventory and return unused materials to Employer.

The contractor shall make good the area affected by his work. Contractor shall plan his work in cooperation with the Employer and/or the Employer's designee in order to minimize the shutdown periods of any feeder or vital part.

The scope of works in Price Schedule of Volume-I specifies estimated quantities of MV, distribution transformers, LV network and service connections to be installed in each Lot. Quantities in the respective lots may change during the implementation of the project.





## 6 Design of Facilities

### 6.1 Scope

With respect to the design of the facilities, Contractor shall carry out the following activities.

- Calculation of sag and tension of conductors based upon the conditions specified in this Specification
- Calculation of maximum spans limited by clearances to ground for each conductor, according to the requirements of this Specification
- Computation of spans limited by structure strength of poles, crossarms, and fixtures, in accordance with the requirements of this specification
- Development of staking tables combining the results of both clearance and structure strength limits, to be used in the field in the detailed design of the distribution facilities
- Field layout, or “staking” of the distribution facilities, noting the structure types and spans on staking sheets, as specified.
- Preparation of observations on the construction unit drawings included in this Specification, for review by the Employer or the Employer’s designee.
- Submittal for approval of all design documents, including sag and tension calculations, structure limit calculations, staking sheets and suggested changes to the construction unit drawings.
- Resolution of observations by the Employer or the Employer’s designee, including redrafting of construction unit drawings in accordance with the approvals of the Employer.
- 

### 6.2 Codes and Standards

The design of the facilities and their installation considers the wind loading and clearance requirement documents stated by local authorities, complies with international best practice.

#### 6.2.1 Service Conditions

The service conditions shall be as follows:

- |   |                        |
|---|------------------------|
| • altitude (above sea level)                  | between 700 and 2,700m |
| • maximum outdoor temperature                 | +31°C                  |
| • minimum outdoor temperature                 | +16°C                  |
| • maximum monthly average temperature         | +30°C                  |
| • annual average temperature                  | +23°C                  |
| • soil temperature at 0.50 – 1.00 m depth     | +35°C                  |
| • maximum relative humidity                   | 80% to 100%            |
| • maximum solar radiation (W/m <sup>2</sup> ) | 1200                   |
| • average Isokeraunic level day/year          | 70                     |
| • maximum wind (gust) velocity                | 35m/s or 120km/h       |
| • type of atmosphere                          | Tropical               |
| • Richter's ( Earthquake) Magnitude Scale     | 6                      |

#### 6.2.2 System Conditions

System conditions are as follows:

- frequency 50 Hz
- nominal system voltages
  - MV 30kV
  - LV 400/230V
- insulation levels: 1.2/50µs impulse 170kV
- power frequency (one minute withstand, wet):
  - MV 70kV
  - LV 1kV
- creepage distance (at max system voltage) 25 mm/kV for inland and 31 mm/kV for coastal areas
- neutral grounding arrangements:
  - MV “Y” connected Grounded only at main substation
  - LV 3 wire single phase Multi-grounded

Values for surge impulse and power frequency withstand levels corresponds to the values stated in IEC standards for the nominal system voltages for sea level installation between 700 and 2,700 meters.

## 6.3 Design Conditions

### 6.3.1 Wind Loading

Wind pressure on the projected area of round structures such as round poles or conductors is calculated according to the formula:

$$F = 0.625 (V_m)^2 C_d$$

Where:

F= Wind pressure in N/m<sup>2</sup>

V<sub>m</sub>= Wind speed in m/s

C<sub>d</sub>= Drag coefficient= 1.0 for round poles.

For the specified wind speed at design stage of 30 m/s (108km/h), wind loadings on conductors and structures will be based on the following wind pressures.

- Loading on conductor projected area-563 N/m<sup>2</sup>
- Loading for round pole projected area- 563 N/m<sup>2</sup>

In recent years, the extreme wind speed in Burundi has reached approximately 65 km/h. Consideration has therefore been given to increasing the wind loading to permit greater survivability. For the purposes of this design, wind pressures of 563 N/m<sup>2</sup>, corresponding to a 108 km/h wind speed will be considered as the design case, and all overload capacity factors will apply. A wind pressure of 1,000 N/m<sup>2</sup>, corresponding to a 144 km/h wind speed, will be applied as an extreme case with an overload capacity factor of 1.0. These values correspond to 30m/s and 40m/s, the two values of wind speed used based on historical wind in Rwanda. Taking extreme loadings into account will ensure that all elements of the entire system, including crossarms, conductors, stays and poles, can handle the extreme loads.

### 6.3.2 Conductor Sag and Tension

Conductor sag and tension will be calculated based upon the following limits. Only one limit will govern, but as it is uncertain which will be all must be considered.

- 50% UTS at initial conditions for a wind loading of 563 N/m<sup>2</sup> at a temperature of 10°C.
- Max 33% UTS at 10°C unloaded initial conditions.
- Max 25% UTS at 10°C unloaded final condition
- 70% of ultimate tensile strength (UTS) at initial conditions for a wind loading of 1,000 N/m<sup>2</sup> at a temperature of 15°C
- Max 20% UTS at 20°C unloaded, initial conditions (EDS conditions)

Clearances will be determined at a sag corresponding to 75°C final unloaded conditions

### 6.3.3 MuSoil Conditions

Soil conditions in the area of the project may be classified in accordance with the following table. This table relates the presumptive soil density to the number of blows by a 2kg hammer necessary to advance a 12mm diameter steel rod 30cm into the soil.

**Table 6.1: Soil Class Table**

Soil Class	Blow Count	Soil Density
1	50-80	Very Dense
2	30-50	Dense
3	8-30	Medium Dense
4	4-8	Loose
5	0-4	Very loose

Soils of class 3 or better are adequate for the direct burial of tangent poles at standard depth and development by stays and anchors of the holding capacity specified. Care must be taken to avoid placing poles and stay anchors in soils of class 4. If such placement cannot be avoided, the design should call for installation of poles 30 cm deeper than the standard depth and should use double anchors on angles and dead ends. Under no circumstances should poles or anchors be placed in soils of Class 5. If such soils are found, spans shall be arranged to cross them without installing a pole or the line shall be rerouted.

### 6.3.4 Clearances

The following limits are established for the design of electrical installations. For MV lines, the projected lines should not exceed these limits at a conductor temperature of 70°C, and in case of clearance between lines, the upper line will be considered at 70°C and the lower LV line at 25°C.

**Table 6.2: Clearances for 30kV lines**

Nature of use of the ground surface under 30 kV line	Clearance in meters at Conductor temperature of 70°C
Railways, Non electrified	7.0
Railways, Electrified	10.5
Ground in urban areas, road crossings	7.0
Ground accessible to pedestrians only	6.0

Over Telecommunication Lines	2.0
Under lines up to 60kV	2.0
Under lines over 60kV	3.0

**Table 6.3: Clearances for Neutral and LV lines (400/230V)**

Nature of ground or surface under neutral or LV conductors	Clearance in meters at a conductor temperature of 70°C
Railways, Non electrified	7.0
Railways, Electrified	10.5
Ground in urban areas, road crossings	6.0
Ground accessible to pedestrians only	4.5
Over Telecommunication Lines	0.5
Under lines up to 60kV	2.0
Under lines over 60kV Over roads.	3.0

The general line design carried out by Employer complies with these design conditions. In all cases, during detailed design, Contractor shall maintain the required clearances

## 6.4 Conductors

Conductor selected for application on the project is ACSR bare conductor – Dog (100 mm<sup>2</sup>) for Main MV and for laterals Rabbit 50mm<sup>2</sup>, and Gopher 25mm<sup>2</sup> for small laterals extension. Aerial Bundled Cables LV – ABC 4 x 50 mm<sup>2</sup> for three-phase, and ABC 2x 50 mm<sup>2</sup> for single phase.

## 6.5 Poles and Structural Span Limits

The poles to be used are wooden poles for lines in open country. From the poles listed below, the 9m, light will be used for LV and the 12m medium will be preferred for MV lines.

**Table 6.4: Poles selected for the project**

Pole Length m	Pole Class	Rated Breaking Strength* KN	Ground line location** m
9	Medium	6.5	1.5
12	Medium	10.5	1.8

\* Load at 0.6m below pole top that breaks pole at the ground line

\*\*Distance from pole butt in meters.

The table above shows the height of the pole, its anticipated burial depth using the rule that burial depth equals 10% of the pole height plus 0.6m, as well as the rating circumferences, which are the minimum circumference of the pole at the top and at the ground line of the poles. The table also gives the rated

breaking strength (RBS), or the load applied at 0.6m below the top of the pole that will just cause the failure of the pole at the nominal groundline.

## 6.6 Ruling Span

Ruling span is the assumed uniform design span which approximately portrays the mechanical performance of a section of conductor between the dead end supports. The purpose of the ruling span is to simplify conductor sag and tension calculations by making those calculations only for a single span value. If properly chosen, the horizontal tension at the supports will be equal for all the varying spans within the range of the assumed ruling span. Making horizontal tensions equal limits the stresses on line tie wires at pin/post insulators and reduces the need for tension equalizing deadend structures. In order for the assumption of equal horizontal tension to hold, the following equation must apply:

$$RS = \{ (L_1^3 + L_2^3 + L_3^3 \dots + L_N^3) / (L_1 + L_2 + L_3 \dots + L_N) \}^{1/2}$$

Where:

$L_1, L_2, L_3 \dots L_N$  = individual span lengths of the series of spans in meters

The exact value of the ruling span can be known only after the detailed design is complete and the spans are known. Contractor shall utilize the estimated ruling spans given above for design purposes and shall compute the actual ruling span once the project is staked. In the event that the actual staking differs from the estimated ruling span by more than 15%, staking shall be adjusted as necessary.

The ruling spans and type of poles initially considered for the design are shown in Table 2.8. Verification of the adequacy of these poles for the purpose will be carried out in succeeding sections.

**Table 6.5: Proposed Ruling Spans**

Application	Conductor	Ruling Span	Proposed Pole and Class
MV feeders, no underbuild	3x 100mm <sup>2</sup> ACSR	85m	12m Medium
MV-urban mains w underbuild	3x 100mm <sup>2</sup> ACSR	50m	12m Medium
MV laterals, no underbuild	3x 50mm <sup>2</sup> ACSR	95m	12m Medium,
MV-urban mains w underbuild	3x 25mm <sup>2</sup> ACSR	100m	12m Medium
LV, 3phase ABC cable	4x50 mm <sup>2</sup> ABC	50m	9m Medium
LV, 3phase ABC cable	2x50 mm <sup>2</sup> ABC	55m	9m Medium

For purposes of this analysis underbuild is taken to mean that the pole supports a 3x50mm<sup>2</sup> ABC LV conductor as well as a 25mm diameter joint use conductor located 0.5m below the LV conductor. The nature of urban service in rural towns is that it is very difficult to prohibit the use of utility poles for other purposes such as cable TV and internet, so it is best to design for that use.

## 6.7 Stays and Anchors

All line angles in excess of one degree on lines with ruling spans of 75m or more and five degrees on lines with ruling spans of 50m or less shall be stayed. The stays and anchors selected for this analysis

have the following characteristics when installed in Class 3 or better soil, details of the structure can be found in the corresponding set of structure drawings developed for this document on Appendix A:

**Table 6.6: Stays and Anchors Strength**

Stay and Anchor	Stay Wire (Weza Power Std) mm <sup>2</sup>	Use	Ultimate StrengthNt	Horizontal Load at 45° Stay Lead Nt	Horizontal Load at 60° Stay Lead Nt
E1-1/F1-1	25mm <sup>2</sup>	LV	30,900	23,967	16,950
E1-2/F1-2	52mm <sup>2</sup>	MV	55,682	39,367	27,841

Stay leads shall preferably be 45 degrees (1:1 rise over run) but in no case shall a stay lead be steeper than 60 degrees (1.7:1 rise over run).

The table above shows the result of a calculation and recommended arrangement of stays for all the lines defined for this design guide, considering stay leads of 45 degrees as the preference and the most demanding load situation for the conductors of each type of line. The table above is constructed for the design, rather than the extreme loadings since this loading condition is the most demanding for stay design.

## 6.8 Transformers

- Transformers up to 75kVA to be installed on a Single pole construction as per the drawing presented in Annexure drawings.
- LV Distribution Board for Type B in Annexure drawings

The connection between the transformer LV bushings and the LV distribution Panel shall be done by insulated copper cable, the contractor must supply the connection clamps and the concerned copper cable for 50 KVA three phase, 25kVA and 15kVA single transformer. Equipment pole shall be earthed using the ZM2-11

## 6.9 Grounding

Grounding shall be carried out separately for MV and LV systems. There shall be no earthing on any of the MV structures, whether single or three phases. Stays that are attached to any pole on the MV system shall be equipped with a stay insulator.

LV lines shall be earthed using the ZM2-11 at every second pole. The ZM2-11 unit shall be installed on the pole prior to erection and connected to the neutral of the triplex conductor by a suitable compression connector after the LV line is installed. Stays installed only on LV poles shall not have a stay insulator, but shall be interconnected with the LV system neutral and shall form part of the neutral earthing system.

General use transformers connected phase to phase on the MV side shall be earthed using a ZM2-11 unit (with a driven ground rod).The earthing connection shall interconnect the surge arrester earthing connection, the transformer tank ground, and the LV neutral bushing such that all are earthed to a common earthing conductor which shall be stapled to the pole as specified in the construction unit.

## **6.10 Service connection**

Single phase service at 230 volts to rural residential and 400 volts to three phase consumers will be provided as part of this project. .

## **6.11 Line Surveys and Setting-out**

For each particular project, MV line route selection should be carried out and the route maps developed in a first stage. Then a detailed surveyed of the projected line would allow to identify the locations of all control points, defined as points where the line makes an angle, or where some special situation, such as the presence of a river, main road, creek or other, mandates that a particular line structure be located at a specific point.

Then it shall be carried out a profile survey over the pre-determined line route in order to determine the variation in terrain elevation along the length of the line. The profile survey results will be used in preparation of a profile drawing which will be used to guide location of line structures in such a way as to ensure that clearances to ground are maintained.

A profile survey consists of a survey of the elevations of points (stations) along the centerline of the line route. Profile measurements shall be taken at stations spaced every thirty (30) meters along the line centerline unless the elevation of any point between two profile stations varies from the elevation of the up-line station by more than sixty (60) centimeters, in which case, an intermediate measurement shall be taken. Each profile station shall be identified with a stake driven into the ground and marked with the station number, and shall be recorded as a GPS point.

Profile station point elevation measurements shall be taken using a total station instrument, preferably with an accuracy of +/-10cm at each point. Measurements based solely on GPS elevations are not recommended, no matter how referenced or corrected can be achieved. The traditional method of preparing a profile survey is to use an instrument with a sight line down the center of the right of way between control points and it is recommended to use this method, although it does require clearing of vegetation to obtain the sight line. There are a number of offset techniques based on the advanced capabilities of the total station, and these are approved so long as the required accuracy of elevation measurement is maintained.

The LV survey shall be made by use of GPS, with waypoints taken for each angle and junction pole. No profile survey is required for the LV network, since it is designed with short spans and consists on insulated ABC cable.

## **6.12 Staking of Lines and Equipment Installations**

The Contractor shall undertake a detail field survey (staking) and fill up staking sheets. The Contractor shall construct only those units shown on the staking sheets and approved by the Employer or Employer's designee and is not authorized to undertake any other work, except as may be ordered in writing by Employer.

Two sets of drawings are used for staking or "spotting" of line structures. The line profile survey shall be plotted on a profile drawing with an exaggerated vertical scale of at least 2:1 (vertical scale is half the horizontal scale) so that vertical relief can be discerned more clearly. Once the profile sheet is plotted, the locations of the control points are marked, as those points are required locations for line structures. A plan view drawing is prepared from the layout map so that the plan view and the profile drawings have the same horizontal scale.

It is then necessary to use a model conductor catenary of the same scales as the profile sheet to investigate the location of line structures between the control points. Criteria include:



- The line to ground clearance must be maintained in compliance with the limiting values established in these specifications for every point within the span. The catenary model is set for the 75C curves of the conductor so this process can be done easily by comparing the height of the conductor with the height of the ground. Due to the cost of excessively short spans, it is desirable to extend the span to the greatest length that complies with the ground clearance.
- Structure locations shall respect the rules of right of way established by agencies having jurisdiction over land use.
- MV line shall be graded so that the conductor profile is flat to the extent possible. This is done by using poles of different heights, with short poles on hilltops and taller ones in the depressions. Uplift, which results when a pole top is lower than the pole tops on either adjacent span by an amount greater than the initial conditions sag at minimum temperature (0oC), shall be avoided by careful grading. If uplift cannot be avoided, dead-end structures shall be installed.
- Construction units shall be noted on the plan view for each structure
- Stays shall be located and plotted on the plan view and verified for clearance to roads, buildings etc. All line angles both on MV and LV lines shall have stays in accordance with these specifications.
- Transformer locations and the proposed LV line lay out shall be marked on the plan view.
- Location of transformers shall comply with the requirements of the design with respect to number of consumers served and a total length of LV line from the transformer to the last consumer
- The staking process shall include a count of all houses within 30m of the LV line and 200m of the MV line, whether they have been designated as consumers or not.
- Consumers shall be plotted and marked for all housing clusters with 10 or more residences within a 200 meter radius. Housing that is more dispersed than this shall not be included in the location of consumers.

The construction units shall be constructed as shown in the construction unit drawings incorporated herein in the annexure. Contractor is not authorized to alter any of the construction unit drawings, except as may be provided in writing by Employer.

The detailed design of distribution systems is referred to as “staking” and is carried out in the field by the Staking Engineer/Surveyor. Line design parameters, such as allowable maximum spans limited by clearances and pole strength, shall be reduced to a series of tables during the detailed design process so that the Staking Engineer/Surveyor can design the line in the field.

### **6.13 “As-Built” Drawings**

The responsibility of performing the construction shall record all the modifications made during the construction of the project onset of revised staking sheets. After completing the construction of the project the collection of corrected drawings and staking sheets as defined above be denominated “As Built” Drawings, and will be used by the owner of the new lines to update their electric system database.

### **6.14 Documentation**

All documentation shall be in the English language.

The electrical documentation shall be prepared in accordance with IEC 60617 and 61082.

#### 6.14.1 Documentation after Award of Contract

The contractor shall prepare all documentation necessary for the execution of the works. The documentation shall be prepared in such detail that not only can the works be executed on-site, but also, in the opinion of the Employer or designee, sufficient for the Employer's checking and approval.

Approval by the Employer or designee of working drawings shall neither relieve the Contractor of any of his obligations under the Contract nor relieve him of correcting any errors found subsequently in the approved working drawings and in the work on the site or elsewhere associated therewith.

The documentation shall, at a minimum, consist of:

- Quality Assurance Manual for the project. The Manual shall be submitted within one month after the commencement date.
- Supervision Plan for works on the site
- Report on soil investigations
- Design calculations and quality requirements
- Staking of all distribution system to be constructed, both in details and a complete list of materials
- Proposal on Contractor's facility area on the site
- Site maps showing operation areas for erection equipment (cranes etc.) and for assembly

The documentation shall be submitted in 6 copies.

During the execution of the works on the site, Contractor shall record all information necessary for preparing as-built drawings. The drawings and other documents shall be available to the Engineer at any time during construction.

The drawings shall be kept up to date.

#### 6.14.2 Documentation before Commissioning

All project drawings shall be delivered as electronic drawings in the AutoCAD format. The final AutoCAD version shall be agreed with the Employer or designee.

These shall include but not be limited to:

- Maps showing the exact location of the installations in UTM coordinates
- Detailed descriptions of all equipment and installations
- Specific operation instructions
- Specific maintenance instructions
- Component list specified for all equipment
- Record of UTM coordinates for all installed energy meters

Contractor shall submit the completion and inspection certificates as specified in relevant clauses.

#### 6.14.3 Documentation As-built

Two weeks after issuance of completion of testing and certification of such completion by the Employer or designee, Contractor shall submit six (6) copies of as-built documentation in the draft.

Six (6) copies of the final manual shall be provided to the Employer within two (2) months after issuance of Test Certificate, incorporating all modifications/ revisions completed during construction. Each copy shall be durably bound in a volume or volumes depending on bulk. All material except drawings shall be A4 size. Drawings shall be on international A size sheet, preferably shall not exceed 297 mm in height

and shall be bound into the volume(s). Volume titles shall be clearly inscribed on the front cover and on the spine of the cover. Drawings shall be marked AS-BUILT.

Together with the As-built documentation, Contractor shall furnish 2 sets of transparencies of good quality material of all drawings, or as AutoCAD format on CD.

Additional two sets of CD shall be delivered with coordinates of MV and LV lines and distribution transformers in a format suitable for the Employer's existing ArcGIS software (QGIS, JOVE, CAMELIA, PLS4)

## **7 Requirements for Construction**

### **7.1 General Rules**

All the equipment, materials, framing and procedures must follow this Construction Manual for Distribution Lines. The Employer or designee may clarify or extend the provisions of this Construction Manual at any time, should differences in interpretation develop. The determination of the Employer as to the interpretation of the requirements is final.

### **7.2 Equipment, Tools, and Personnel Provided by the Contractor**

The equipment and tools that the Contractor provides for the execution of the construction work shall be those described in the accepted Proposal. Only changes that improve quality or quantity can be approved. The tools and equipment that are rejected due to being inadequate must be immediately removed from the Project site and replaced with adequate tools or equipment.

Contractor further shall employ as supervisors and engineers, if any, solely those persons described in the accepted Proposal, or such equally qualified persons as may be approved by Employer. Contractor shall employ as linemen, technicians, and installers only those persons experienced and qualified for the tasks to be carried out.

Contractor is solely responsible for the performance and behavior of staff employed or contracted by Contractor to perform construction tasks, and Employer will not exercise any supervisory control over such staff. However, in the event that, in the opinion of Employer, any of the staff employed or contracted by Contractor are behaving in a way that is deleterious to the success of the project, or in a way that may constitute a hazard to Employer personnel or the general public, Employer may order the removal and replacement of such staff and Contractor agrees to remove and replace such staff forthwith.

### **7.3 Permit to Work:**

Contractor shall be responsible for obtaining work permits for work on line sections from the appropriate Weza Power office and for complying with all terms of the work permit, including time periods allowed. Contractor shall not work on lines or meters unless a valid work permit is in place covering the work location and the time period. Work permits are subject to inspection by Employer or Weza Power.

Contractor shall not switch or carry out operations on the Weza Power system.

Contractor is solely responsible for installing grounds and providing a safe working environment for their installation crews regardless of what actions may or may not be taken by the Weza Power.

## 8 Construction Assemblies of Lines and Installation of Equipment

Construction of the distribution system includes the excavation of pole holes, transportation, framing, and setting of poles in accordance with the units specified on staking sheets, installation of stays and anchors, installation and sagging of conductors, and installation of equipment such as transformers, and installation of consumer services and meters.

### 8.1 General

Tasks and activities of the Contractor shall be performed in such a way and to such extent that the Contractor delivers to Employer the completed tasks to Employer’s satisfaction and in accordance with this specification and other Contract Documents. The Contractor is responsible for the methods used to achieve these results and for the safety of personnel and the general public while construction is underway. Contractor is responsible for transportation and safekeeping of materials from the point at which they are delivered by suppliers and is responsible for making good any damage to said materials that occurs during the transportation or installation process.

### 8.2 Excavations

Poles shall be located as specified on the staking sheets. Changes in a location may be made only after consultation with the Employer or designee.

Prior to undertaking an excavation for placing of poles, Contractor shall determine what underground facilities might be impacted by contacting the affected utility and determining the location of water lines, sewer lines, gas lines, underground communications facilities or electric lines. Contractor shall take such precautions as may be required to prevent damage to underground facilities, and any damage that might occur shall be repaired to the satisfaction of the affected owner at Contractor’s expense.

Poles shall not be installed in driveways or close enough to doorways as to interfere with exit or entry. Poles shall not be installed in sewage canals or junction boxes, shall avoid water lines of 50mm dia. or greater.

The excavations must be executed with tools that are adequate for the terrain, excavating the respective holes with a uniform diameter, with vertical walls, center-aligned with the axis of the line and with depth in accordance with Table 8.1, considering class 3 soil, as defined before:

**Table 8.1: Pole Setting Depth**

<b>Pole Height m.</b>	<b>Setting Depth m</b>
9	1.5
11	1.7
12	1.8
14	2.0

For pole excavations on sloping ground, depth shall be measured from the lower edge of the hole.

Excavations for poles must have a diameter of at least twice the diameter of the base of the pole. Excavations that must be left open at night shall be covered to prevent people or animals from falling into the hole. Covers shall be heavy enough that they cannot be easily moved.

### **8.3 Transportation of Material**

Contractor shall transport all materials with care from the store to the worksite. Material and equipment that is rejected by Employer due to damage by Contractor shall be replaced at Contractors expense.

- Poles shall be transferred to the final erection site by a trailer specifically designed for that purpose and erected by a crane truck. Poles may be handled by hand or machine, but must not be dragged along the ground or damaged in any way.
- Insulators shall be transferred to the job site in their shipping crates to avoid chipping and breakage.
- Hardware shall be properly handled so as to prevent bending of the parts or galling of the galvanizing.
- Conductor reels shall be transported upright and lifted on and off transports with slings and tackle. It is not permitted to roll conductor reels off the back of the transport to fall on the ground.
- Equipment shall be transported separately from other materials that may cause damage to bushings, and shall be lifted on and off transports with slings and tackle. The manual lifting of transformers is not allowed. Small pieces of equipment such as cutouts and surge arresters shall be transported in their shipping boxes to protect them.

### **8.4 Framing of Structures**

All structures shall be framed as shown in the relevant drawings, with the proper number of bolts, washers, and hardware as shown. Makeshift or casual construction of structures will result in rejection of the structure.

Pole structures shall be framed on the ground unless otherwise instructed by Employer.

Crossarms shall be assembled to the pole using measurements such that the crossarm is perpendicular to the long axis of the pole.

Insulators shall be installed by tightening the insulator onto the pin. The groove of the insulator shall be adjusted to be longitudinal to the line by adjusting the orientation of the pin/insulator combination, not by unscrewing the insulator. Following adjustment of the orientation of the groove, the pin bolt shall be tightened.

Structures shall be assembled with all hardware as shown in the construction drawings, including washers. In general, washers are required under the head of any bolt and under any nut, including eye bolts.

Hardware shall be completely installed and fully tightened during framing. Hardware shall be installed with open-ended wrenches so as not to damage the bolt and nut heads. The use of pliers or adjustable pliers for tightening nuts is not permitted. Nuts shall be installed with the flat side up to allow for proper operation of the type MF locknuts.

The lengths of the bolts indicated in the construction units of the bidding designs are indicative, and it should be select the correct lengths according to the real diameter of each pole so that the threads of the bolt, after installing the nuts and washers, protrude a minimum of 12mm and a maximum of 50mm. For thread protrusions greater than 50mm, a shorter bolt shall be substituted. Bolts may not be cut to achieve the required length.

## **8.5 Setting of Poles and Framed Structures**

Poles and framed structures shall be set and aligned correctly so that any prepared holes in the pole are either inline or at 90 degrees to the pole centerline. Poles installed at line angles shall be installed such that holes in the pole are on the angle bisector.

Poles shall be set with a tolerance of one centimeter off the axis of the line and plumbed to within two centimeters from the vertical at the top. Poles that are set at line angles or deadends shall be inclined opposite the direction of force by one centimeter for every three meters of the pole's length unless otherwise indicated by Employer.

The crossarms shall be aligned with the longitudinal axis of the crossarm perpendicular to the axis of the line and to the axis of the pole. In the angled structures, the longitudinal axis of the crossarms must bisect the angle.

Excavations shall be cleared of water before backfilling. Backfill shall be earth, free of rocks over 50cm in diameter. Backfill shall be tamped with pneumatic tampers or, if hand tampers are used, there shall be two men tamping for each man shoveling earth into the hole. Backfill shall be tamped to within 90% of the density of undisturbed soil, as tested by the comparative blow count required to hammer a steel rod 12mm in diameter 30cm into the backfill and into the virgin soil. If the inspection personnel deem necessary the use of imported backfill material, then the Contractor shall provide it at their expense and without additional payment. Except in paved areas, backfill earth shall be mounded around the base of the pole to a height of 15cm. All pole holes made in streets, sidewalks or other paved areas shall be restored to the condition existing prior to the opening of the pole hole. In the event there is any excess material remaining following backfilling of the pole hole, it shall be removed from the site and disposed of at Contractor's expense.

## **8.6 Stays and Anchors**

Stays and anchors shall be installed in accordance with the drawings.

Holes for anchors shall be dug such that the anchor rod protrudes from the ground at the location of the stake. Holes for setting the anchor and the trench for the anchor rod shall be as small as possible so as to disturb as little soil as possible. The anchor and rod shall be assembled on the ground prior to setting. The trench for the anchor rod shall be dug so that the anchor is aligned with the direction of the force.

The stays and the corresponding anchor shall be installed aligned with the axis of the force which they are to support. Anchor rods shall not be bent to achieve the appearance of the alignment.

The eye of the anchor rod must protrude at least 15 cm over the level terrain after the backfill has been compacted, but not more than 30cm. The angle of inclination of the anchor rod must be left such that when loaded it experiences only longitudinal forces.

Hardware on the pole shall be aligned so that it is aligned with the strain and not subject to twisting or lateral forces.

Stays shall be installed before stringing conductors and shall be temporarily finished, which is left with the stay grip incompletely installed until the conductor is strung the stay can be properly tensioned and the stay grip properly finished.

Stay strand shall protrude from the gripping portion of the stay grip by the amount specified in the manufacturer's specifications.

No stay grip once installed and removed may be reused.

## **8.7 Stringing and Sagging of Conductors**

### **8.7.1 General Information**

The installation of the conductors will consist of the following tasks:

- Preparation for pulling in conductors, including provision, assembly, and removal of temporary installations and guard structures to protect conductors and the general public.
- Transporting reels with conductors and removal of empty reels.
- Installation and removal of temporary safety grounding.
- Installation and removal of stringing blocks on all structures
- Pulling in, sagging and tying in of the conductors.
- Complete any type of repair of conductors as may be required.
- Documentation of the sagging process
- Installation of jumpers as required.

### **8.7.2 Preparation for Pulling In of Conductors**

Contractor shall install stringing blocks on every structure. Stringing blocks on post insulator type tangent and angle structures are fastened to the crossarm adjacent to the insulator the conductor will eventually rest on. Care should be taken so that blocks are as close as possible to the final conductor position. On flying angle structures, blocks are hung on the ends of the insulator strings. Stringing blocks shall be supported so that the conductor will lie in the block at approximately the same elevation as the tie point on the insulator.

Stringing blocks shall be properly sized for the conductor being strung. Construction specifications usually indicate the minimum groove diameter, groove radius, and groove width required for the conductor, as well as the proper working load rating of the block.

Blocks shall be free-running, without discernable friction.

The grooves of the blocks shall be clean and free of sharp abrasions that might damage the surface of the conductor. If the blocks are lined, the lining shall be in good condition and properly bonded to the sheave groove.

Contractor shall establish suitable guard structures at all road and railroad crossings so that conductor cannot become a public nuisance by hanging low enough that it can be snagged by passing traffic. Guard structures need not have stringing blocks in place, but the surface over which the conductor passes must be smooth and rounded, of a nonabrasive material such as wood; and the structure should be designed so as to prevent the conductor from falling off or from being caught by structure elements. Guard structure shall be of a height sufficient to perform the necessary protection, but short enough that the conductor will not be in contact with the structure when pulled up to sag.

When required by the process being used to pull in the conductor, the Contractor shall establish temporary stays as necessary to prevent improper loading of any structures being used as temporary deadends or in any circumstance when the pulling in or sagging of conductors might result in abnormal forces on a line structure. Temporary stays shall be of sufficient strength to serve the purpose and shall

be anchored by purpose installed anchors. The use of trees, parts of buildings, fences, etc. as anchor points is unacceptable. The use of rope as temporary stay material is unacceptable.

Contractor shall determine the length of the stringing section based on the characteristics of their equipment the method to be used for pulling in the conductors and the nature of the terrain under the line.

Selection of the method used to pull in the conductor, the equipment to be used in the stringing process, the length of the stringing section, the location of stringing equipment, and the selection of sag check spans are all subject to the approval of Employer or designee and shall be determined prior to Contractor beginning the pulling in the process.

### 8.7.3 Pulling in of Bare or Insulated Single Conductors

Bare or insulated single conductors may be pulled in by either tension stringing or slack stringing. In tension stringing, a lead line is run the length of the stringing section and used to pull in the conductor. Tension stringing is often used when there are a large number of obstacles under the line and it is desired to maintain the conductor at a height near to its final position. In slack stringing, the conductor is carried the length of the stringing section, stopping at each structure to be run through the stringing blocks. This method requires a large contingent of manpower because of the need to avoid dragging the conductor on the ground.

Two methods of conductor pulling that are completely unacceptable are the pullout method and the layout method. In the pullout, method conductors are pulled out along the ground before being lifted into place on the structures. This method results in unavoidable conductor damage and is not allowed. In the layout method, the reel trailer is pulled the length of the pull, lying off conductor. While this method avoids dragging the conductor along the ground, it still exposes the conductor to being run over by vehicles, picking up dirt and debris, and constituting a public nuisance.

The following considerations apply to whatever method chosen for pulling in conductor

- Conductor reels transported to the worksite shall be inspected for damaged tires or lagging. In the event of apparent exterior damage, lagging shall be removed and the conductor inspected by Employer to determine whether it can be used.
- Preparatory to removing conductor from the reel, the outer protective lagging shall be removed carefully and all surfaces in contact with the running conductor shall be examined for protruding nails, screws, or other projections that might damage the conductor.
- Care must be taken to ensure that conductor pulling tension remains well below the expected sagging tension. This is particularly important for the initial or lead portion of the conductor, which is subject to the most stress. Conductors that have been overstressed shall be cut out.
- Sufficient tension should be maintained on the conductor that it is not allowed to drag along the ground. Furthermore, the conductor cannot be allowed to come in contact with any structure, vehicle or any surface that may damage the aluminum strands .In the lead portion of a pull using the slack tension method, where the conductor is necessarily near ground level, manpower shall be used to prevent conductor contact with the ground or other structures.
- During the pulling in the process it is important that the conductor reels shall be lightly braked to prevent conductor run-on resulting in conductor kinking or tangling. Conductor that has kinked or tangled shall be cut out and spliced.

If damaging surfaces brush up against the conductor, the work must be stopped to check the conductor. The work can resume only after receiving approval from Employer who will determine the type of repair to perform if needed.



All repairs made to the conductor must be made in the presence of Employer. In case of discrepancies about the type of repairs to perform, then the resolution given by Employer must be accepted.

After each time a conductor is repaired, the following must be recorded as proof:

- Nature of the damage to the conductor.
- Type of repair performed.
- Location of the repair
- Length of the eliminated conductor.

#### 8.7.4 Sagging of Bare or Single Insulated Conductors

Conductor shall be sagged within no more than six hours after having been pulled into the stringing blocks.

Sagging operations shall be carried out during weather conditions with minimal wind and stable temperatures.

Contractor shall select at least two spans within a stringing section in which to check sag. Sag check spans shall not be located within two spans of either the pulling end of the reel end of the stringing section. Sag check spans should be within 10% of the ruling span in length, should be level and should not terminate in a deadend or flying angle on either end.

The method used for checking sag is subject to the approval of Employer. Sagging through the use of a dynamometer to measure conductor tension is not acceptable. Sagging by the return wave method, in which a traveling wave is induced mechanically in the conductor and the reflections timed, is the recommended sagging method.

Contractor shall develop sag tables for the use in sagging, showing temperature and target values of sag for a range of spans. Sag tables are subject to approval by the Employer.

Contractor shall measure and record the temperature at which sagging operations are carried out and shall keep a log of the length of the sag check span, the ruling span, the temperature, the target sag from the tables, and the achieved sag. This log will be provided to Employer.

Conductor shall be brought up to sag quickly and smoothly. It shall not be pulled up too tight and then dropped down to proper sag.

The tolerance, when sagging the conductors, should not be greater than +/- 1 cm. for every 20 meters of continuous conductor, but must never exceed 2.5 cm.

If a stringing section is not deadend to deadend, splices shall be installed as required to connect the sagged stringing section to the subsequent section. Splices shall be installed in accordance with manufacturer's instructions. No more than one repair sleeve or splice per conductor will be accepted in any single span of continuous conductor and in case of initial installation, it must not be placed less than three meters from the respective insulator. Splices will not be installed over roads, bridges, or rivers and when possible avoid putting splices adjacent to the deadend structures of the conductor. All permanent splices must be placed in the presence of Employer.

#### 8.7.5 Tying In of Bare or Single Insulated Conductors

Once the conductor is sagged, it shall be tied into the insulators, including the deadends, within six hours. Contractor shall use all due care to avoid damaging the conductor as it is transferred from the stringing blocks to its final position and tied or clamped in place.

If required, Contractor shall install the number and size of armor rods. Armor rods shall not be bent or forced into position and shall be installed centered on the insulator.

Ties shall be properly installed as specified. If preformed ties are provided, they shall be installed in accordance with the manufacturer's instructions and shall not be forced or bent into place.

Deadend and running angle clamp bolts shall be tightened to the specified torque and no further.

#### 8.7.6 Special Considerations for Multiplex Conductors

ABC (insulated neutral) cables shall be pulled in and tensioned in the same fashion as single conductor line, using free-rolling sheaves at each pole to allow the conductor to move freely. ABC conductors shall be sagged using targets on adjacent poles, as the return wave method is not applicable to multi-conductor cables. Tension shall be applied only to the neutral conductor. Upon completion of sagging, the neutral conductor of the ABC shall be placed in the suspension clamp at the pole. It is NOT acceptable to suspend the ABC by any conductor other than the neutral. ABC cables shall not be spliced in any span.

### 8.8 Grounding (Earthing)

The respective ground rods and connections for grounding will be placed according to the staking sheets and the drawings. The rods must be inserted in undisturbed soil at a distance of at least 60 cm from the closest pole. The rod head must be buried at least 50 cm under the natural level of terrain. Connections to the neutral of the LV line shall be by compression connector. Connection to the equipment shall be by a suitable connector. Wrapping of ground wire under bolt heads will not be allowed.

### 8.9 Installation of equipment

Equipment such as transformers, reclosers, cutouts and surge arresters shall be installed as shown in the construction drawings and in accordance with the manufacturer's instructions.

#### 8.9.1 Location

The equipment shall be installed in the location specified in the staking sheets.

#### 8.9.2 Transportation and Handling

Transportation of the equipment from the warehouse to the worksite, including loading and unloading, shall be done such as way so as not to cause damage to the bushings or bushing terminals.

Transformers and regulators are sealed and will not leak under normal circumstances, so any leak indicates maltreatment sufficient to require repair. No transformer or regulator with any indication that they are leaking oil may be installed. Other types of equipment, such as reclosers are not sealed and extreme care must be exercised to ensure that they are transported upright.

#### 8.9.3 Installation

Installation of heavy equipment shall be done with blocks and tackle of appropriate ratings, and using hand lines as required controlling the lift of the equipment. Employer may inspect equipment proposed by constructor for use in lifting to ensure it is adequate and may reject any equipment that, in its judgment is not. The rejection or failure to reject any equipment by Employer does not relieve Contractor from their obligation to carry out equipment installation in a manner that gives the required results and does not constitute a hazard to the public.

Equipment shall be installed plumb and square on the structure.

Conductors under tension must be properly deadended and shall not depend on equipment bushings to provide mechanical strength.

Bolts, supports and mounting brackets shall be installed as specified in the drawings.

All equipment shall be connected to the pole ground in at least two places using a loop of grounding conductor in accordance with the drawings.

Switches and cutouts shall be installed so that the blades move in a strictly vertical arc and do not bind, and shall be located so as to maintain clearances with the blade in both the open and the closed position.

#### 8.9.4 Electrical Connections

Electrical connections shall be made in accordance with the construction drawings.

Jumpers shall be installed so as to exert a minimal load on the bushing connectors. Jumpers shall be of the material and size specified and shall be installed such that the quality of the connection can be verified. Clamshell and ring-type connectors shall have conductor showing on the offside of the connection. Compression terminals shall have the number of crimps specified by the manufacturer and shall be made with the appropriate tool. Bolted connections shall be properly tightened to the torque values specified.

Medium voltage jumpers shall be addressed to achieve specified clearances between phase and the surface of the structure or another phase.

### 8.10 Installation of Meters

Upon completion and energization of facilities, Contractor shall install customer service drops to the new facilities.

#### 8.10.1 Staking of Service Drops

- Contractor shall locate all service drops meters to be installed
- Staking units shall be selected in conformance with the limits on service drop length specified on the drawings. This means that an unsupported service drop may have a length no greater than 30 meters from the pole to the attachment point at the consumer. In the event that a longer service drop may be required, Contractor shall install additional LV poles to provide the necessary length such that the distance from the LV to the consumer's premises does not exceed 30 meters.

#### 8.10.2 Installation of Service Drops

- Service drops shall be connected with low voltage line using compression connectors as per drawing
- Oxide inhibiting compound shall be applied on the connectors
- Service drop conductors shall be dead-ended and attached to the service loop brackets on the LV line and to the eye bolts on the walls using insulated service support brackets. Dead-ending shall be accomplished using appropriate preformed grips. Service drop cables shall be routed and tensioned so that they do not lie on or drape over any portion of any house, sign, or other service drops. It may be necessary to locate the eyebolt at the wall at increased elevation to achieve this,

but Contractor will be required to remove and reinstall service drops found to be improperly tensioned.

- Service drop conductors shall be located and sagged so as to maintain clearances above ground and from the service drop cable to the house, windows, roofs, and balconies in accordance with the clearance requirement.
- Service drop cables shall be affixed to structures with cable ties and shall be clipped to buildings with clamps.
- Service drop runs located on house walls shall be properly located, straight, properly tensioned, clipped to the wall, and shall have a workmanlike appearance. Sloppy or loose installations are not permitted and Contractor will be required to remove and reinstall any poorly installed service drops.
- Service drops shall be fixed on meter terminals properly
- Sharp bends of Service drop cables shall be avoided

#### 8.10.3 Installation of Out-going Cables

- Service drop cable shall be used to extend service from the LV pole and meter installation to the consumer's premises. Contractor shall install cable from the meter unit to the service panel on the consumer's premises. Contractor shall locate and install the customer interface unit and shall test it to ensure that it is properly interfaced to the meter and that it is communicating
- Insure restoration of power supply to consumer

#### 8.10.4 Energy Meter Securing

- Each energy meter, after installation and testing, shall be properly secured by sealing the meter box on the pole with lead seals, as provided by Weza Power.

### **8.11 Construction Unit Drawings**

In Appendix A, there are the following sets of drawings for all the structures considered through the document including the detail and quantity of materials needed for all the structures and a detail of dimensions as well as mounting details.

### **8.12 Final Work**

Final work will be defined as all the tasks which, due to their nature or characteristics, can be left to complete last. In general, the Contractor shall execute all the necessary minor tasks to complete the tasks included in the Contract, among these are resolution of all punch list items, installation of jumpers, and readying the project for energization.

The final cleaning tasks will be the Contractor's responsibility and all costs will run at the expense of the Contractor, without Employer having to make any additional payments for this requirement.

### **8.13 Stays and Anchors**

Stays shall be installed at staked locations approved by the Engineer. Points of attachment to poles shall be as shown on construction drawings. Stays shall be installed before conductors are strung.

Anchors and rods shall be in line with the strain and shall be so installed that approximately 200 mm of the rod remains out of the ground. In cultivated fields or other locations, as deemed necessary, the projection of the anchor rod above earth may be increased to a maximum of 300 mm to prevent the burial of the rod eye. Under no circumstances shall it be back-filled and tamped in the same manner as for pole holes, as the anchor has to be set in undisturbed soil. The setting of each anchor as regards depth and position shall be inspected by the Engineer before the anchor hole is back-filled.

Stay markers should be placed on all stays located in areas of pedestrian traffic.

Stay insulators shall be installed on stay wires in accordance with construction drawings whenever stay wires are not bonded to a pole ground (see paragraph Pole Grounding).

### **8.14 Bolts and Lock Nuts**

Pole through-bolts must be of proper length. Through-bolts, when installed in the structure, shall extend at least 12 mm and not more than 60 mm beyond the nuts.

A lock-nut shall be installed with each nut, or other fasteners, on all bolts or threaded hardware such as insulator pins, upset bolts, double arming bolts, etc.

### **8.15 Number plate**

The number plate of approved design and material shall be provided with each pole.

### **8.16 Line Accessories**

#### Taps and Jumpers

Jumpers and other leads connected to line conductors shall have sufficient slack to allow free movement of the conductors. Where slack is not shown on the construction drawings, it will be provided by at least two bends in a vertical plane, or one in a horizontal plane, or the equivalent. In areas where excessive vibration occurs, special measures to minimize the effects of jumper breaks shall be used as specified.

Jumpers of series-connected equipment such as reclosers and sectionalizing switches shall have conductivity equal to the circuit conductor. A suitable electric joint inhibitor compound should be used in all connections between jumpers and equipment.

#### Compression Conductors

Compression type connectors should be used in the following situations:

- All neutral jumper connections and in all bonding connections between neutral, ground wire and stay wire
- All sleeves and joints in high voltage phase conductors

- At all tap lead connections to high voltage line conductors whenever hot-line clamps are not required.

### **Earthing**

The neutral conductor of LV lines shall be grounded at the transformer station, every dead-end, and every 300 meters distance.

The earthing shall be made by a core of the ABC down to an earth spike which can be installed at the bottom of the pole pit in order to avoid theft. A detailed earthing arrangement as per drawing attached to this document.

Ground rods shall be driven in undisturbed earth in accordance with the secured to the pole with staples. The staples on the ground wire shall be spaced 600 mm apart except for a distance of 2.5 m above the ground rod and 2.5 m down from the top of the pole where they shall be 150 mm apart.

Equipment grounds and grounds at MV or LV circuit dead-end poles should normally employ ground rod or trench type ground electrodes. The total impedance of the service ground shall be less than 10  $\Omega$  for LV and MV (protective earth).

In case these requirements cannot be fulfilled by installing a reasonable amount of grounding material, step and touch voltages have to be measured after finalization of the installations and depending on the results of these measurements additional protection measures might become necessary. These measures could include graveling of an area around electrical installations or the application of additional ground wires and ground rods.

## **8.17 Service Connections**

This specification covers the supply of some accessories (IPC connectors, strain clamps, copper cable from LV network to Pole Top Box) installation, testing and commissioning of consumer connections further specified in this document and the accompanying drawings.

### **Scope of Work**

The work comprises the supply, delivery, and erection of all materials (except service connection cable, meter, ready board, and pole top box) and equipment required to do consumer service connections from the overhead reticulation system to the consumer point.

Each service connection shall be tested, commissioned, sealed and handed over individually.

### **Commissioning and Testing**

A commissioning test will only be successful once the specified values are attained, irrespective of the number of readings required in the process.

The tests required are:

- Polarity;
- Phase to neutral voltage reading on the longest circuit from distribution board;
- Any other tests called for by the Engineer to prove the safety of the installation if it is

called for.

### **Certificate of Compliance**

The Contractor shall further be required to issue certificates of compliance of the domestic type ready boards installed under this contract to the customers in compliance with the ruling Acts and Regulations.

A certificate of compliance (COC) shall form part of the commissioning of each service connection.

The Contractor shall allow for the issuing of a COC by an accredited person in the event where pre-wired houses are to be connected to the network and a Ready board is not required. The accredited person must be present on site at the time of testing and certification of the new installation.

### **Electrical Shutdowns**

The Contractor shall give the Employer a week's written notice if he requires an electrical shutdown.

The Contractor shall give the exact duration of the shutdown.

### **Earthing**

The contractor shall be responsible for Earthing of the service connection installation. The concerning earthing materials shall be supplied by the contractor.

### **Materials for Trench Earth**

Stranded bare copper shall be used as general-purpose material for earth electrodes. The sizes shall be 25 sq mm.

Under no circumstances shall connection points, bolts, screws etc. used for Earthing be utilized for any other purpose. It will be the responsibility of the Contractor to supply and fit earth terminals or clamps on equipment and materials that must be earthed, where these are not provided. Unless earth conductors are connected to proper terminals, the ends shall be tinned and lugged. Lugs may be crimped using mechanical or pneumatic tools designed for this purpose, on condition that evidence is submitted that the method used complies with the performance requirements of BS 4579, Part 1: Compression Joints in Copper.

## **9 Technical Specification: Distribution Line Hardware**

### **Scope**

This specification shall cover the design, manufacturing, testing, and supply of distribution line hardware and accessories for installation on rural distribution lines in Burundi.

### **Standards**

The materials offered shall conform to the latest editions of the ANSI, NEMA, IEC and ISO standards applicable to their construction.

### **Experience and Quality Control**

The materials supplied under this RFQ shall be fabricated in a plant that has manufactured materials of similar ratings and characteristics for a period of not less than ten years, and that holds an ISO 9001:2008 certification for quality management.

### **Material Characteristics**

Hardware and accessories shall comply with the specifications provided by Weza Power. Bidder may substitute technically equivalent materials fabricated by other manufacturers if qualified on the basis of experience, quality control, source, and origin requirements of the RFQ.

### **Packaging**

All materials supplied under this contract shall be packaged in sealed ocean freight containers for export to a tropical climate, and shall be packed in such a fashion as to be protected from conditions that may occur during loading, transport and unloading without suffering damage. The packaging shall comply with the best commercial practice for these conditions. Packaging for materials subject to deterioration on exposure to weather shall be sufficient to protect them from these conditions both during transit and during outdoor storage for a period not less than two months.

Minimum protection for those materials packed in cardboard boxes shall be palletizing of the boxes on a wooden pallet, protected and sealed with an integral plastic wrapping that not only covers the entirety of the packaged materials but which also protects the interior from moisture entry.

Unless otherwise specified, steel guy strand and ground wire shall be supplied in 200-meter coils, subject to the length tolerances specified by the applicable standard.

### **Documentation**

The following technical information shall be provided with the tender for each item offered:

- Description of the materials supplied including evidence of compliance with referenced standards and equivalence to descriptions and reference manufacturers listed in Quotation Tables
- Packaging details.
- Terms of manufacturer's warranty
- Statement of manufacturing experience of plant where conductors will be manufactured
- Statement of country of origin for all items
- List and explanations for any deviations from or exceptions to these specifications
- Copy of ISO 9001:2008 certifications for the manufacturing plant



## 9.1 Technical Particulars for Distribution Line Accessories

### Guarantee Schedules (G-1): Technical Data for Line Hardware and Accessories

Equivalent Reference Catalog for distribution line hardware technical specifications. Bidders are required to complete the following by entering the manufacturer and catalog number of the items. These items Reference Code are used in the construction structure drawings presented in the Annexure A-

#### Technical specifications for distribution line Accessories

Sl#	Materials	Ref. Code	Unit	Bidder Offer	
				Mfr.	Catalog No.
1	Eye bolt 16mm x required length	1a	ea.		
2	Preformed Armor rods	1e	ea		
3	Suspension clamp	1f	ea		
4	Parallel groove clamp	1g	ea		
5	Eye clevis	1h	ea	extension	
6	Parallel clamp for ground wire	a1	ea		
7	Oval eye nut, M16, galvanized, strength of Grade 4.6 bolt	aa	ea.		
8	Nut, thimble type eye, M16	ab	ea.		
9	Surge Arrester, gap type MOV, polymer housed,36kV UR, 29kV UC normal duty with crossarm bracket and isolator	ae	ea.		
10	Fused cutout, 100amp,27kV, 170kV BIL, 10kA	af	ea.		
11	Galvanized ground rod 16mm dia, 2400mm long	ai	ea.		
12	ground rod clamp for 16mm dia ground rod	aj	ea.		
13	Staples, ground wire	al	ea.		
14	Guy wire marker	at	ea		
15	Straight, thimble eyebolt, M16x required length, Grade 4.6	ao	ea.		
16	Shackle, anchor M16	bo	ea		
17	Preformed Armor rods for double support ACSR conductor	bv	ea.		
18	Preformed wrap lock tie, phase	bva	ea		
19	Preformed Dead end for ACSR conductor	bv	ea.		
20	Bolt, machine M16x required length, grade 4.6, galvanized with nut	c	ea.		
21	Ground wire, soft annealed iron, 3 strand x 4mm galvanized	cj	mtr		
22	Clamp, anchor rod for 16mm dia rod	ck	ea.		
23	Insulator, spool ANSI 53-2	cm	ea.		
24	Brace, steel, 840mm	cu	ea		

Weza Power Bidding Document Supply and Installation \_Employer Requirement

Sl#	Materials	Ref. Code	Unit	Bidder Offer	
				Mfr.	Catalog No.
25	Washer, square 50x50x5mm, galvanized, 17.5mm hole, galvanized	d	ea.		
26	Washer, circular 15x28x2.5mm, galvanized	d1	ea.		
27	Lock washer M16	d11	ea		
28	Lock washer	dd	ea		
29	Washer circular, M19 x 45mm	dd1	ea.		
30	Spool insulator support	da	ea.		
31	Elastomeric end caps	eec	ea		
32	Bracket, pole top for post insulator w M16 hardware	eb	ea.		
33	Locknuts	ek	ea.		
34	Pin for metallic crossarm	f	ea		
35	Metallic crossarm, 76x76x6mm, length 2.40meters	g	ea		
36	Alley crossarm brace (length 2330mm)	h	ea		
37	Bolt, steel, M14x40mm + NUT M14	i	ea.		
38	Bolt, steel, M16x40mm	i1	ea.		
39	Guy stain insulators	k1	ea		
40	Thimble eye clevis	l	ea		
41	Bolt Double arming, M16 x required length grade 4.6, galvanized, w 4 nuts ea.	n	ea.		
42	Bolt, oval eye, M16 x 250mm, Grade 4.6 rolled threads, galvanized	o	ea.		
43	Bolt, Hook Bolt with bended washer and nut, 300mm M16	o2	ea		
44	Connector, as required	p1	ea.		
45	Connector, Insulation Piercing connector, parallel Grove (7-150mm <sup>2</sup> & 2-95 mm <sup>2</sup> covered)	P3	ea		
46	Connectors ground ,as required	p2	ea.		
47	Clamp, Dead end anchor clamps for self supporting ABC	pre	ea		
48	Preform, Dead end for insulated cable	pre3	ea		
49	Clamp, ABC clamp 0 <sup>0</sup> to 30 <sup>0</sup>	psu	ea		
50	Clamp, ABC clamp 30 <sup>0</sup> to 90 <sup>0</sup>	Psu1	ea		
51	Swing Clevis	s	ea		
52	Support for steel band	s1	ea		
53	Steel band	sb	ea		
54	Side walk guy bracket	ss	ea		
55	Thimble, guy wire support	ss	ea.		
56	Galvanized steel pipe, 2'x1 meter	st	ea.		
57	Preformed guy-grip, dead end	u	ea.		

Weza Power Bidding Document Supply and Installation \_Employer Requirement

Sl#	Materials	Ref. Code	Unit	Bidder Offer	
				Mfr.	Catalog No.
58	Guy attachment	v	ea.		
59	Guy hook	v1	ea		
60	Anchor Rod, thimble eye M16x2400mm	x	ea.		
61	Anchor cross plate type 1600 cm2	z	ea.		
62	Concrete anchor cone	z	ea.		
63	Cable Tie 21" Black Nylon UV		ea.		
64	5/16"EHS galvanized steel Guy wire, as required	y	mtr.		

Guarantee Schedules (G-2): Technical Data for Surge Arrester, 30 kV

Technical Data for Surge Arrester, 30 kV				
No.	Description	Minimum Requirements		Data offered by Bidder
		Unit	Data	
1	Manufacturer			
2	Country of origin			
3	Type		polymer housed, gap type	
4	Housing		composite Polymeric housing	
5	Color		grey	
	<b>Nominal characteristics</b>			
6	Temp. Overvoltage for 10s.	p.u. MCOV	2.0	
7	Rated operating voltage Ur	kV rms	36	
8	Max. continuous operating voltage Uc	kV rms	29	
9	Rated discharge current (peak)	kA	5	
10	Line discharge class (IEC 60099-4)		1	
11	ANSI Duty rating		Normal	
12	Rated frequency	Hz	50	
	<b>Protection characteristics</b>			
14	Max. residual voltages:			
	For lightning impulse current, 8/20 μs, 5 kA	kV	80	

<b>Technical Data for Surge Arrester, 30 kV</b>				
<b>No.</b>	<b>Description</b>	<b>Minimum Requirements</b>		<b>Data offered by Bidder</b>
		<b>Unit</b>	<b>Data</b>	
	<b>Insulation levels of Housing</b>			
15	<u>Lightning impulse withstand voltage of housing</u>	kV	200	
16	Power frequency withstand (10 sec wet)	kV	140	
17	Power frequency withstand volt. (1 min. dry)		148	
18	Creepage distance	mm	1000	
	<b>Weights and dimensions</b>			
19	<ul style="list-style-type: none"> <li>• Outline drawing</li> </ul>		To be supplied by Bidder-	
20	<ul style="list-style-type: none"> <li>• Weight</li> </ul>	kg	To be supplied by Bidder-	
	<b>Accessories</b>			
21	Mounting hardware		yes	
22	Crossarm Bracket- wood crossarm 90x115mm		yes	
23	Isolator		yes	
24	Ground connector	Type	Stud and wire clamp	
25	HV terminals connectors	Type	Stud and wire clamp	
26	Type test report		to be included in bid	
27	Standard(s)		IEC 60099-4 or ANSI C62.11	
38	Quality control		ISO 9001	
29	Installation		outdoor	

## Guarantee Schedules (G-3):Technical Data for Fuse Cut-Out, 30 kV

<b>Technical Data for Fuse Cut-Out, 30 kV</b>				
No.	Description	Minimum Requirements		Data offered by Bidder
		Unit	Data	
1	Manufacturer			
2	Country of origin			
3	Type			
4	Rated max. voltage			
	• Phase to ground	kV	27	
5	Rated current	A	100	
6	Rated frequency	Hz	50	
7	Asymmetrical interrupting current	kA	10	
8	Impulse withstand voltage BIL	kV	170	
9	Power frequency withstand voltage	kV(rms)	70	
10	Creepage distance	mm/kV	31	
11	Max. ambient temperature	°C	40	
13	Bushing type		porcelain	
14	Fuse holder cap compatible with universal fuse links		yes	
15	Max. relative humidity	%	100	
16	Mounting crossarm bracket meeting the requirements of ANSI C37.42, Section 2.4 for Type A mounting brackets. The mounting bracket shall be adjustable to accommodate standard 90*115 * 2400 meter wood cross arms.		yes	
17	Terminals can be connected with aluminum /copper cables		yes	
18	Standard		IEC /NEMA IEEE-C37.40 ANSI37.42	

## 10 Materials Specifications\_ Vehicle

### Vehicles – Technical Data Sheet

#### Single Cabin

#### Single Cabin

<b>Overview</b>		
	Minimum Required	Offered
Engine	>or = 2.0 esel	
Doors	2	
Transmission	Manual	
Fuel Consumption (Average)	8.8l/100km	
<b>Engine</b>		
Power Max	118 Kw	
Power Max rpm	3700 r/min	
Torque Max	385 Nm	
Torque Max rpm	1500-2500 r/min	
Engine Size	>or = 2.0 esel	
Cylinders	4	
Charger	Turbocharger	
Fuel Type	Diesel	
Engine Position / Location	Front	
Transmission type	Manual	
Gear ratios quantity	6	
Gearshift	Manual	
Driven Wheels	All	
All-wheel-drive	Part-time	
<b>Economy</b>		
Average (l/100Km)	7	
Co2		
Fuel range		
Fuel tank capacity	80 l	
<b>Safety</b>		

ABS	✓
-----	---

EBD	✓	
Traction control	✓	
Stability control	✓	
Driver airbag	✓	
Passenger airbag	✓	
<b>Waranty</b>		
Warranty years	3	
Warranty distance	120000 Km	
Service plan years	6	
Service plan distance	60000 Km	
Service interval time	1	
<b>Features</b>		
Electric windows	Front (rear Fixed)	
Power steering	✓	
Central locking	✓	
Air conditioning	✓	
Cd player	✓	
Bluetooth connectivity	✓	
USB port	✓	
Auxiliary input	✓	
Daytime driving running lights	✓	
Alloy wheel	✓	
Front tyres		
Rear tyres		
Tow bar trailer hitch	✓	



## **2. Double Cabin**

### **Double Cabin**

<b>Overview</b>		
	Minimum Required	Offered
Engine	>or = 3.0 esel	
Doors	2+2	
Transmission	Automatic	
Fuel Consumption (Average)	8.8l/100km	
<b>Engine</b>		
Power Max	147 Kw	
Power Max rpm	3000 r/min	
Torque Max	470 Nm	
Torque Max rpm	1500-2750 r/min	
Engine Size	>or = 3.0 esel	
Cylinders	5	
Charger	Turbocharger	
Fuel Type	Diesel	
Engine Position / Location	Front	
Transmission type	Automatic	
Gear ratios quantity	6	
Gearshift	Automatic	
Driven Wheels	All	
All-wheel-drive	Part-time	
<b>Economy</b>		
Average (l/100Km)	8	
Co2		
Fuel range		
Fuel tank capacity	80 l	
<b>Safety</b>		
ABS	✓	
EBD	✓	
Traction control	✓	
Stability control	✓	
Driver airbag	✓	
Passenger airbag	✓	

<b>Waranty</b>		
Warranty years	3	
Warranty distance	120000 Km	
Service plan years	6	
Service plan distance	60000 Km	
Service interval time		1
<b>Features</b>		
Electric windows	Front (rear Fixed)	
Power steering	✓	
Central locking	✓	
Cruise control	✓	
Air conditioning	✓	
Climate control	✓	
Cd player	✓	
Bluetooth connectivity	✓	
USB port	✓	
Auxiliary input	✓	
Navigation	✓	
Daytime driving running lights	✓	
Auto on/off lights	✓	
Front fog lights	✓	
Rear fog lights	✓	
High level brake light	✓	
Rain sensor wipers	✓	
Electric folding mirrors	✓	
Multi function steering wheel controls	✓	
Keyless access	✓	
Alloy wheel	✓	
Front tyres		
Rear tyres		
Park distance control rear	✓	
Park distance control front		
Camera for park distance control	Rear	
Tow bar trailer hitch	✓	



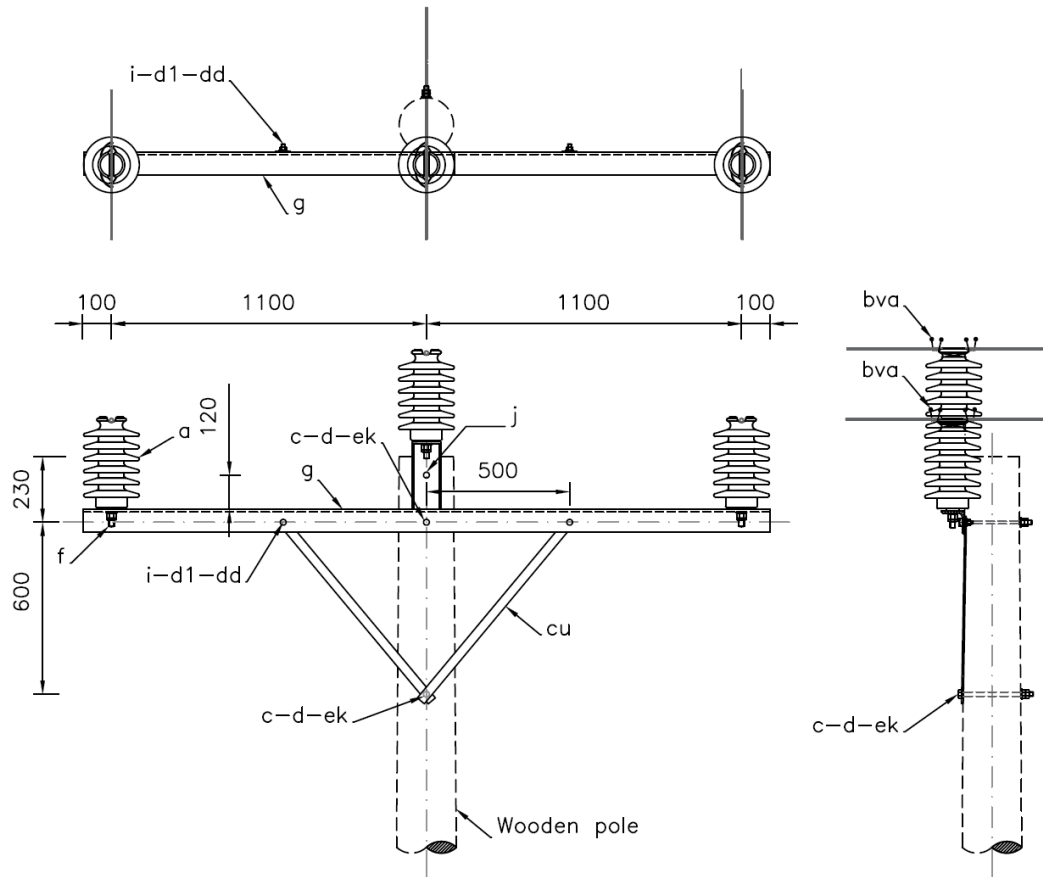
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**Medium Voltage 30kV Three Phase -Wooden Pole**

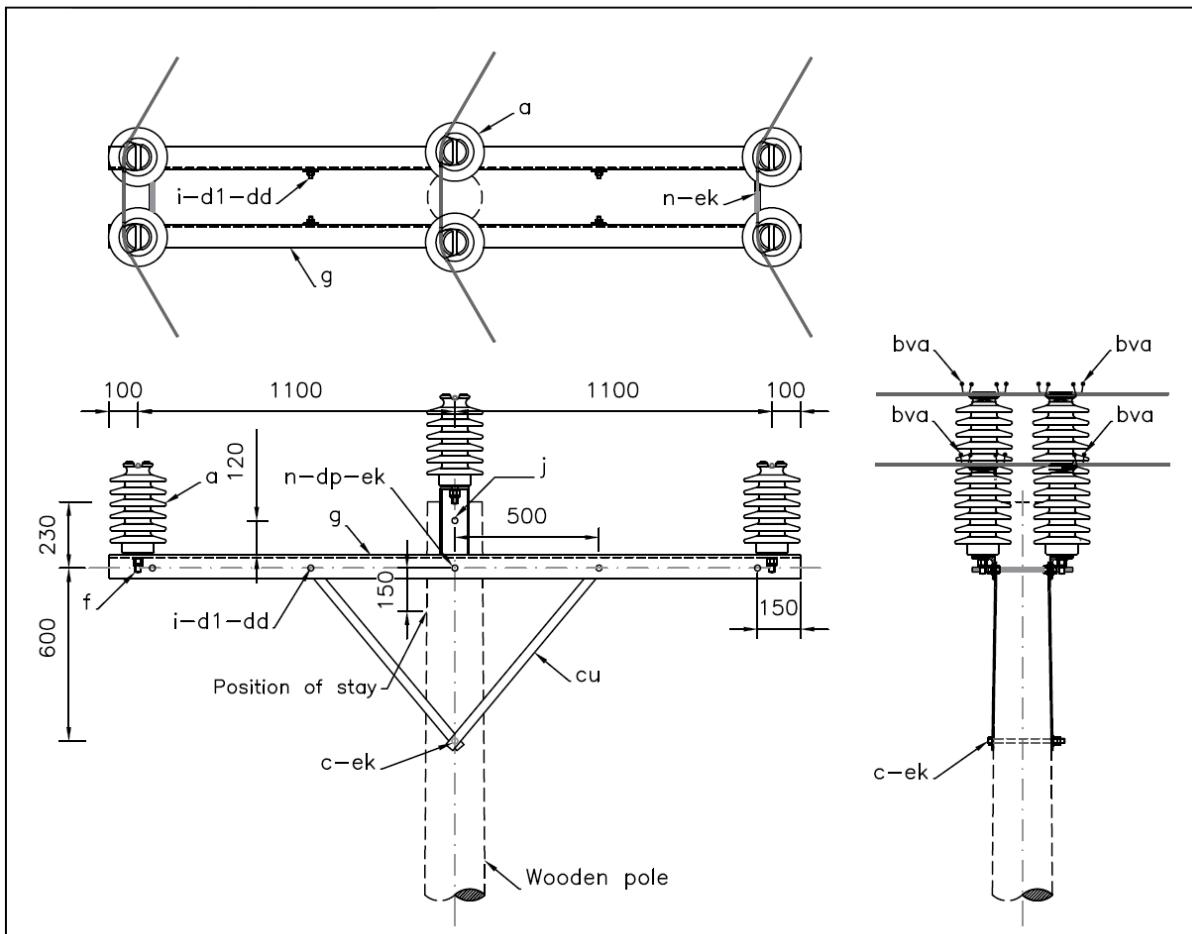
**Figure 11.1: ZC1\_Tangent \_ 30 kV Intermediate Assembly**



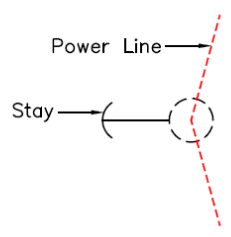
ITEM	QTY	DESCRIPTION OF MATERIAL
a	3	Insulator post type (33 kV)
c	2	Machine bolt , M16 x required length
j	1	Lag screw 12mm X 120 mm
d1	2	Washer, circular, M12, galvanized
f	3	Pin for metallic crossarm
g	1	Metallic crossarm, 75x75x7mm,length 2,40 meters
i	2	Machine bolt , M12x40mm+NUT M12
ek	2	Locknuts
dd	2	Lock washer M12
bva	3	Preformed wraplock tie, phase
cu	2	Brace, steel, 840mm
d	2	Washer, square, 50x50x5mm, galvanized, 17.5 mm hole

Note:  
1.- Dimensions in millimeters

**Figure 11.2: ZC2\_Double Primary Support\_ 30 kV Angle Assemble 0 -20 deg Single Pole**

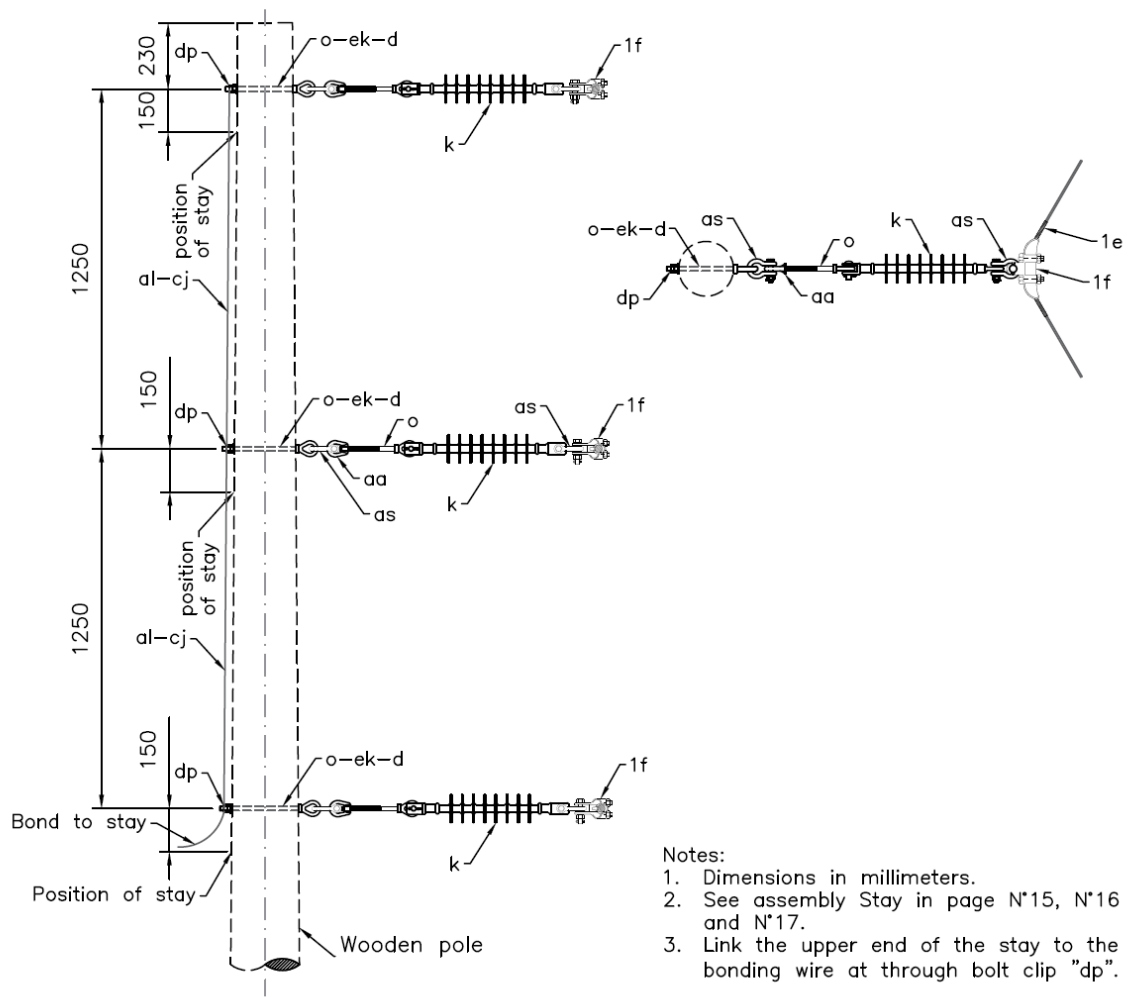


- Notes:  
 1. Dimensions in millimeters  
 2. See assembly Stay in page N°15, N°16 and N°17.

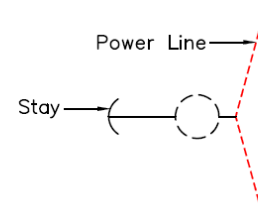


ITEM	QTY	DESCRIPTION OF MATERIAL
a	6	Insulator post type (33 kV)
c	1	Machine bolt , M16 x required length
j	2	Lag screw 12mm X 120 mm
d1	4	Washer, circular, M12, galvanized
f	6	Pin for metallic crossarm
g	2	Metallic crossarm, 75x75x7mm,length 2,40 meters
i	4	Machine bolt , M12x40mm+NUT M12
ek	6	Locknuts
dd	4	Lock washer M12
bva	6	Preformed wraplock tie, phase
cu	4	Brace, steel, 840mm
n	3	Bolt, double arming, M16 x req'd length
dp	1	Through bolt with clip

**Figure 11.3: ZC3\_Suspension Angle\_ 30 kV Angle Assembly 20 - 60 deg- Pole**



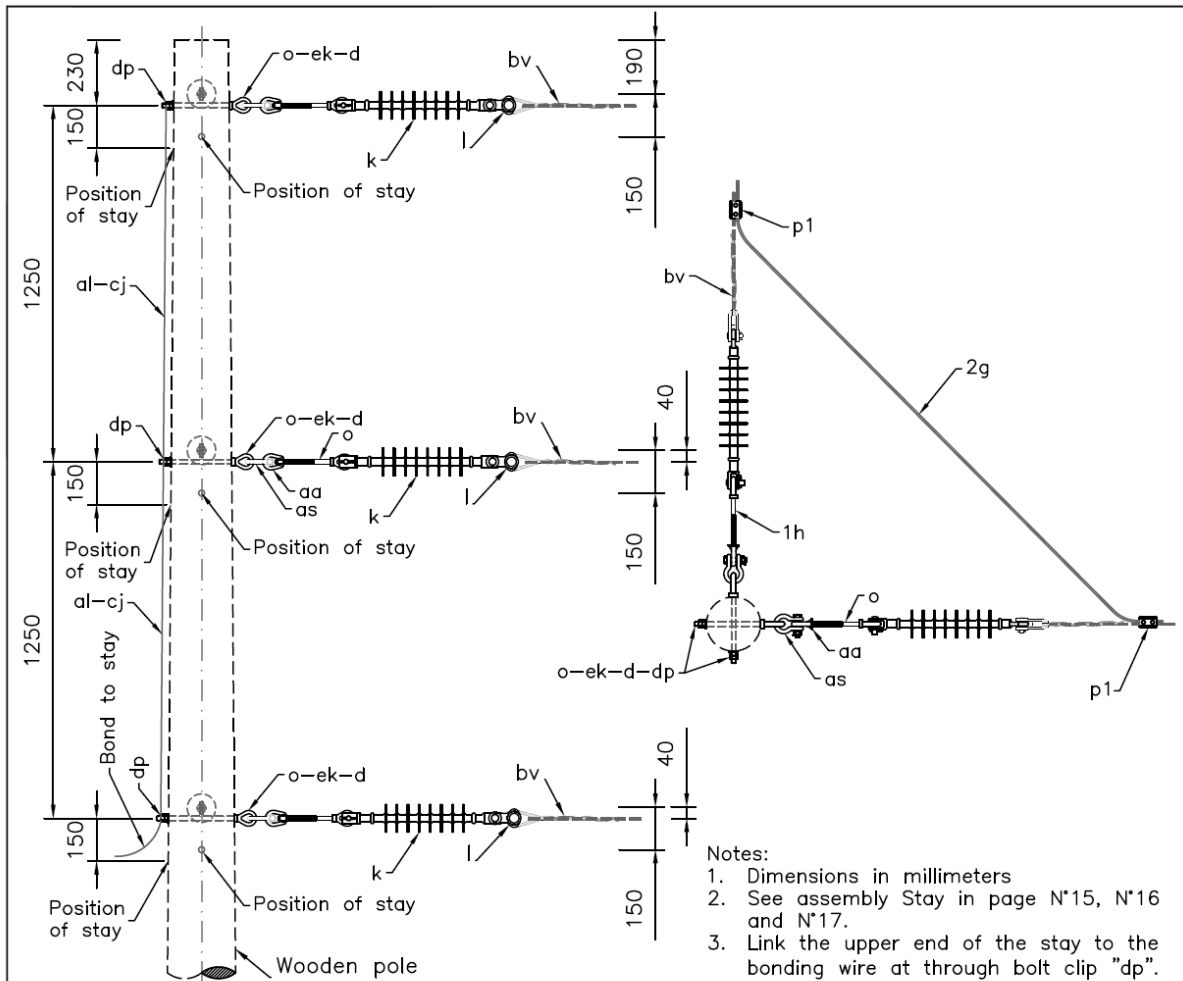
ITEM	QTY	DESCRIPTION OF MATERIAL
k	3	Insulator, suspension, type (33 kV)
d	3	Washer, square, 50x50x5mm, galvanized, 17.5 mm hole
ek	3	Locknuts
o	6	Eye bolt 16 mm x required length
1e	3	Preformed armor rod
1f	3	Suspension clamp
aa	3	Eye nut 16 mm
as	6	Anchor shackle
al	as required	Staple, earth wire staples, Hot Dip Galvanized
cj	-	Pole ground wire, as required
dp	3	Through bolt with clip





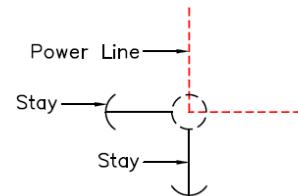
**Figure 11.4: ZC4: Vertical Construction\_ 30 kV Angle Assembly 60 - 90 deg- Pole**

Note: instead of ZC4 , DZC7 can be used in needed

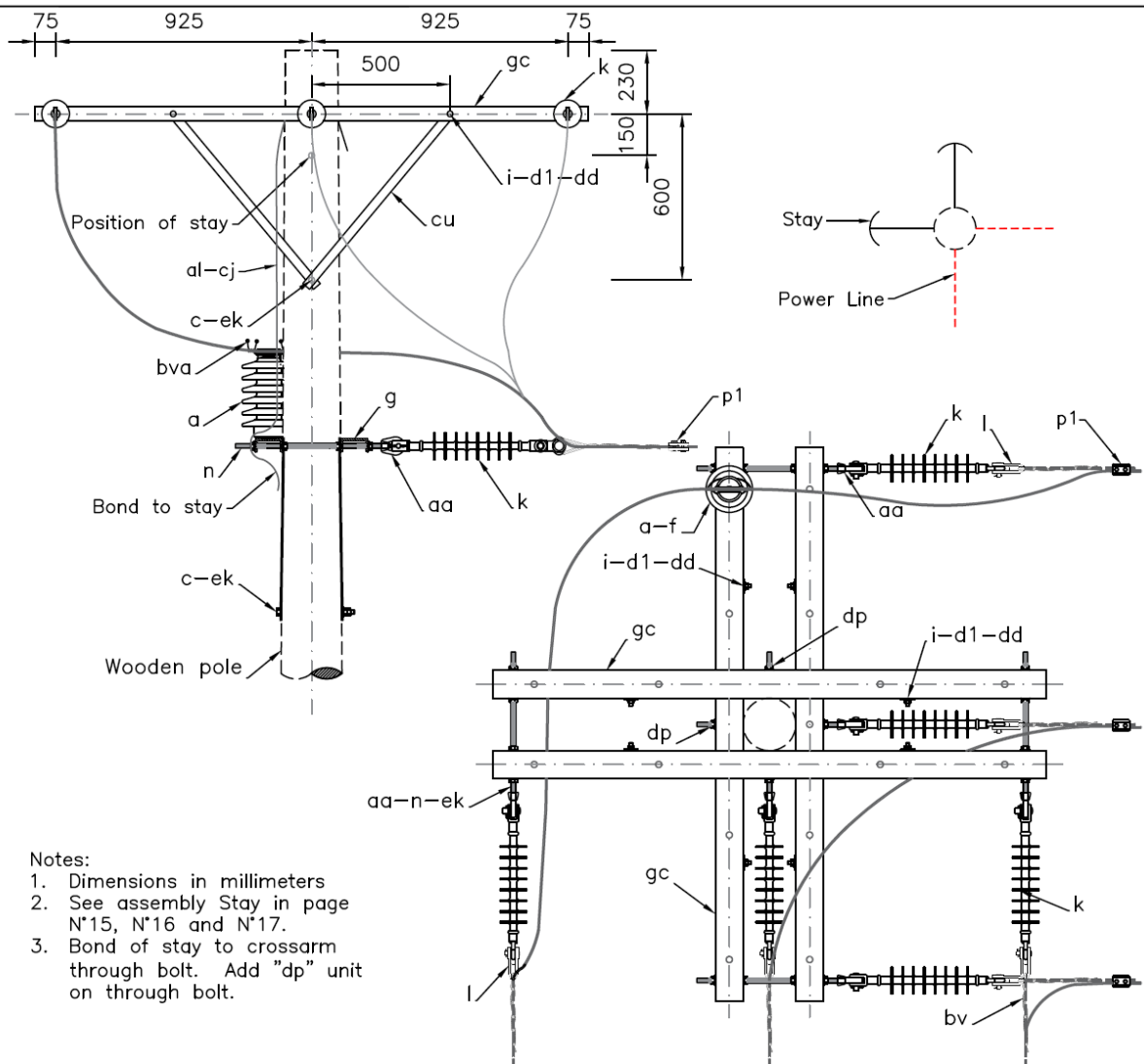


- Notes:
1. Dimensions in millimeters
  2. See assembly Stay in page N°15, N°16 and N°17.
  3. Link the upper end of the stay to the bonding wire at through bolt clip "dp".

ITEM	QTY	DESCRIPTION OF MATERIAL
k	6	Insulator, suspension, type (33 kV)
d	6	Washer, square, 50x50x5mm, galvanized, 17.5 mm hole
ek	6	Locknuts
bv	6	Preformed deadend
l	6	Thimble eye Clevis
o	6	Eye bolt 16 mm x required length
p1	6	Parallel groove clamp
2g	3	Conductor jumpers, size as required
1h	3	Eye clevis extension
aa	6	Eye nut 16 mm
as	6	Anchor shackle
al	as required	Staple, earth wire staples, Hot Dip Galvanized
cj	-	Pole ground wire, as required
dp	6	Through bolt with clip



**Figure 11.5: ZC7: Double DeadEnd\_ 30 kV Angle Assembly- 90 deg- Pole**



- Notes:
1. Dimensions in millimeters
  2. See assembly Stay in page N°15, N°16 and N°17.
  3. Bond of stay to crossarm through bolt. Add "dp" unit on through bolt.

ITEM	QTY	DESCRIPTION OF MATERIAL	ITEM	QTY	DESCRIPTION OF MATERIAL
p1	6	Parallel groove clamp, two by phase	dd	8	Lock washer M12
k	6	Insulator, suspension	bv	6	Preformed deadend
c	2	Machine bolt , M16 x required length.	n	6	Bolt, double arming, M16 x req'd length
f	1	Pin for metallic crossarm	aa	6	Eye nut, M16
d1	8	Washer, circular, M12, galvanized	l	6	Thimble eye Clevis
gc	4	Metallic channel cross arm, 100x50x8.5mm,length 2 meters	bva	1	Preformed wraplock tie, phase
i	8	Machine bolt , M12x40mm+NUT M12	dp	2	Through bolt with clip
a	1	Insulator post type (33 kV)	al	as required	Staple, earth wire staples, Hot Dip Galvanized
cu	8	Brace, steel, 840mm	cj	-	Pole ground wire, as required
ek	14	Locknuts.			

ELECTRIC DISTRIBUTION SYSTEM  
MEDIUM VOLTAGE 30 KV

DZC7: DOUBLE DEAD END,  
ANGLE 90° DEGREES

TITLE



N° Page: 9

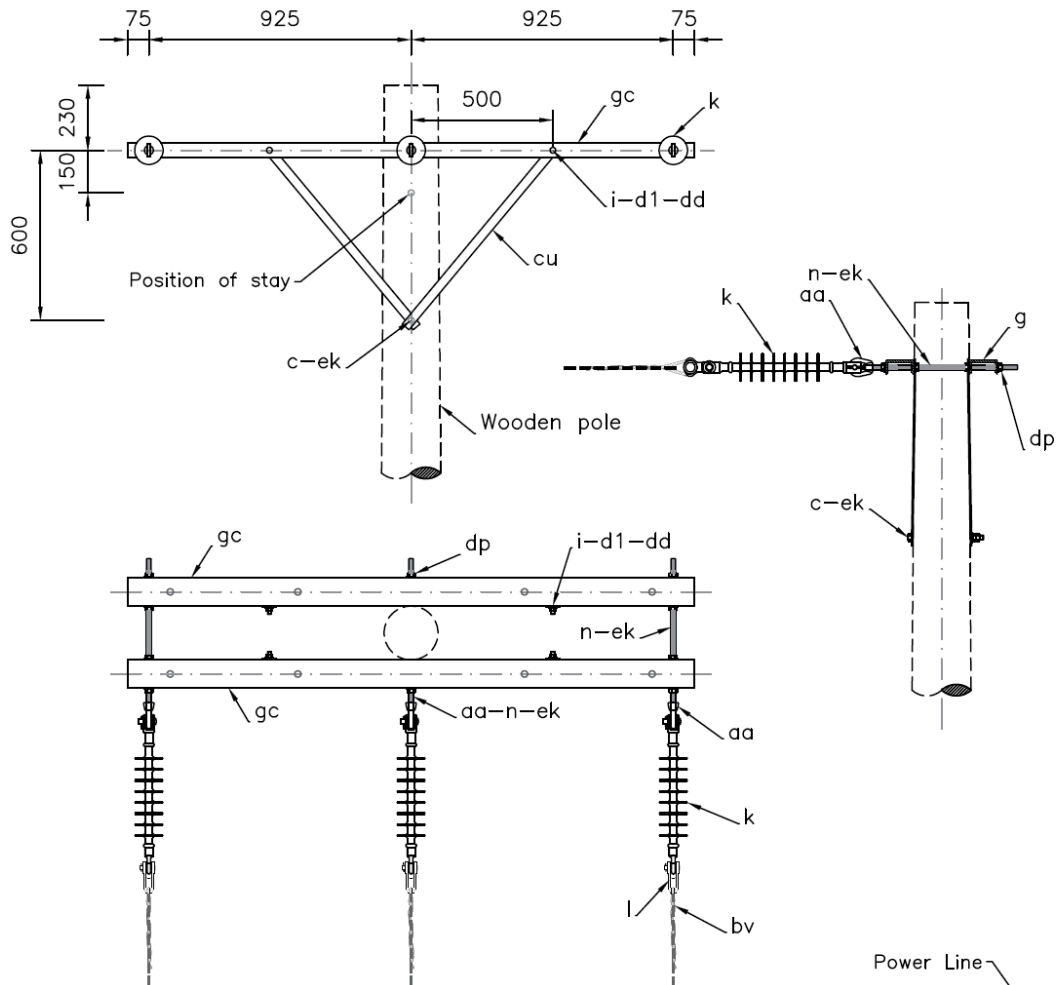
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N° Rev: A

Date: 30-01-2024

**DZC7**

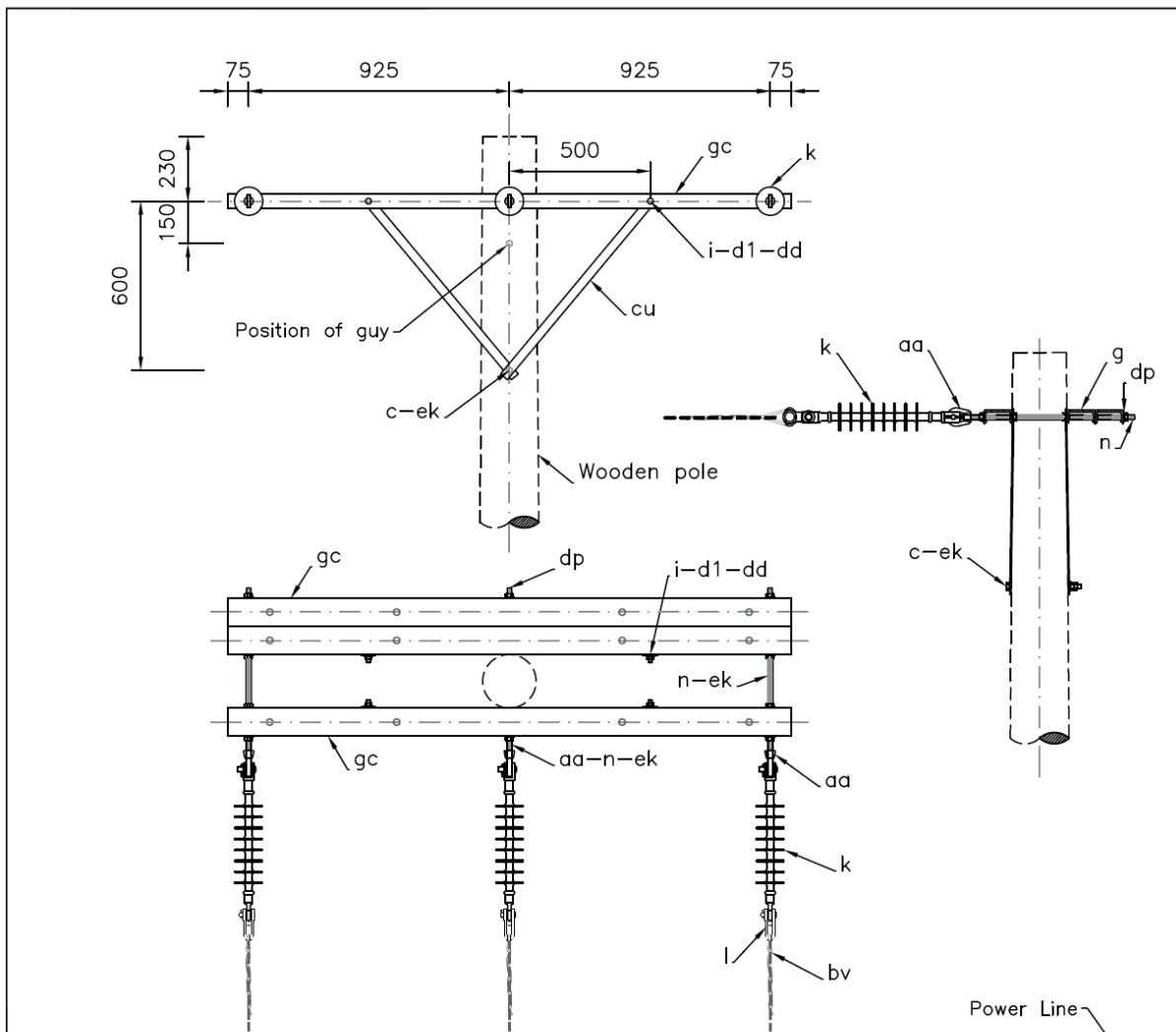
**Figure 11.6: ZC7\_Deadend (Single)\_ 30 kV Dead End Terminal Assembly- Pole**



- Notes:
1. Dimensions in millimeters
  2. See assembly Stay in page N°15, N°16 and N°17.
  3. Bond of stays to crossarm through bolts.

ITEM	QTY	DESCRIPTION OF MATERIAL	ITEM	QTY	DESCRIPTION OF MATERIAL
k	3	Insulator, suspension	dd	4	Lock washer M12
c	1	Machine bolt , M16 x required length.	bv	3	Preformed deadend
d1	4	Washer, circular, M12, galvanized	n	3	Bolt, double arming, M16 x req'd length
gc	2	Metallic channel cross arm, 100x50x8.5mm,length 2 meters	aa	3	Eye nut, M16
i	4	Machine bolt , M12x40mm+NUT M12	l	3	Thimble eye Clevis
cu	4	Brace, steel, 840mm	dp	1	Through bolt with clip
ek	7	Locknuts.			

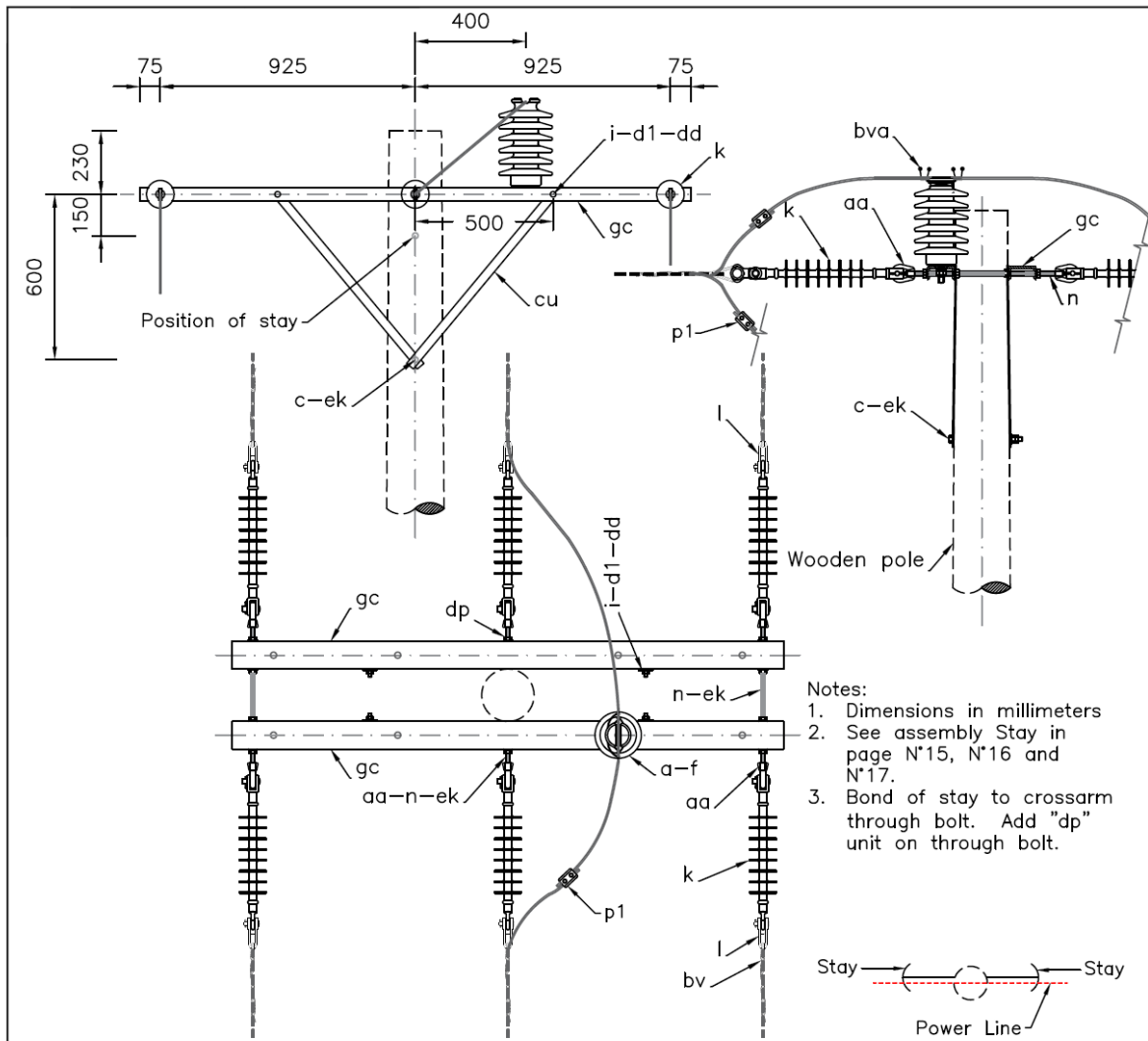
**Figure 11.7: ZC7-1\_Deadend (Single)\_ 30 kV Dead End Terminal Assembly- Pole**



- Notes:
1. Dimensions in millimeters
  2. See assembly Stay in page N°15, N°16 and N°17.
  3. Bond of stays to crossarm through bolts.

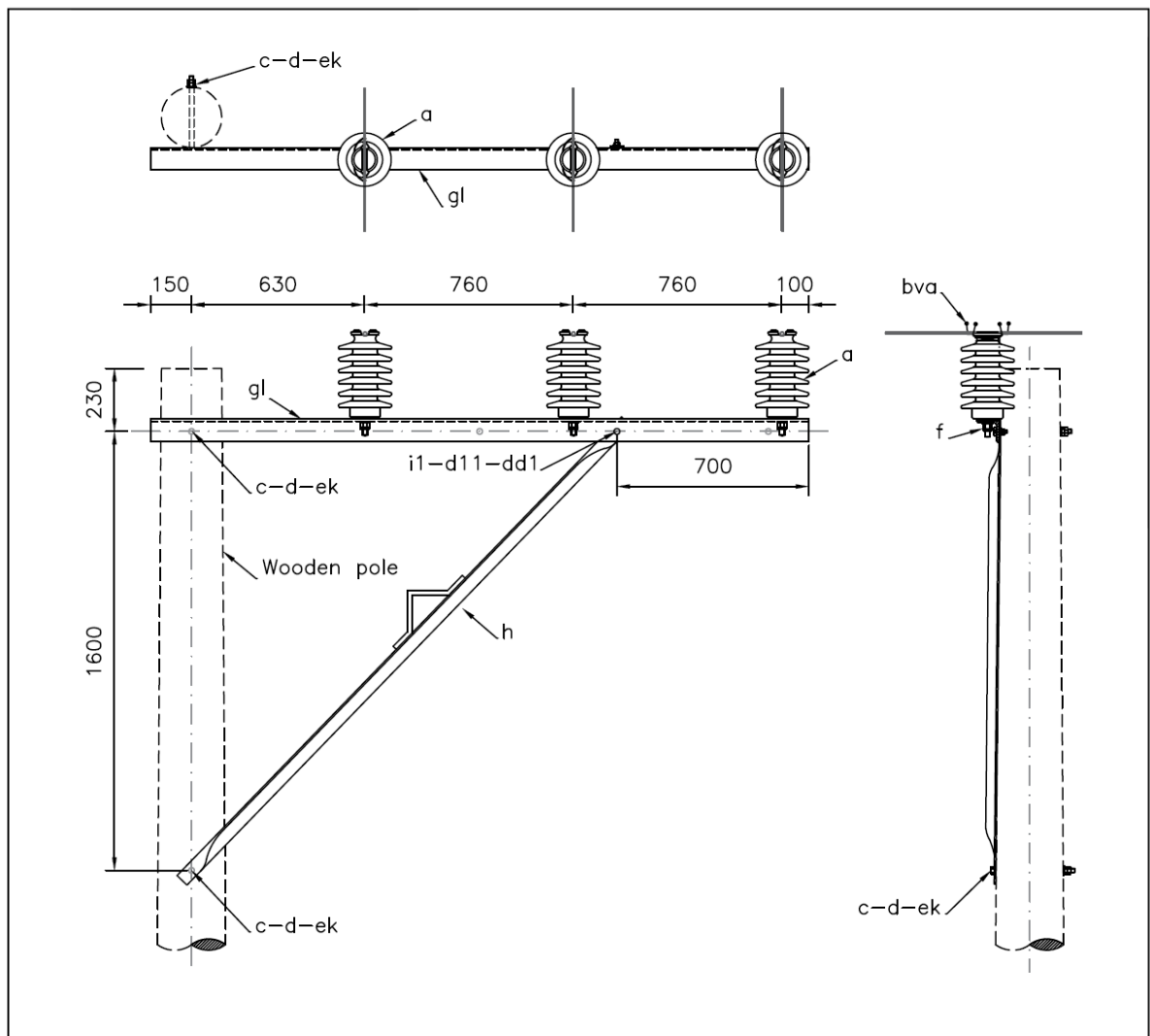
ITEM	QTY	DESCRIPTION OF MATERIAL	ITEM	QTY	DESCRIPTION OF MATERIAL
k	3	Insulator, suspension	dd	4	Lock washer M12
c	1	Machine bolt , M16 x required length.	bv	3	Preformed deadend
d1	4	Washer, circular, M12, galvanized	n	3	Bolt, double arming, M16 x req'd length
gc	3	Metallic channel cross arm, 100x50x8.5mm,length 2 meters	aa	3	Eye nut, M16
i	4	Machine bolt , M12x40mm+NUT M12	l	3	Thimble eye Clevis
cu	4	Brace, steel, 840mm	dp	1	Through bolt with clip
ek	7	Locknuts.			

**Figure 11.8: ZC8: Deadend (Double)\_ 30 kV In-Line Strain Assembly**




ITEM	QTY	DESCRIPTION OF MATERIAL	ITEM	QTY	DESCRIPTION OF MATERIAL
k	6	Insulator, suspension	dd	4	Lock washer M12
c	1	Machine bolt , M16 x required length.	bv	6	Preformed deadend
d1	4	Washer, circular, M12, galvanized	n	3	Bolt, double arming, M16 x req'd length
gc	2	Metallic channel cross arm, 100x50x8.5mm,length 2 meters	aa	6	Eye nut, M16
i	4	Machine bolt , M12x40mm+NUT M12	l	6	Thimble eye Clevis
a	1	Insulator post type (33 kV)	bva	1	Preformed wraplock tie, phase
f	1	Pin for metallic crossarm	p1	3	Parallel groove clamp, two by phase
cu	4	Brace, steel, 840mm	dp	1	Through bolt with clip
ek	7	Locknuts.			

**Figure 11.9: ZC10: Cantilever Cross Arm**

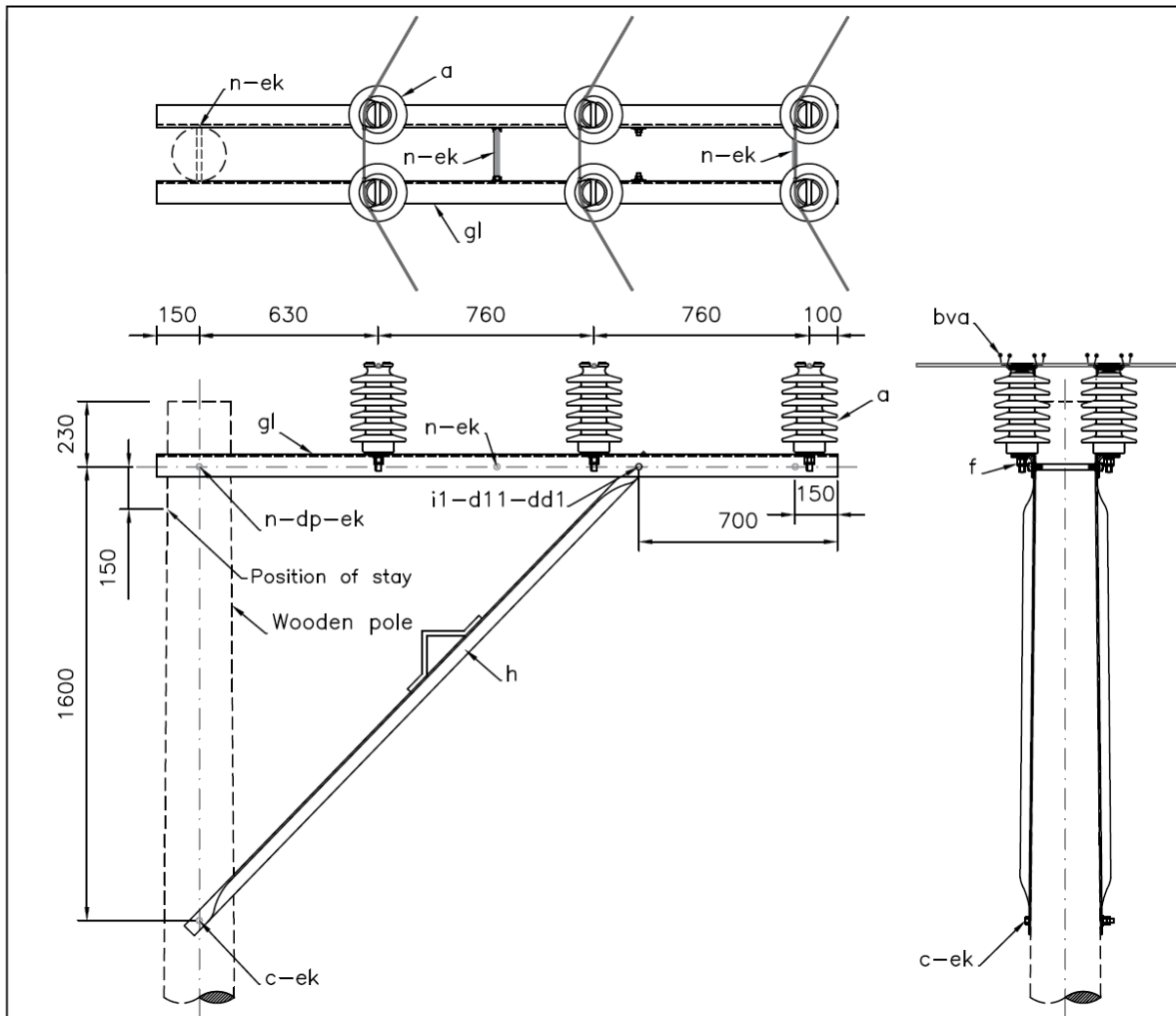


ITEM	QTY	DESCRIPTION OF MATERIAL
a	3	Insulator post type (33 kV)
c	2	Machine bolt , M16 x required length.
d	2	Washer, square, 50x50x5mm, galvanized, 17.5 mm hole
dd1	1	Washer, circular, M19 x 45mm
f	3	Pin for metallic crossarm
gl	1	Metallic crossarm, 75x75x7mm,length 2,40 meters
i1	1	Machine bolt , M12 x 40mm
h	1	Alley crossarm brace (length 2330 mm.)
ek	2	Locknuts
d11	1	Lock washer M16"
bva	3	preformed wraplock tie, phase

Note:  
1. Dimensions in millimeters

<p><b>ELECTRIC DISTRIBUTION SYSTEM</b> <b>MEDIUM VOLTAGE 30 kV</b></p> <p><b>ZC10: CANTILEVER CROSSARM</b></p> <p>TITLE</p>	 <p><b>NRECA International</b> Your Touchstone Energy® Partner</p>
<p>N° Page: 11</p> <p>N° Rev: A</p> <p>Date: 30-01-2024</p>	<p>Code:</p> <p><b>ZC10</b></p>

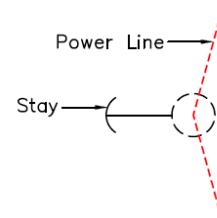
**Figure 11.10: ZC11: Cantilever Double Cross Arm**



ITEM	QTY	DESCRIPTION OF MATERIAL
a	6	Insulator post type (33 kV)
c	1	Machine bolt , M16 x required length.
dd1	1	Washer, circular, M19 x 45mm
f	6	Pin for metallic crossarm
gl	2	Metallic crossarm, 75x75x7mm,length 2,40 meters
i1	2	Machine bolt , M12 x 40mm
h	2	Alley crossarm brace (length 2330 mm.)
ek	4	Locknuts
d11	2	Lock washer M16
bva	6	preformed wraplock tie, phase
n	3	Bolt, double arming, M16 x req'd length
dp	1	Through bolt with clip

**Notes:**

1. Dimensions in millimeters
2. See assembly Stay in page N°15, N°16 and N°17.
3. Bond of stay to crossarm through bolt. Add "dp" unit on through bolt.



ELECTRIC DISTRIBUTION SYSTEM  
MEDIUM VOLTAGE 30 kV  
**ZC11: CANTILEVER DOUBLE CROSS ARM**  
TITLE



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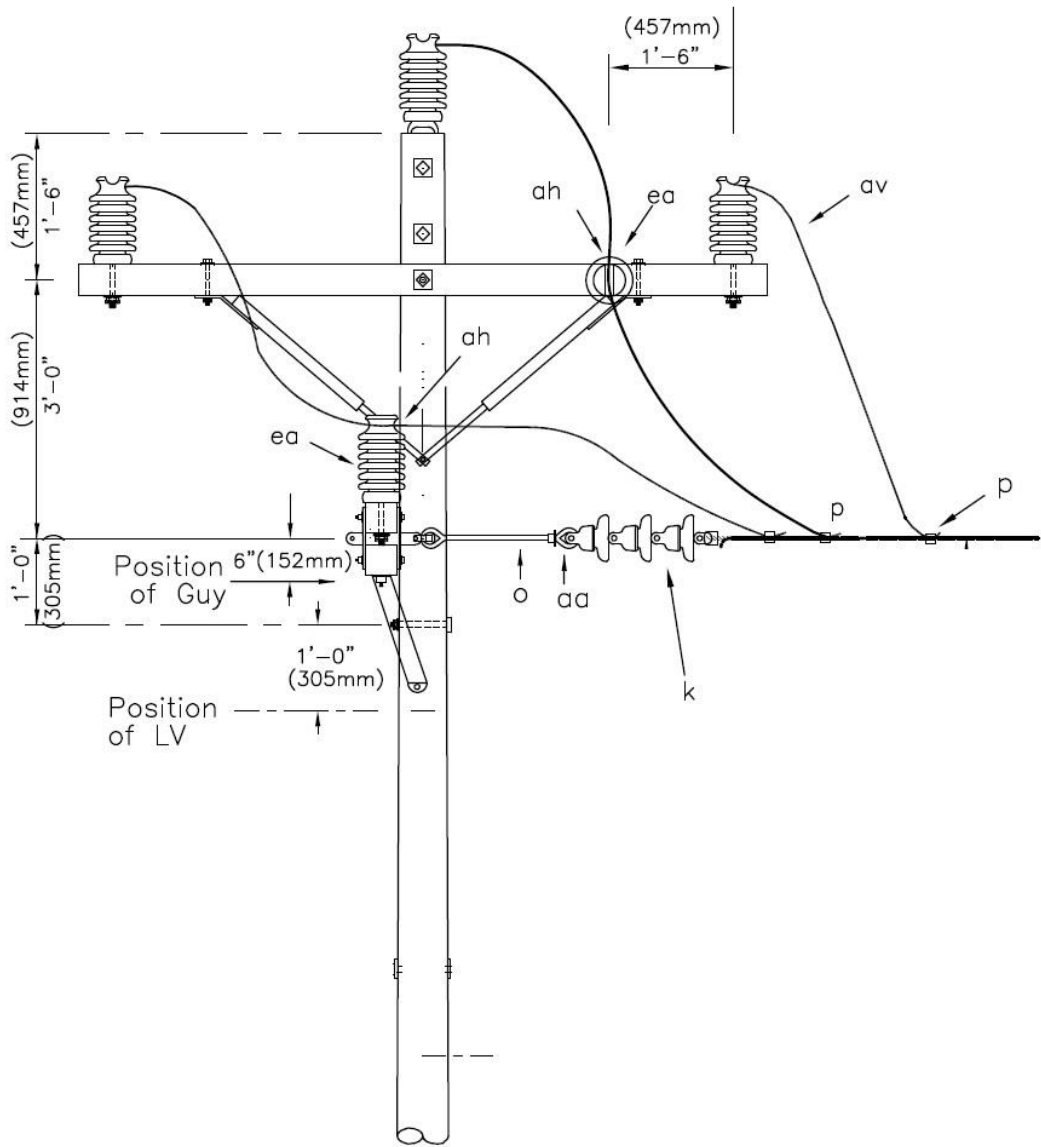
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N° Rev: A

Date: 30-01-2024

**ZC11**

**Figure 11.11: ZM29-2: 30 kV T-Off Assembly Single Pole**



ITEM	QTY	MATERIAL	ITEM	QTY	MATERIAL
	1	ZC1 Primary Assembly	o	3	Eyebolt 5/8" x 10"
	1	ZC7/ZC7-1 Primary Assembly	bo	3	Shackle, anchor 5/8"
p	-	Connectors, compression type, as req'd	aa	3	Eyenuit 5/8"
av	-	Jumpers, bare stranded as req'd	ea	2	Insulator, post type ANSI 57-2, F-Neck, 7" stud, w/ nut
			ah	2	Preformed Wraplock Tie, Phase

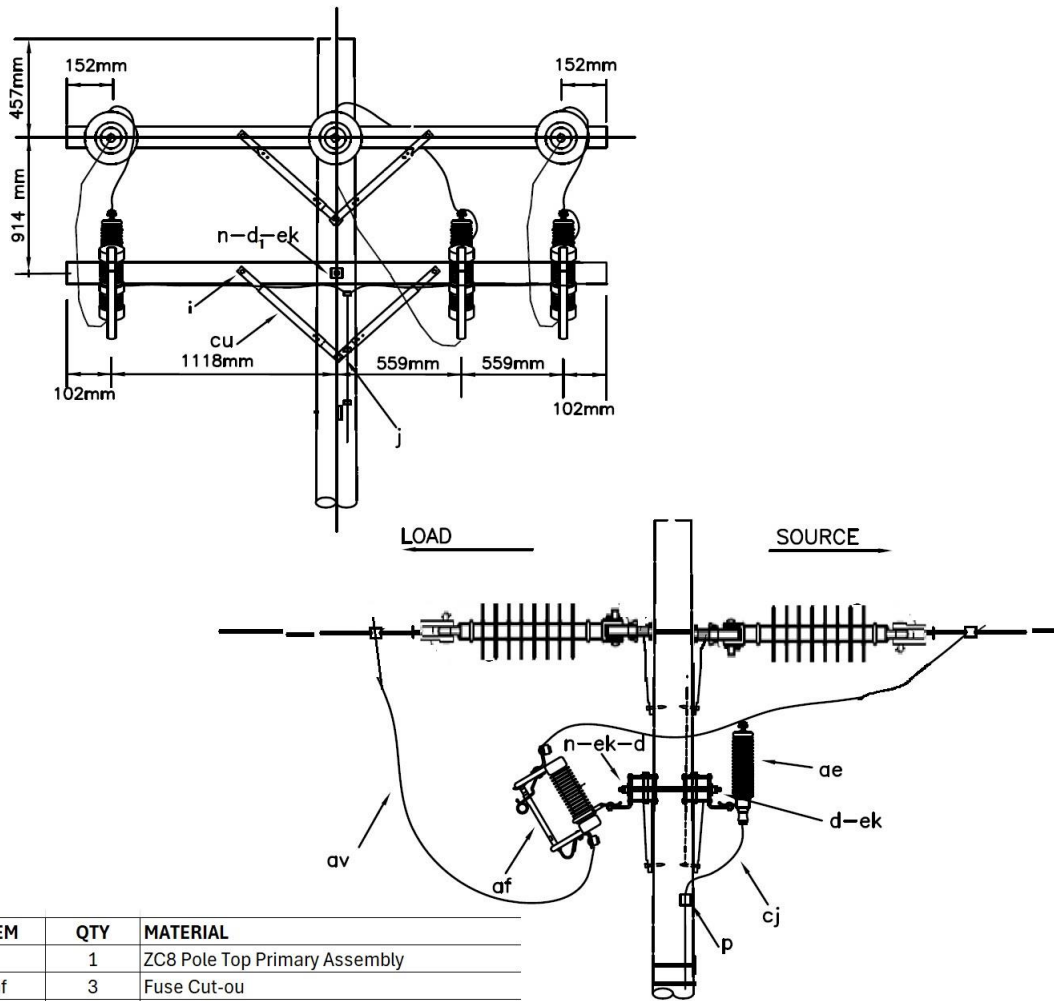
Primary Three Phase Tap  
Guide  
Medium Voltage 30KV

Date: 10-04-2024

ZM29-2

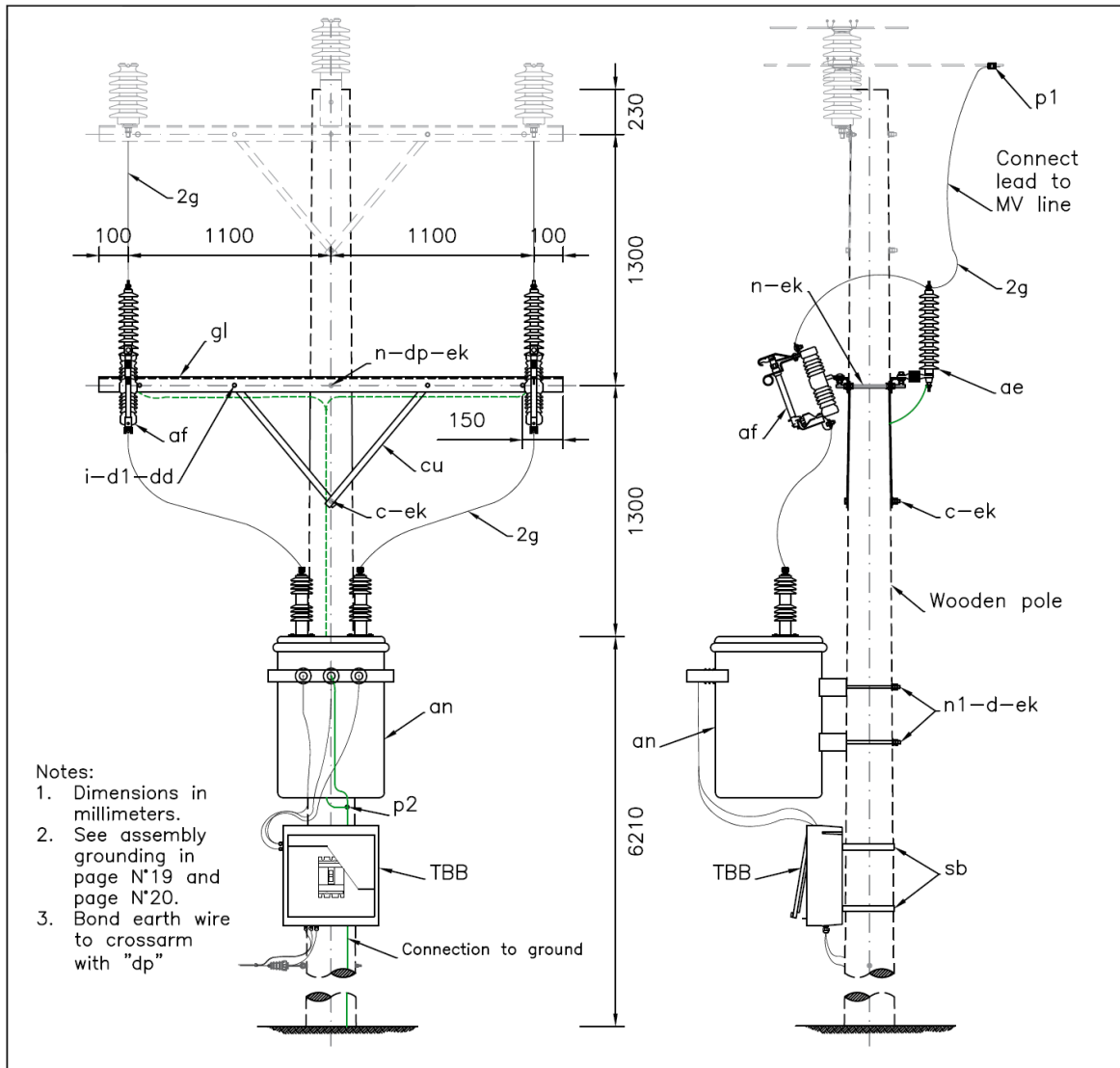


**Figure 11.12: ZM3-3: 30kV Sectionalizing Fuse Cut-out Assemblies**



ITEM	QTY	MATERIAL
	1	ZC8 Pole Top Primary Assembly
af	3	Fuse Cut-ou
ae	3	Surge Arrester
av		Conductor, as req'd
gl	2	Metallic crossarm, 75x75x7mm, length 2.4m
cu	4	Brace, steel 840mm
d1	6	Washer, circular M12 galvanized
ek	6	Locknuts
i	2	Machine bol, M12x40mm+Nut m12
n	2	Bolt, double arming, req'd leangth
p		Connector, ground, as req'd
p2		Connector, compression type, as req'd
M2-11	1	Grounding Unit

**Figure 11.13: ZG2: Single Phase (Phase-Phase) Transformer**



Notes:

1. Dimensions in millimeters.
2. See assembly grounding in page N°19 and page N°20.
3. Bond earth wire to crossarm with "dp"

ITEM	QTY	DESCRIPTION OF MATERIAL	ITEM	QTY	DESCRIPTION OF MATERIAL
2g	4	Conductor jumpers, size as required	af	2	Cutout, dist. open
c	1	Machine bolt , M16 x required length.	p1	2	Connectors, as req'd
gl	2	Metallic crossarm, 75x75x7mm,length 2,40 meters	p2	-	Connectors ground, as req'd
ek	8	Locknuts.	n	3	Bolt, double arming, M16 x req'd length
an	1	Transformer 2-PH, 19/0.460-230 KV, 50 kVA.	d1	4	Washer, circular, M12, galvanized
cu	4	Brace, steel, 840mm	dd	4	Lock washer M12
i	4	Machine bolt , M12x40mm+NUT M12	sb	2	Steel band
d	2	Washer, square, 50x50x5mm, galvanized, 17.5 mm hole	TBB	1	Transformer Breakers Box
ae	2	Arrester, surge	n1	2	Machine bolt , M20 x required length.
			dp	1	Through bolt with clip

**ELECTRIC DISTRIBUTION SYSTEM  
MEDIUM VOLTAGE 30 KV**

**ZG2: TWO PHASE TRANSFORMER**

TITLE



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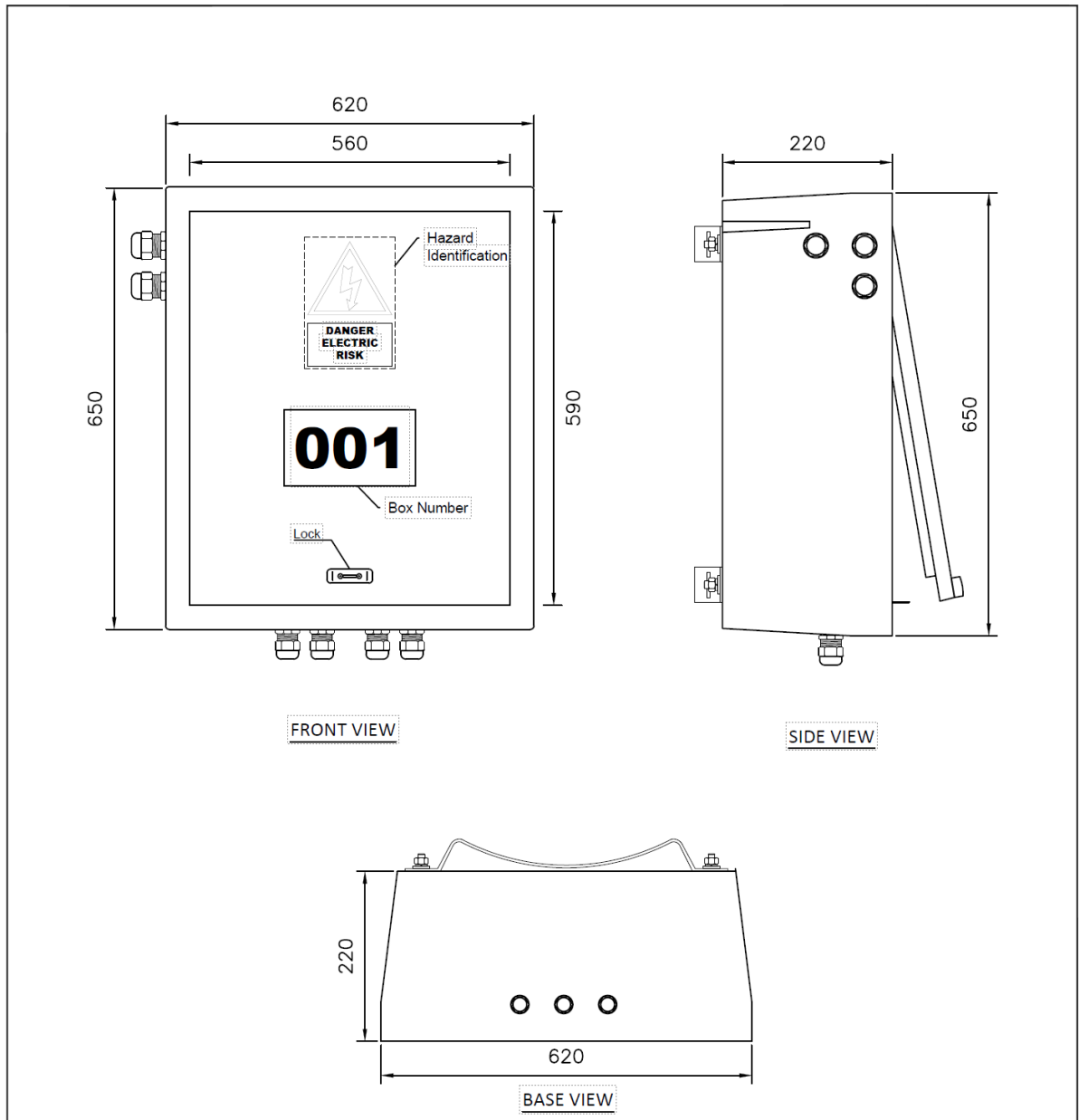
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Date: 30-01-2024

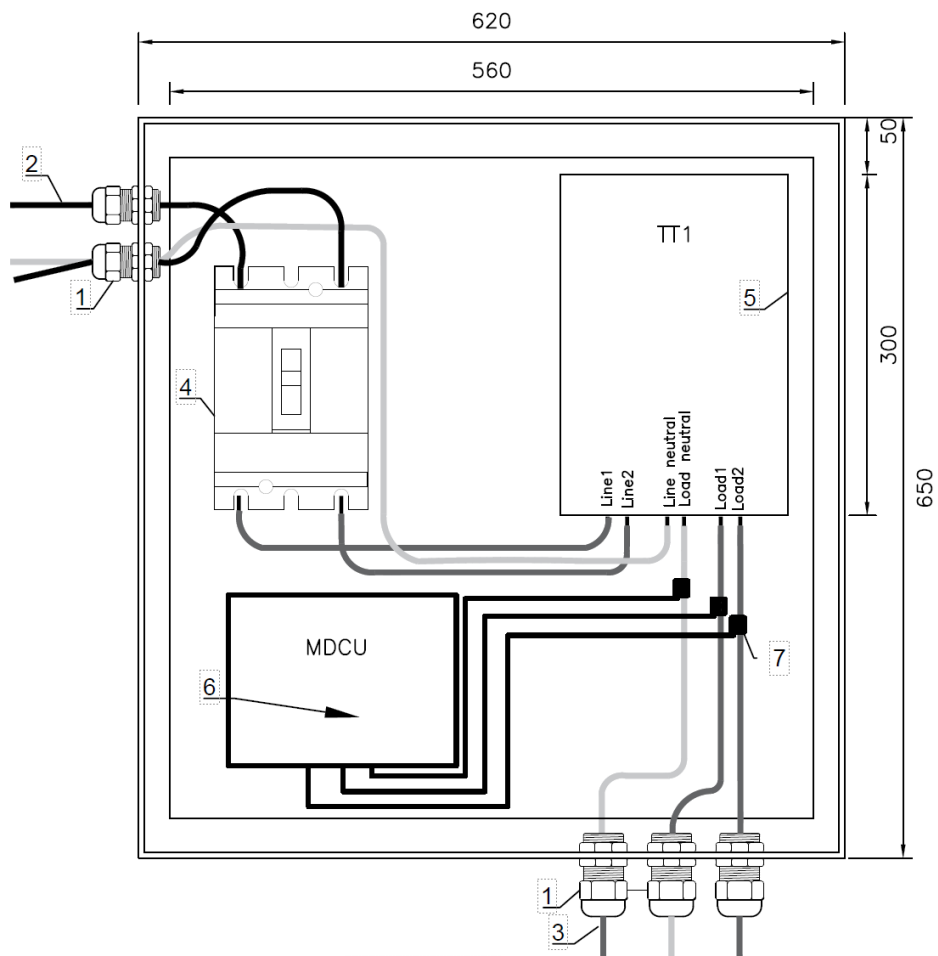
**ZG2**

**Figure 11.14:TBB1: Single phase Transformer Breaker Box**



- Notes:
- 1.- Dimensions in millimeters.
  - 2.- Box should be provided with supports on the back to fix it with steel bands.
  - 3.- View Internal wiring arrangement in page N°15.

<p><b>ELECTRIC DISTRIBUTION SYSTEM LOW VOLTAGE</b></p>							
<p><b>SINGLE PHASE TRANSFORMER BREAKER BOX</b></p>							
<p>TITLE</p>		<table border="1"> <tr> <td>N° Page: 14</td> <td>Code:</td> </tr> <tr> <td>N° Rev: A</td> <td rowspan="2" style="text-align: center; font-size: 24pt;"><b>TBB1</b></td> </tr> <tr> <td>Date: 10-04-2024</td> </tr> </table>	N° Page: 14	Code:	N° Rev: A	<b>TBB1</b>	Date: 10-04-2024
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N° Rev: A	<b>TBB1</b>						
Date: 10-04-2024							



Note:  
1.- Dimensions in millimeters.

FRONT VIEW

ITEM	QTY	DESCRIPTION OF MATERIAL
1	-	Cable Glante
2	-	Incoming cable from transformer
3	-	Outgoing load cable
4	1	Molded case circuit breaker
5	1	Direct connected 1phase 2 elements AMI Meter
6	-	Metering Data Concentrator Unit
7	3	Insulating Piercing Connector

ELECTRIC DISTRIBUTION SYSTEM  
LOW VOLTAGE

INTERNAL WIRING ARRANGMENT  
1-PHASE TRANSFORMER BREAKER BOX

TITLE



N° Page: 15

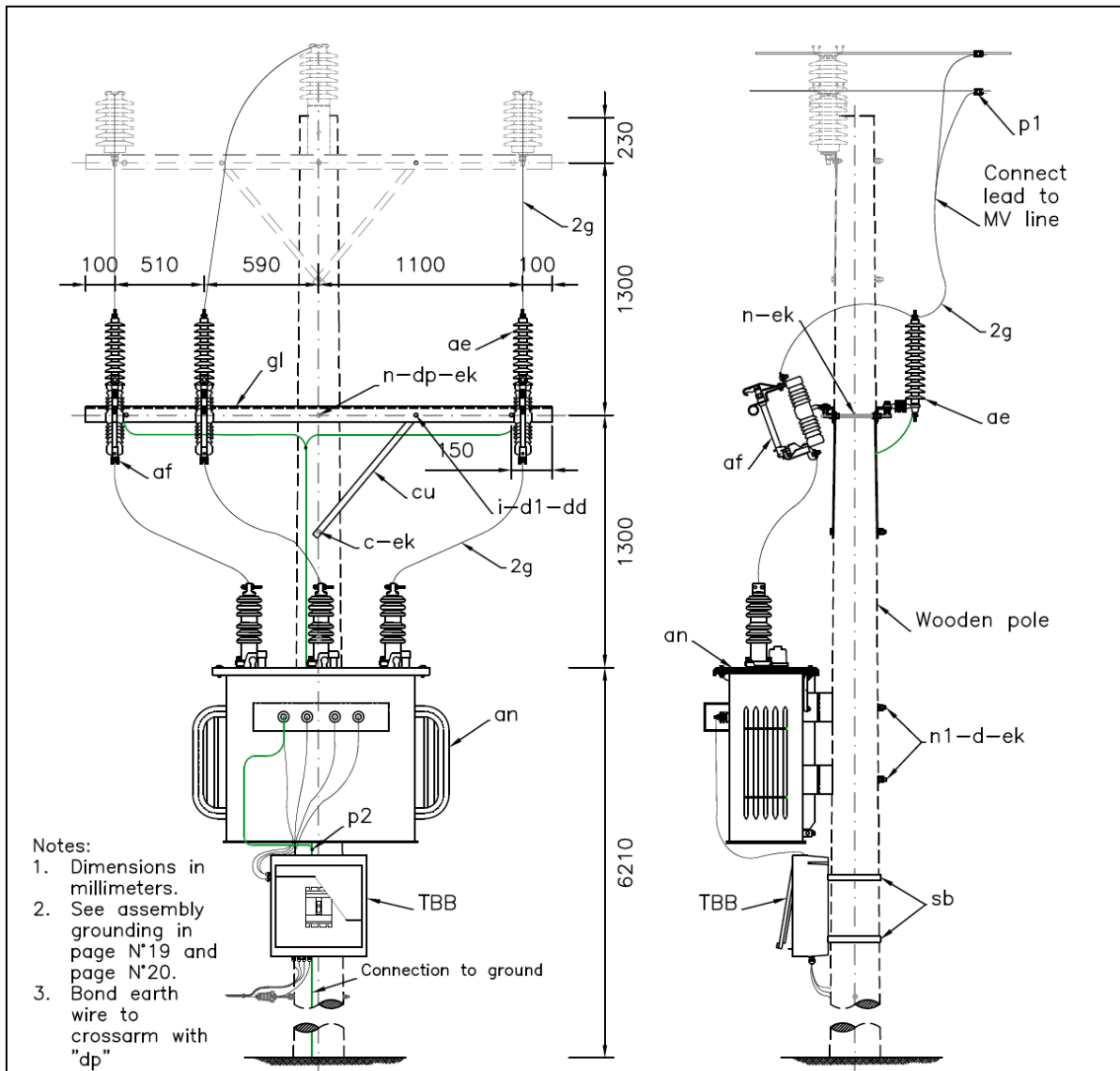
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N° Rev: F

Date: 10-04-2024

TBB1

**Figure 11.15: ZG3: Transformer Assemblies Three Phase Transformer**

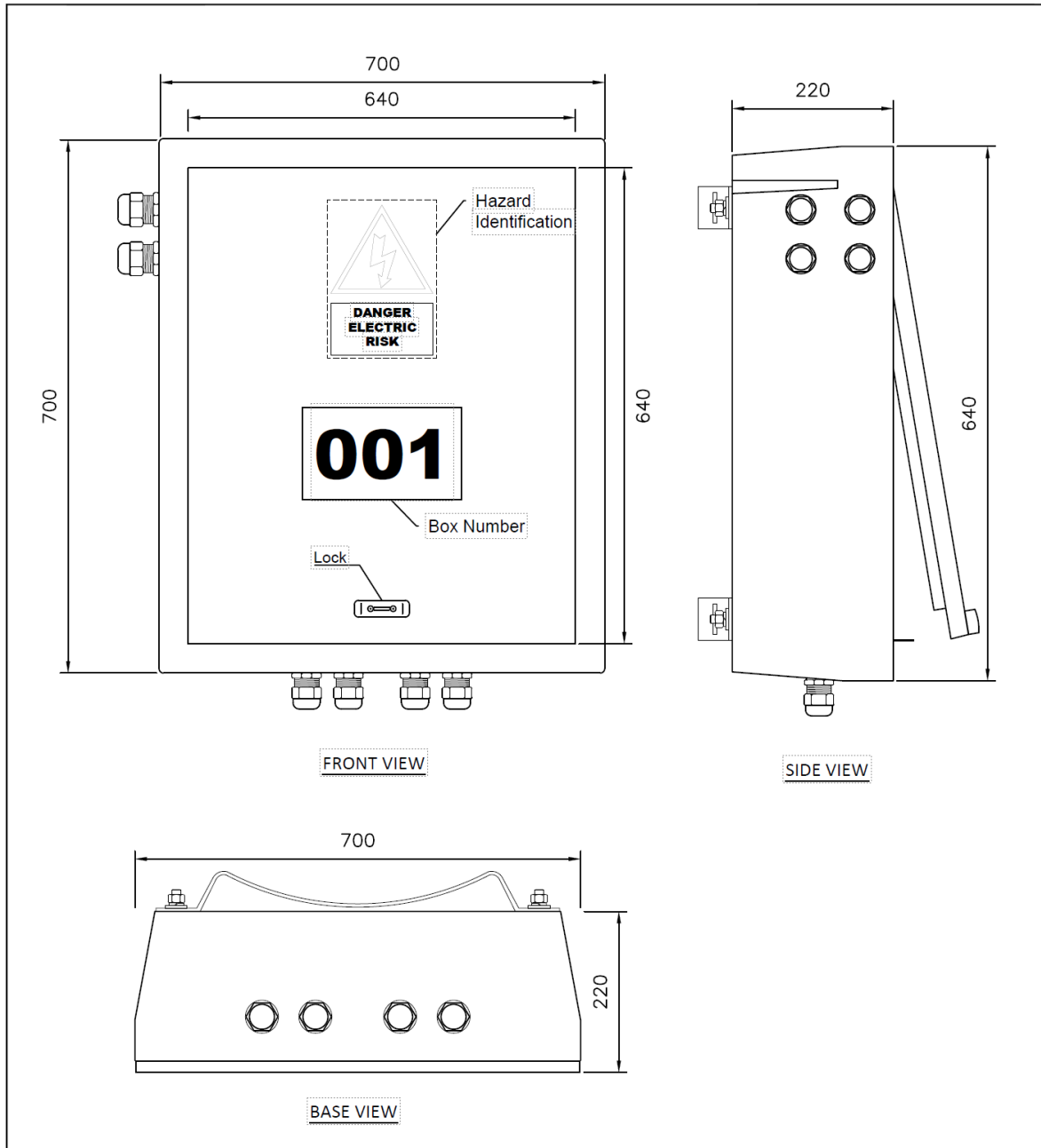


ITEM	QTY	DESCRIPTION OF MATERIAL	ITEM	QTY	DESCRIPTION OF MATERIAL
2g	6	Conductor jumpers, size as required	af	3	Cutout, dist. open
c	1	Machine bolt , M16 x required length.	p1	3	Connectors, as req'd
gl	2	Metallic crossarm, 75x75x7mm,length 2,40 meters	p2	-	Connectors ground, as req'd
ek	8	Locknuts.	n	2	Bolt, double arming, M16 x req'd length
an	1	Transformer 3-PH, 33/0.460-230 kV, 75 kVA	d1	4	Washer, circular, M12, galvanized
cu	2	Brace, steel, 840mm	dd	4	Lock washer M12
i	4	Machine bolt , M12x40mm+NUT M12	sb	2	Steel band
d	2	Washer, square, 50x50x5mm, galvanized, 17.5 mm hole	TBB	1	Transformer Breakers Box
ae	3	Arrester, surge	n1	2	Machine bolt , M20 x required length.
			dp	1	Through bolt with clip


ELECTRIC DISTRIBUTION SYSTEM  
MEDIUM VOLTAGE 30 KV

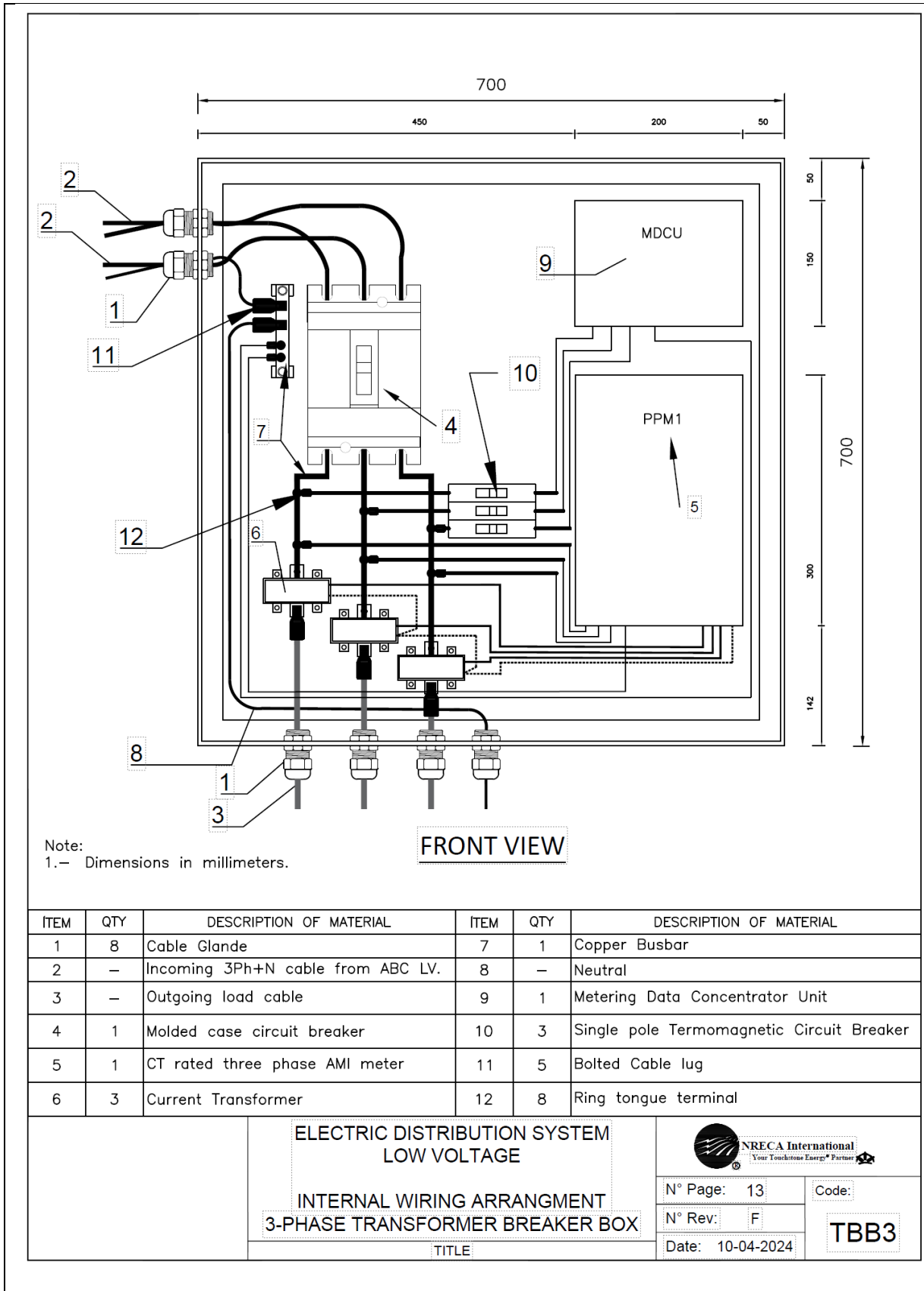


**Figure 11.16:TBB3: Three phase Transformer Breaker Box**

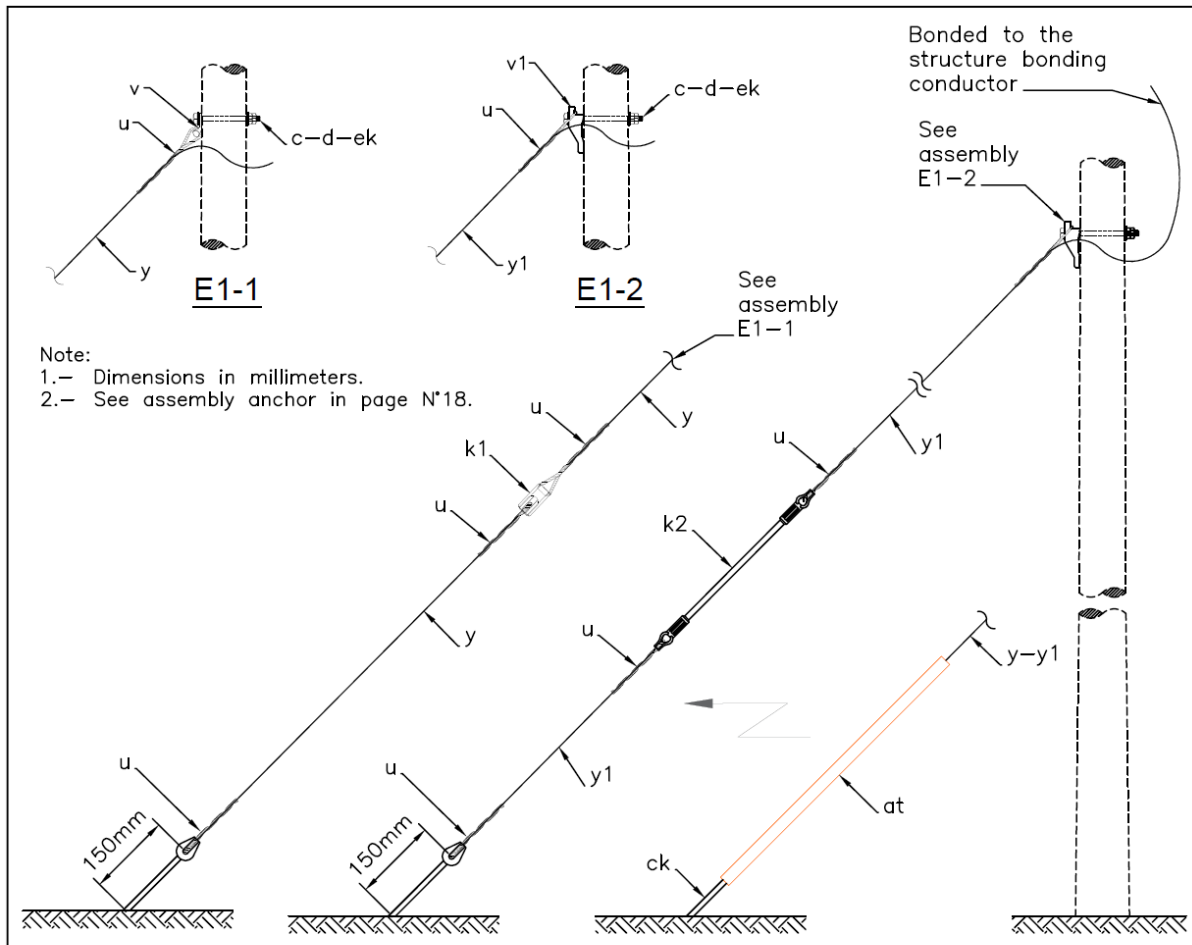


- Notes:
- 1.- Dimensions in millimeters.
  - 2.- Box should be provided with supports on the back to fix it with steel bands.
  - 3.- View Internal wiring arrangement in page N°13.

<p><b>ELECTRIC DISTRIBUTION SYSTEM LOW VOLTAGE</b></p> <p><b>THREE PHASE TRANSFORMER BREAKER BOX</b></p> <p>TITLE</p>	 <p><b>NRECA International</b> Your Touchstone Energy® Partner</p>	
	<p>N° Page: 12</p>	<p>Code:</p>
	<p>N° Rev: A</p>	<p><b>TBB3</b></p>
	<p>Date: 10-04-2024</p>	



**Figure 11.17: ZE1-1/2 Stay Assemblies Single Down Stay**



Note:  
 1.- Dimensions in millimeters.  
 2.- See assembly anchor in page N°18.

ITEM	QTY		DESCRIPTION OF MATERIAL
	Low Voltage	Medium Voltage	
	E1-1	E1-2	
c	1	1	Machine bolt , M16 x 300mm length
d	1	1	Washer, square, 50x50x5mm, galvanized, 17.5 mm hole
k1	1	—	Guy strain insulators
u	4	4	Preformed guy-grip, dead-end
v	1	—	Guy attachment
y	1	—	25 mm <sup>2</sup> galvanized steel stay wire, as required
y1	—	1	52 mm <sup>2</sup> galvanized steel stay wire, as required
at	1	1	Guy wire marker
ek	1	1	Locknuts
v1	—	1	Guy hook
k2	—	1	Fiberglass guy strain insulator

**ELECTRIC DISTRIBUTION SYSTEM  
 MEDIUM VOLTAGE 30 KV**

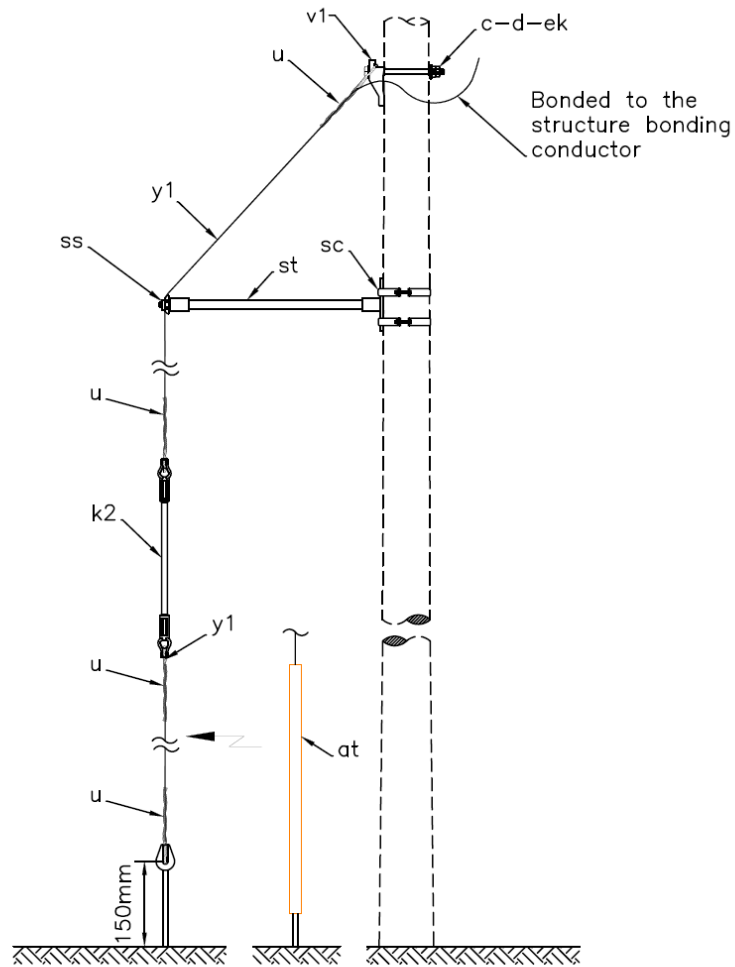
E1-1: SINGLE DOWN STAY (LV Line)  
 E1-2: SINGLE DOWN STAY - Heavy Duty

N° Page: 15	Code:
N° Rev: A	E1-1/2
Date: 30-01-2024	

TITLE




**Figure 11.18:ZE1-2S Stay AssembliesSide Walk Guy**

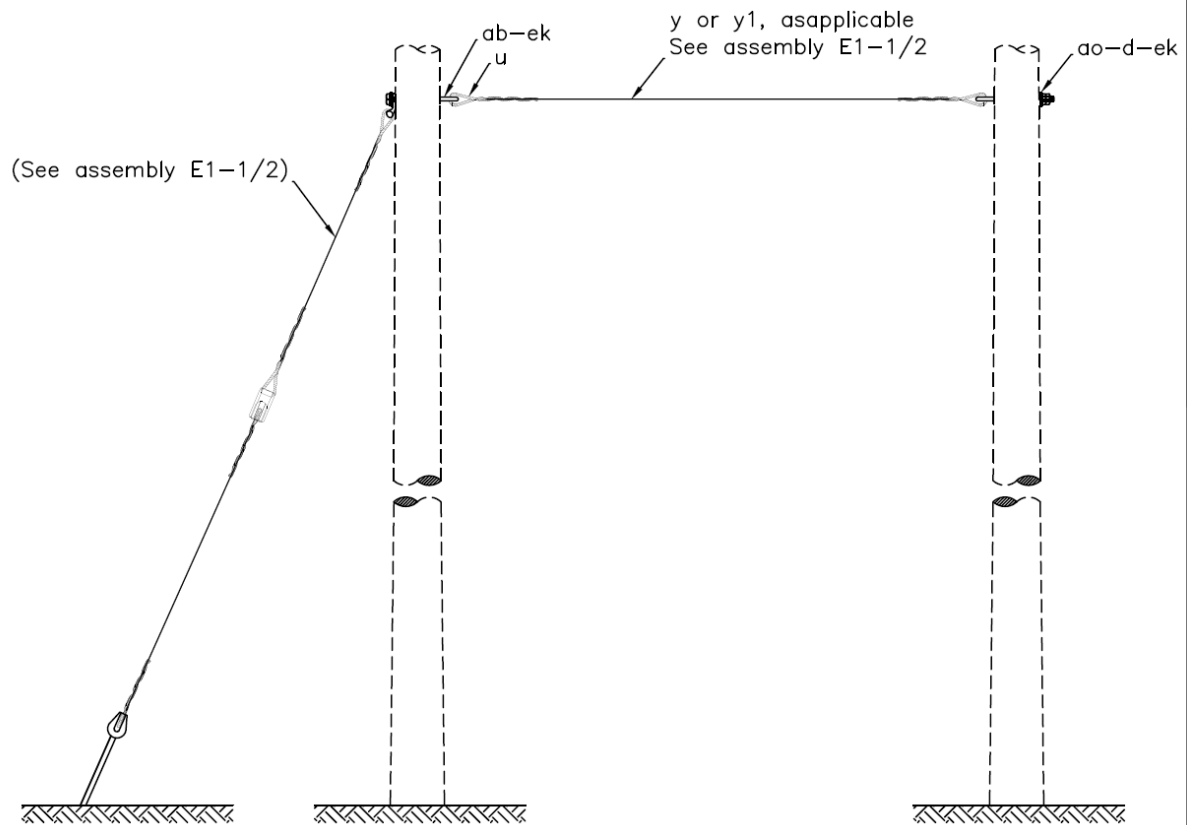


ITEM	QTY	DESCRIPTION OF MATERIAL
c	1	Machine bolt , M16 x 300mm length
d	1	Washer, square, 50x50x5mm, galvanized, 17.5 mm hole
k2	1	Fiberglass guy strain insulator
u	4	Preformed guy-grip, dead-end
v1	1	Guy hook
y1	1	52 mm2 galvanized steel stay wire, as required
at	1	Guy wire marker
av	1	Jumpers, as req'd
ss	1	Clamp, guy wire support
ek	1	Locknuts
st	1	Galvanized Steel pipe, 2"x1 meter
sc	1	Side Walk guy bracket


Note:  
1.- Dimensions in millimeters.

	ELECTRIC DISTRIBUTION SYSTEM MEDIUM VOLTAGE 30 kV		 NRECA International Your Touchstone Energy® Partner	
	E1-2S: SIDE WALK STAY			N° Page: 16
	TITLE		N° Rev: A	E1-2S
			Date: 30-01-2024	

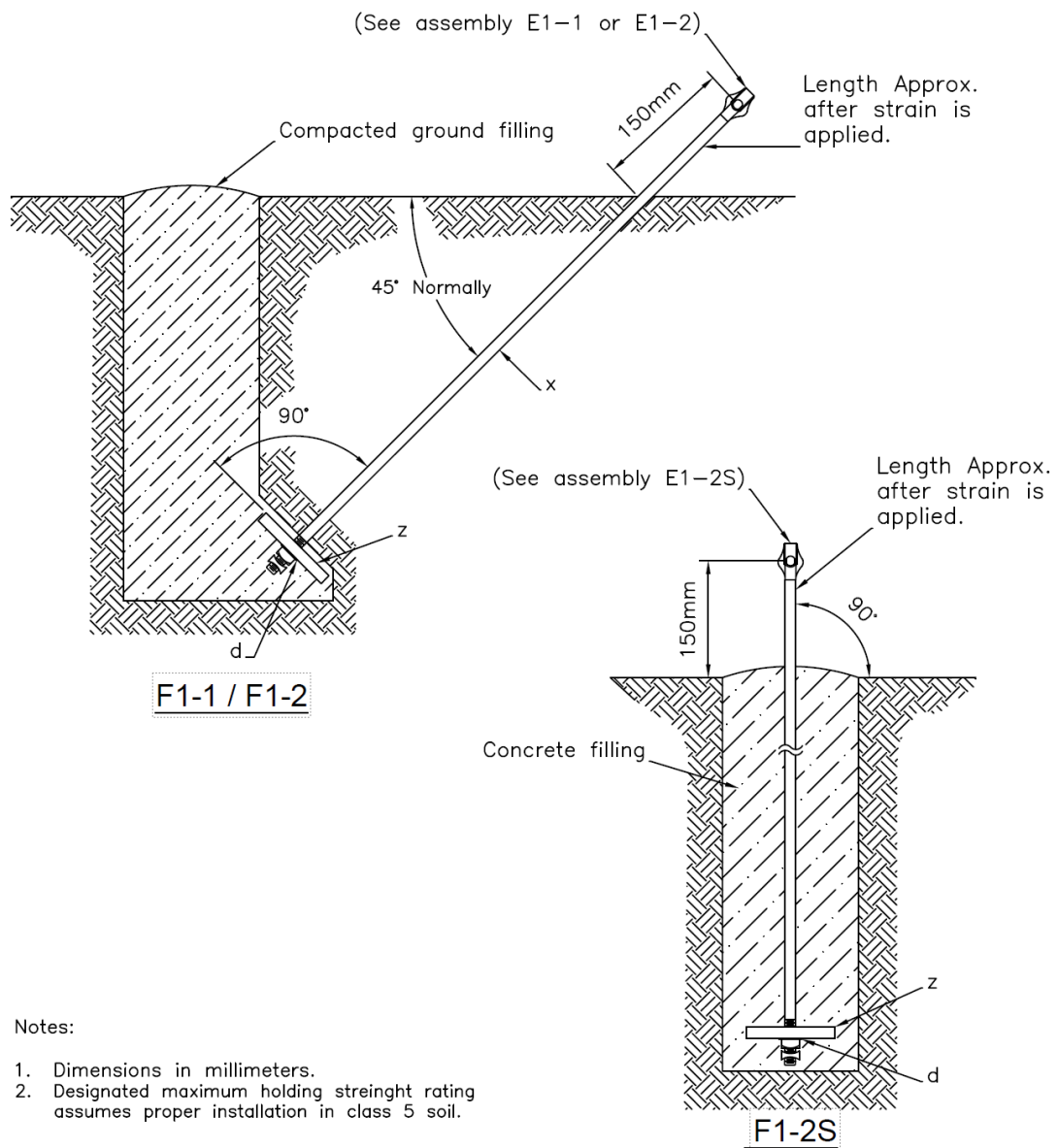
**Figure 11.19:ZE2-2: Overhead Guy Assemblies**



ITEM	QTY	DESCRIPTION OF MATERIAL
d	1	Washer, square, 50x50x5mm, galvanized, 17.5 mm hole
u	2	Preformed guy-grip, dead-end
y or y1	1	Galvanized steel stay wire, as required
ab	1	Nut, thimble eye type, M16
ao	1	Bolt, thimble eye type, M16 x req'd length
ek	2	Locknuts

	ELECTRIC DISTRIBUTION SYSTEM MEDIUM VOLTAGE 30 kV			
	E2-2: OVERHEAD STAY			N° Page: 17
	TITLE			N° Rev: A
				Date: 30-01-2024
			<b>E2-2</b>	

**Figure 11.20:F1-2 Anchor Assemblies**



ITEM	QTY			DESCRIPTION OF MATERIAL
	F1-1	F1-2	F1-2S	
d	1	1	1	Washer, square 50x50x6mm, galvanized, 17 mm hole
x	1	1	1	Rod, anchor, thimble eye, M16 x 240 cm
z	-	1	1	Anchor cross, plate type
z	1	-	-	Concrete anchor cone

**ELECTRIC DISTRIBUTION SYSTEM  
MEDIUM VOLTAGE 33 kV**

F1-1: LINE ANCHOR ASSEMBLY  
F1-2: LINE ANCHOR ASSEMBLY- Heavy Duty

TITLE



N° Page: 18

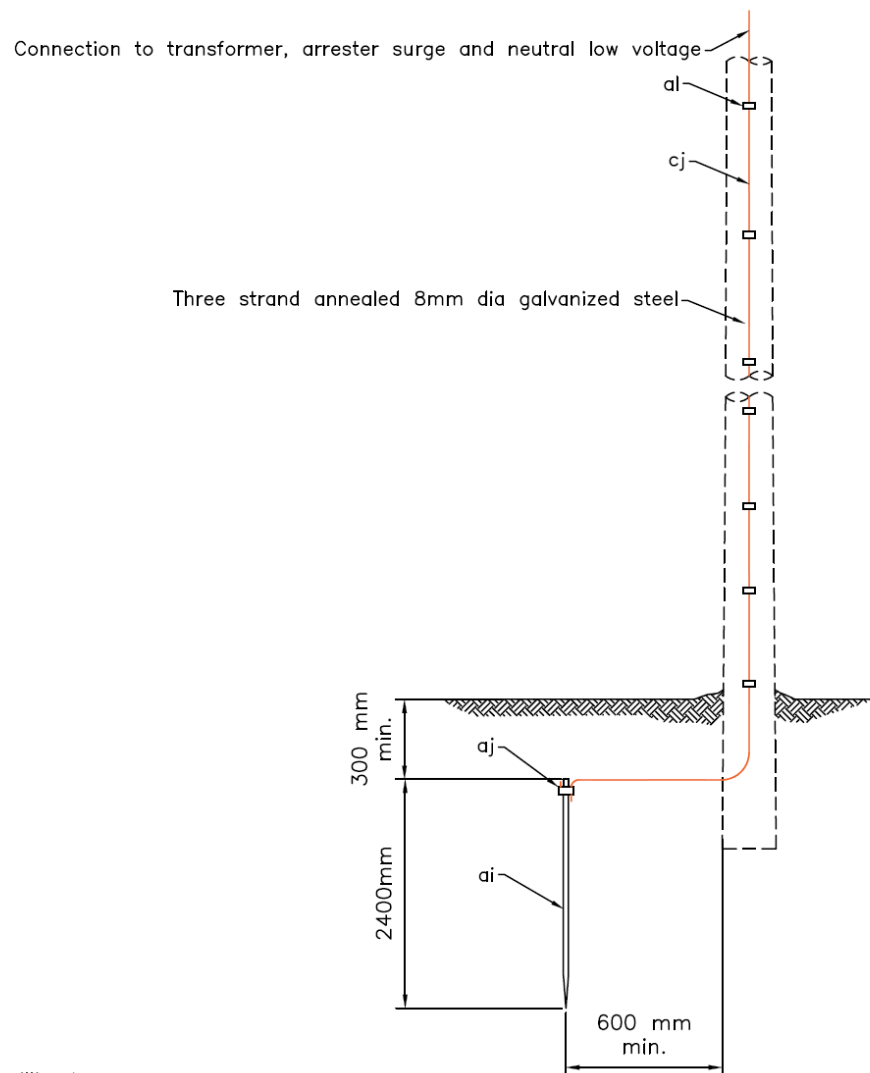
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N° Rev: A

Date: 21-05-2024

**F1-1/2**


**Figure 11.21: Transformer Pole Grounding Assembly Ground Rod Type**



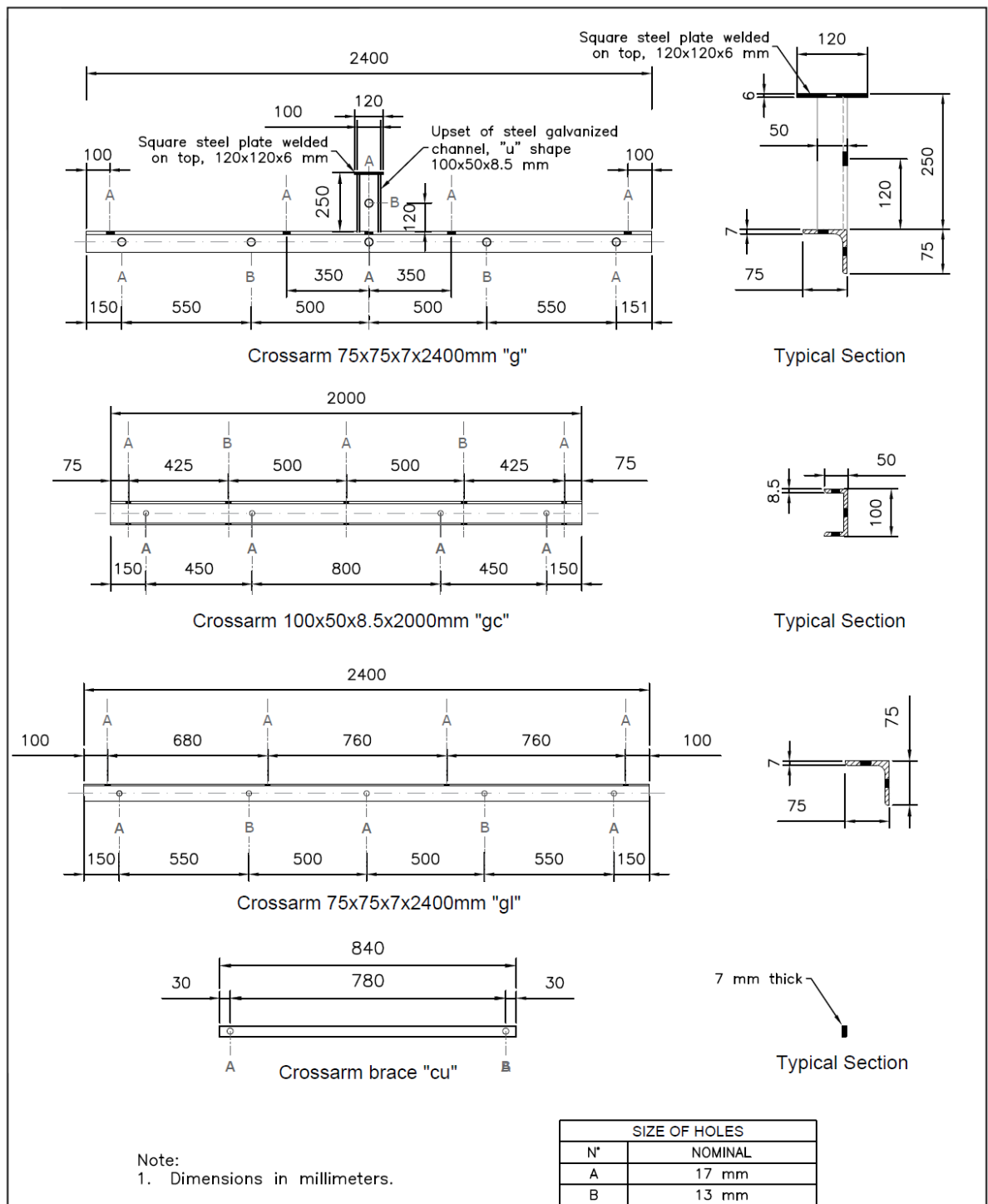
Notes:


1. Dimensions in millimeters.
2. Ground wire ("cj") to have minimum conductivity of N°16mm<sup>2</sup> copper or equivalent.

ITEM	QTY	DESCRIPTION OF MATERIAL
ai	1	Rod, ground galvanized steel, 16 mm min. diameter
aj	1	Clamp, ground rod
al	as required	Staple, earth wire staples, Hot Dip Galvanized
cj	—	Pole ground wire, as required

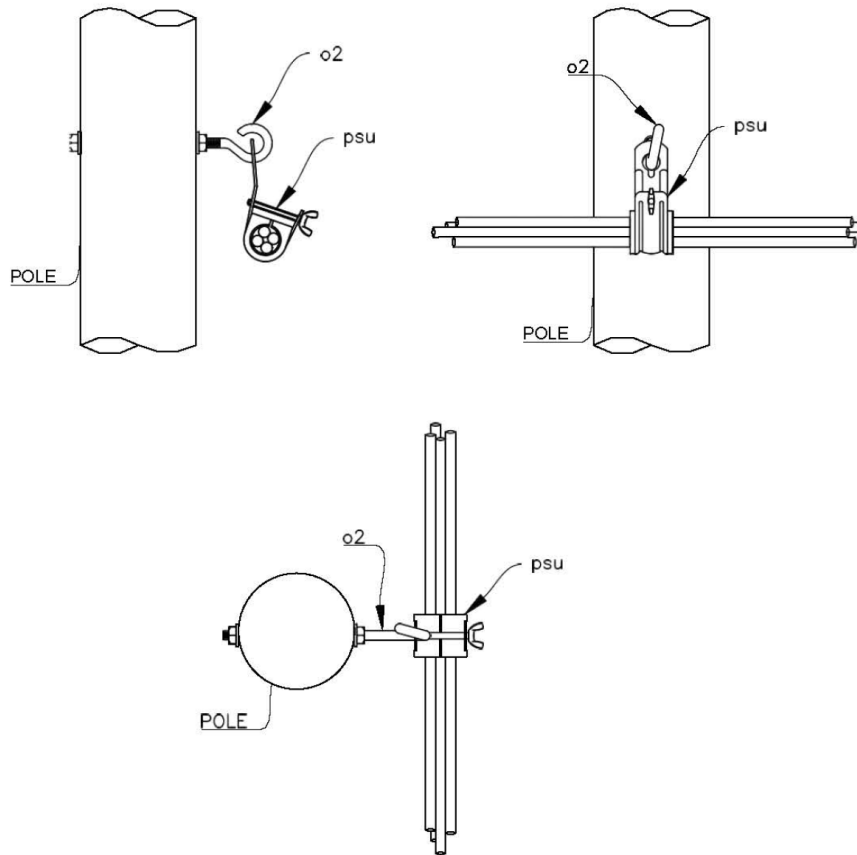
	ELECTRIC DISTRIBUTION SYSTEM MEDIUM VOLTAGE 30 kV		 NRECA International Your Touchstone Energy® Partner	
	GROUNDING UNIT			N° Page: 19      Code:
	TITLE		N° Rev: A	M2-11
			Date: 30-01-2024	

**Figure 11.22: Crossarm and cu Brace Steel drilling guide**



<p>ELECTRIC DISTRIBUTION SYSTEM MEDIUM VOLTAGE 30kV</p> <p>CROSSARM DRILLING GUIDE</p> <p>TITLE</p>	 <p>NRECA International Your Touchstone Energy® Partner</p>	
	N° Page: 22	Code:
	N° Rev: A	<b>M19</b>
	Date: 30-01-2024	

**Figure 11.23: J10\_\_ LV 3 Phase ABC Intermediate Assembly 0-30 deg**



ITEM	QTY	UNIT	DESCRIPTION
o2	1	ea	Bolt, Hook bolt with curved washers and nut, 300 mm M16
psu	1	ea	Clamp, ABC clamp 0° to 30°

ELECTRIC DISTRIBUTION SYSTEM  
LOW VOLTAGE

J10: TANGENT UP TO 30 DEGREES ABC



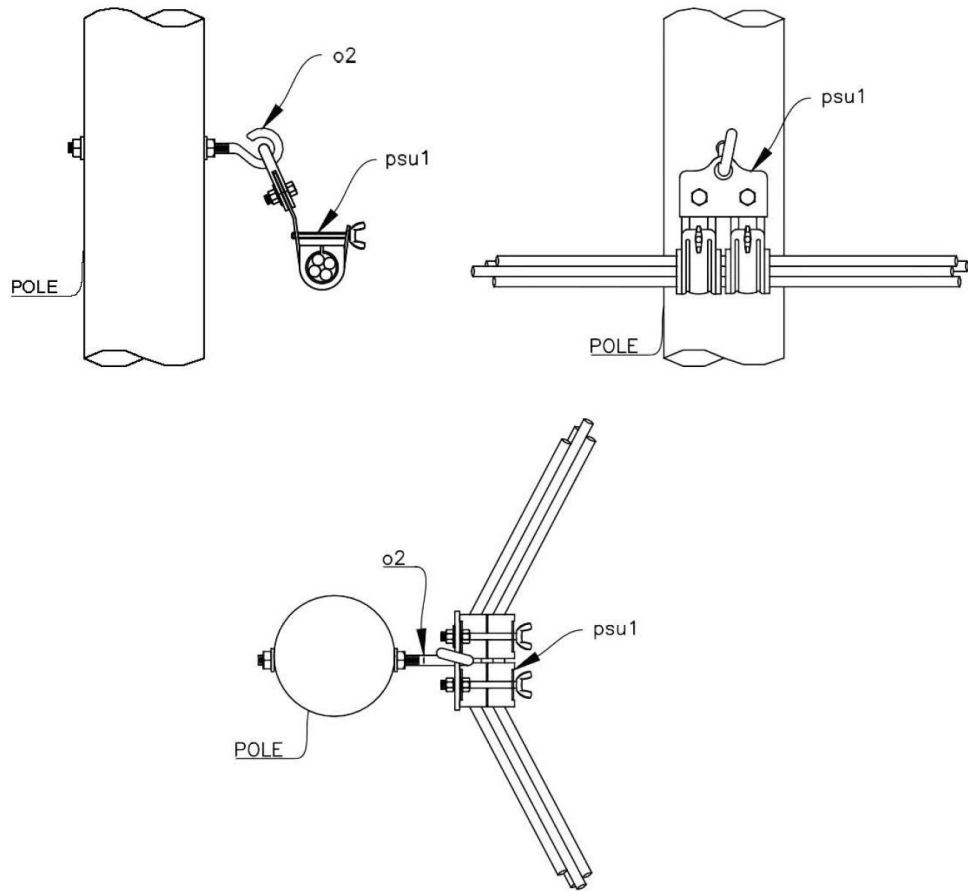
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N° Rev: A

J10

**Figure 11.24: J12\_ LV 3 Phase ABC Strain Angle Assembly 30-60 deg**



ITEM	QTY	UNIT	DESCRIPTION
o2	1	ea	Bolt, Hook bolt with bended washer and nut, 300 mm M16
psu1	1	ea	Clamp, ABC clamp 30° to 90°

**ELECTRIC DISTRIBUTION SYSTEM  
LOW VOLTAGE**

**J12: TANGENT FROM 30 TO 60 DEGREES  
ABC**



**N° Page: 5**

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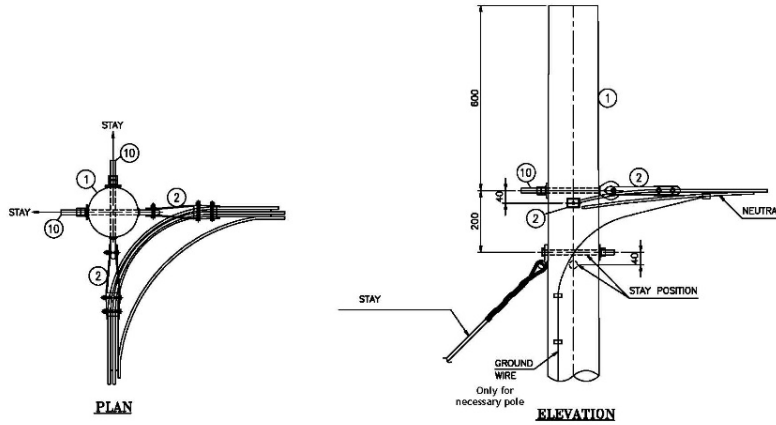
**N° Rev: B**

**J12**

**Figure 11.25: J13\_Dead-End ABC\_LV Phase Angle Assembly 60-90 deg**

**NOTES:**

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. POLE TO BE PLANTED AT A DEPTH OF 1500mm BELOW GROUND LEVEL.
3. FOR DETAIL OF GROUNDING REFER DRAWING "GROUNDING ARRANGEMENT FOR LOW VOLTAGE DISTRIBUTION"
4. FOR DETAIL OF STAY ASSEMBLY REFER DRAWING "STAY ASSEMBLY DRAWING FOR FOR LOW VOLTAGE DISTRIBUTION"



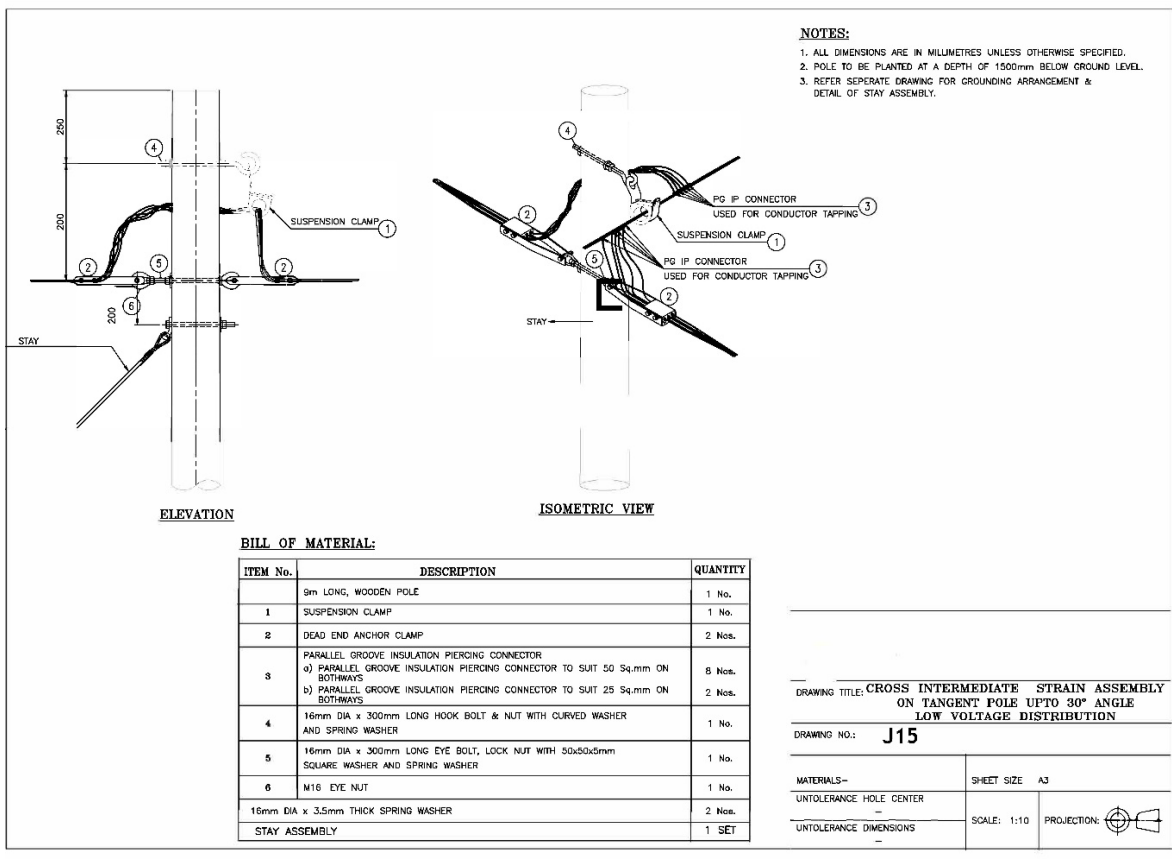
**BILL OF MATERIAL:**

ITEM No.	DESCRIPTION	QUANTITY
1	9m LONG, WOODEN POLE	1 No.
2	DEAD END ANCHOR CLAMP	2 Nos.
10	18mm DIA x 300mm LONG EYE BOLT & NUT, LOCK NUT WITH 50x50x5mm SQUARE WASHER AND SPRING WASHER	2 Nos.
	18mm DIA x 3.5mm THICK SPRING WASHER	2 Nos.
	STAY ASSEMBLY	2 SET

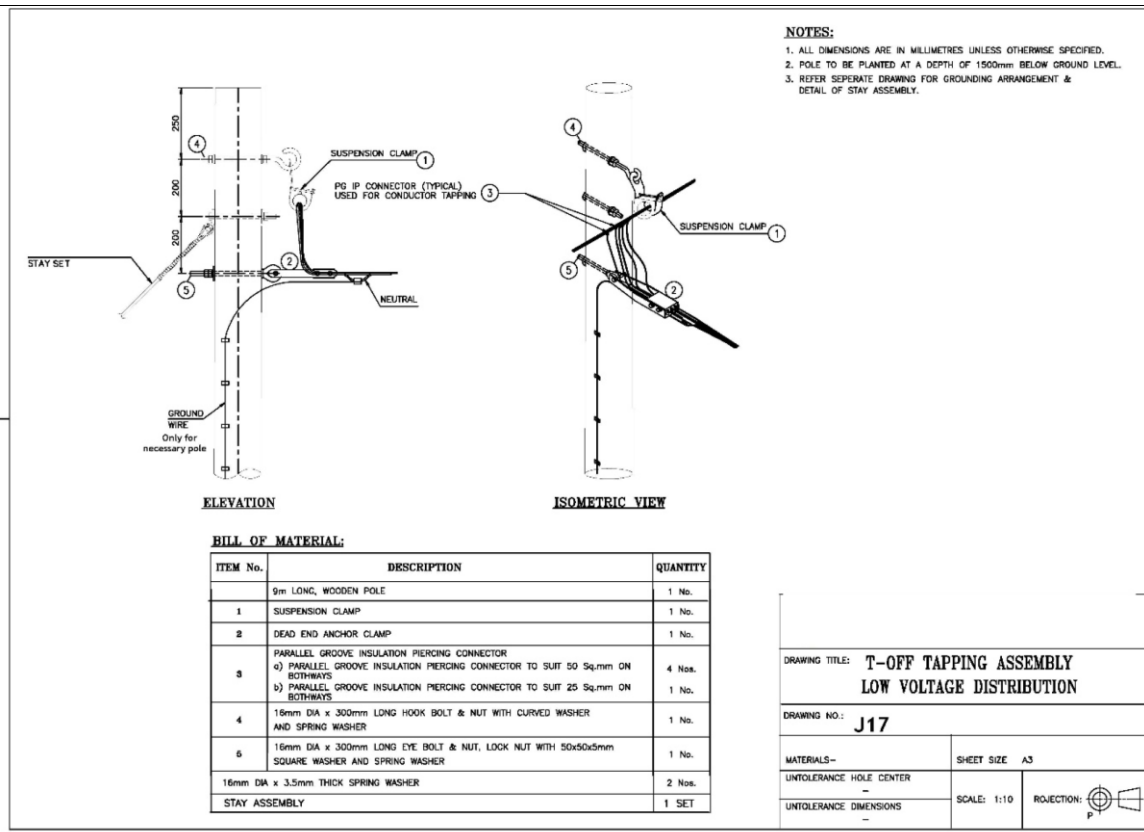
C		
DRAWING TITLE: <b>LV 3 PHASE ABC 60 TO 90 ASSEMBLY</b>		
DRAWING NO.: □□□ <b>J13</b>		
MATERIALS-	SHEET SIZE A3	
INTOLERANCE HOLE CENTER	SCALE: 1:10	PROJECTION:
INTOLERANCE DIMENSIONS		



**Figure 11.26: J15\_Dead-End ABC\_LV Cross Intermediate Strain Assembly up to 30 deg**



**Figure 11.27: J17\_Dead-End ABC\_LV T-off Assembly**



**NOTES:**  
 1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.  
 2. POLE TO BE PLANTED AT A DEPTH OF 1500mm BELOW GROUND LEVEL.  
 3. REFER SEPERATE DRAWING FOR GROUNDING ARRANGEMENT & DETAIL OF STAY ASSEMBLY.

**BILL OF MATERIAL:**

ITEM No.	DESCRIPTION	QUANTITY
	9m LONG, WOODEN POLE	1 No.
1	SUSPENSION CLAMP	1 No.
2	DEAD END ANCHOR CLAMP	1 No.
3	PARALLEL GROOVE INSULATION PIERCING CONNECTOR TO SUIT 50 Sq.mm ON BOTHWAYS	4 Nos.
	b) PARALLEL GROOVE INSULATION PIERCING CONNECTOR TO SUIT 25 Sq.mm ON BOTHWAYS	1 No.
4	16mm DIA x 300mm LONG HOOK BOLT & NUT WITH CURVED WASHER AND SPRING WASHER	1 No.
5	16mm DIA x 300mm LONG EYE BOLT & NUT, LOCK NUT WITH 50x50x5mm SQUARE WASHER AND SPRING WASHER	1 No.
	16mm DIA x 3.5mm THICK SPRING WASHER	2 Nos.
	STAY ASSEMBLY	1 SET

DRAWING TITLE: **T-OFF TAPPING ASSEMBLY**  
**LOW VOLTAGE DISTRIBUTION**

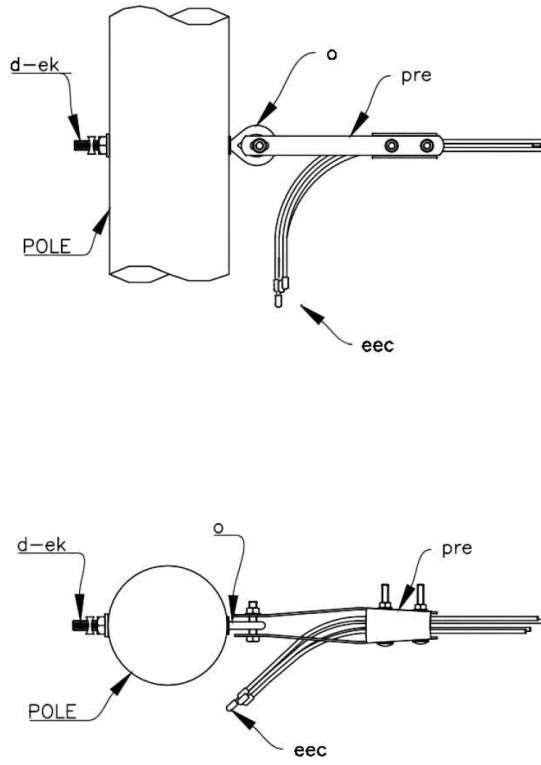
DRAWING NO.: **J17**

MATERIALS-- SHEET SIZE: A3

INTOLERANCE HOLE CENTER - SCALE: 1:10 REJECTION:

INTOLERANCE DIMENSIONS -

**Figure 11.28: J19\_Dead-End ABC\_LV 3 Phase Terminal Assembly**



ITEM	QTY	UNIT	DESCRIPTION
d	1	ea	Washer, square, 50x50x5mm, galvanized, 17.5 mm hole
eec	4	ea	elastomeric end caps
ek	1	ea	Nut, Lock nut, M16
o	1	ea	Bolt, Eye bolt with nut, M16 x 250mm
pre	1	ea	Clamp, Dead end anchor clamps for self supporting ABC

**ELECTRIC DISTRIBUTION SYSTEM  
LOW VOLTAGE**

**J19: DEAD END ABC**



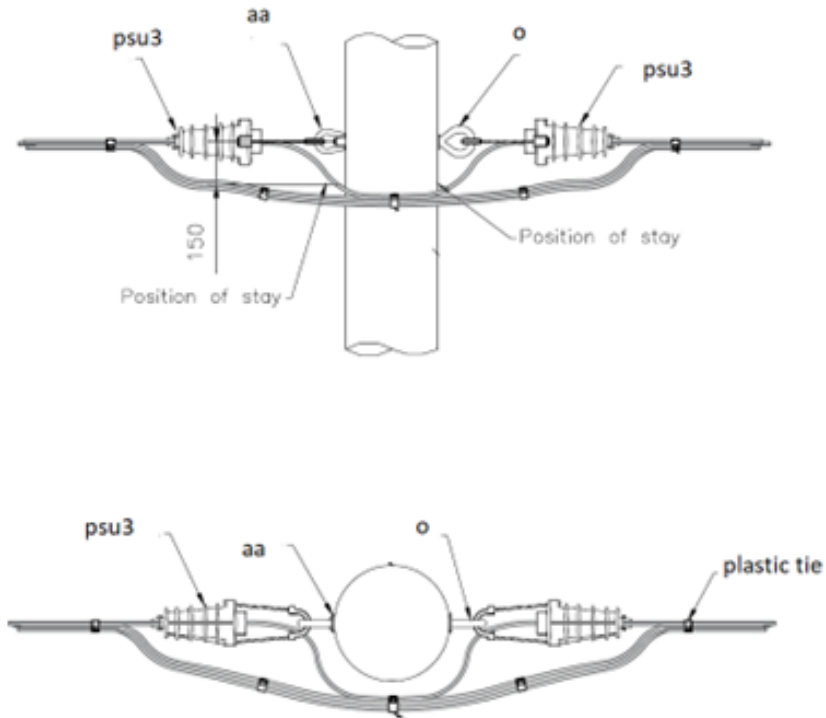
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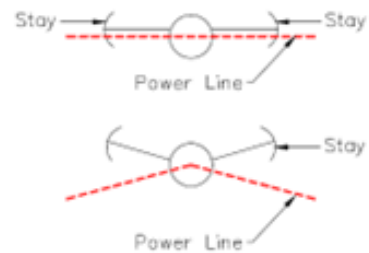
**N° Rev: A**

**J19**

Figure 11.29: J20\_Double Dead-End ABC\_LV 3 Phase Terminal Assembly (Strain)



- Notes:  
 1.- Dimensions in millimeters.  
 2.- See assembly Stay



ITEM	QTY	DESCRIPTION OF MATERIAL
pe1	req'd	Insulated piercing connector
psu3	2	Deadend clamp for for insulated neutral ABC, 50mm <sup>2</sup>
o	1	Eye bolt M16, length 300mm
	req'd	Plastic tie
aa	1	Eye nut, M16

ELECTRIC DISTRIBUTION SYSTEM  
 LOW VOLTAGE

J20 DEAD END ABC (DOUBLE)



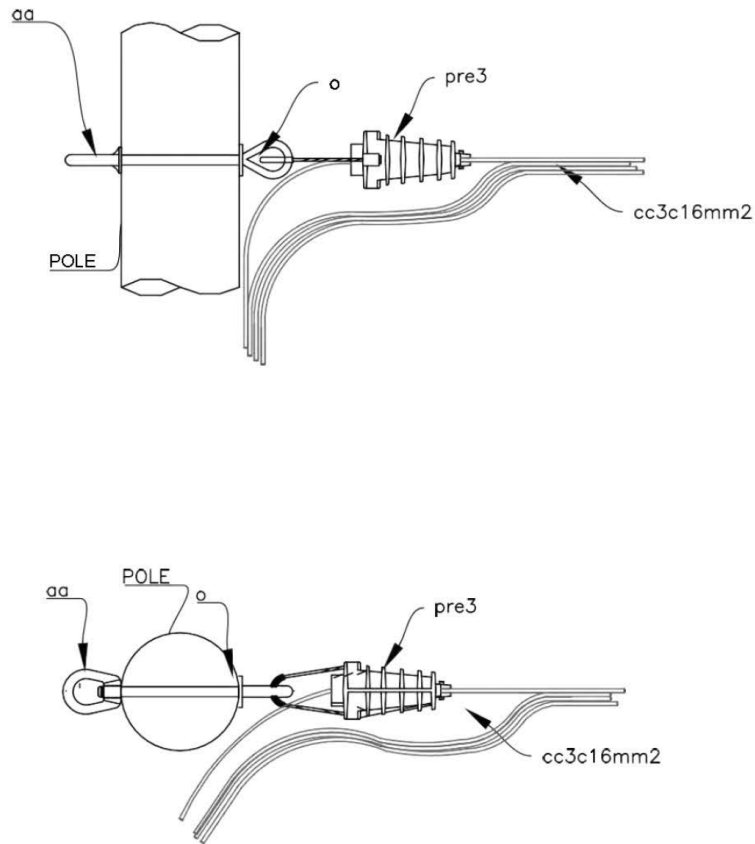
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J20

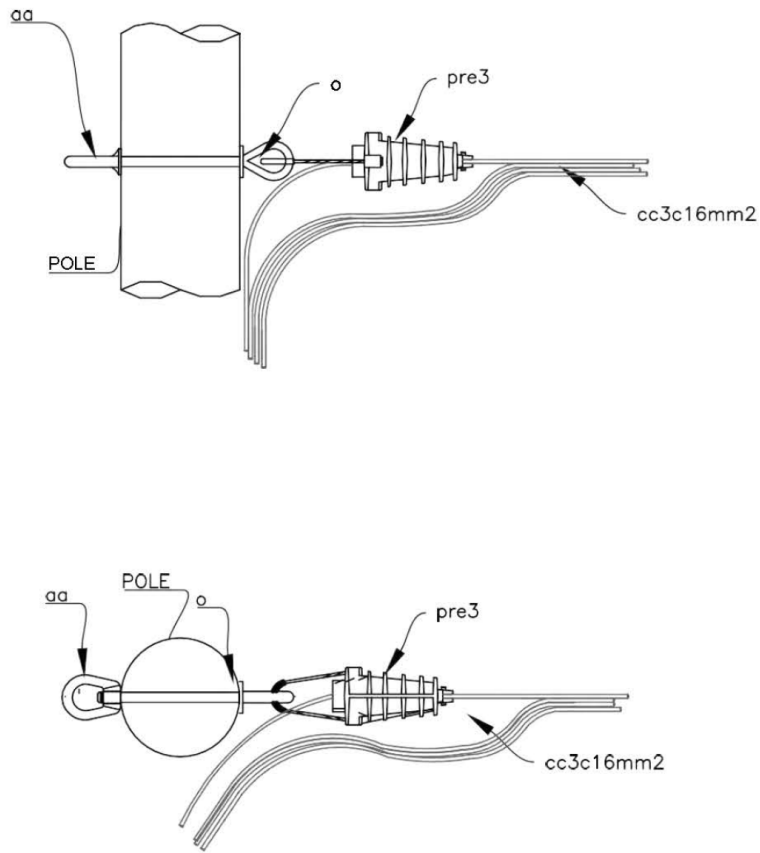
**Figure 11.30:K11\_ABC-1 Phase Service Drop**



ITEM	QTY	UNIT	DESCRIPTION
aa	1	ea	Nut, Eye M16
cc3c16mm2	30	m	Conductor, Insulated 3 phase ABC cable 16mm2
cm		ea	Insulator, Spool
o	1	ea	Bolt, Eye bolt with nut, M16 x 250mm
pre3	1	ea	Strain Clamp for insulated cable of service Drop
s		ea	Swing Clevis

	ELECTRIC DISTRIBUTION SYSTEM LOW VOLTAGE		 <b>NRECA International</b> Your Touchstone Energy® Partner	
	K13: ABC 3 PHASE SERVICE DROP			N° Page: 7
	TITLE			N° Rev: A
				Date: 10-08-2020
			Code: <b>K13</b>	

**Figure 11.31:K13\_ABC-3 Phase Service Drop**



ITEM	QTY	UNIT	DESCRIPTION
aa	1	ea	Nut, Eye M16
cc3c16mm2	30	m	Conductor, Insulated 3 phase ABC cable 16mm2
cm		ea	Insulator, Spool
o	1	ea	Bolt, Eye bolt with nut, M16 x 250mm
pre3	1	ea	Strain Clamp for insulated cable of service Drop
s		ea	Swing Clevis

ELECTRIC DISTRIBUTION SYSTEM  
LOW VOLTAGE

K13: ABC 3 PHASE SERVICE DROP



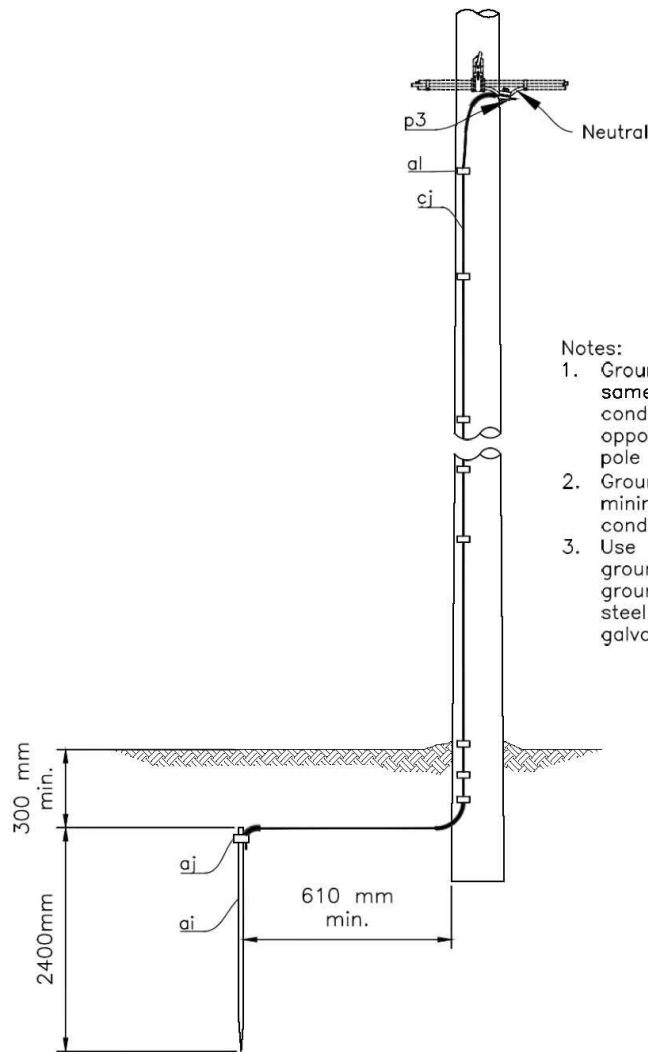
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N° Rev: A

K13

Figure 11.32:M2-11\_Earthing




Notes:

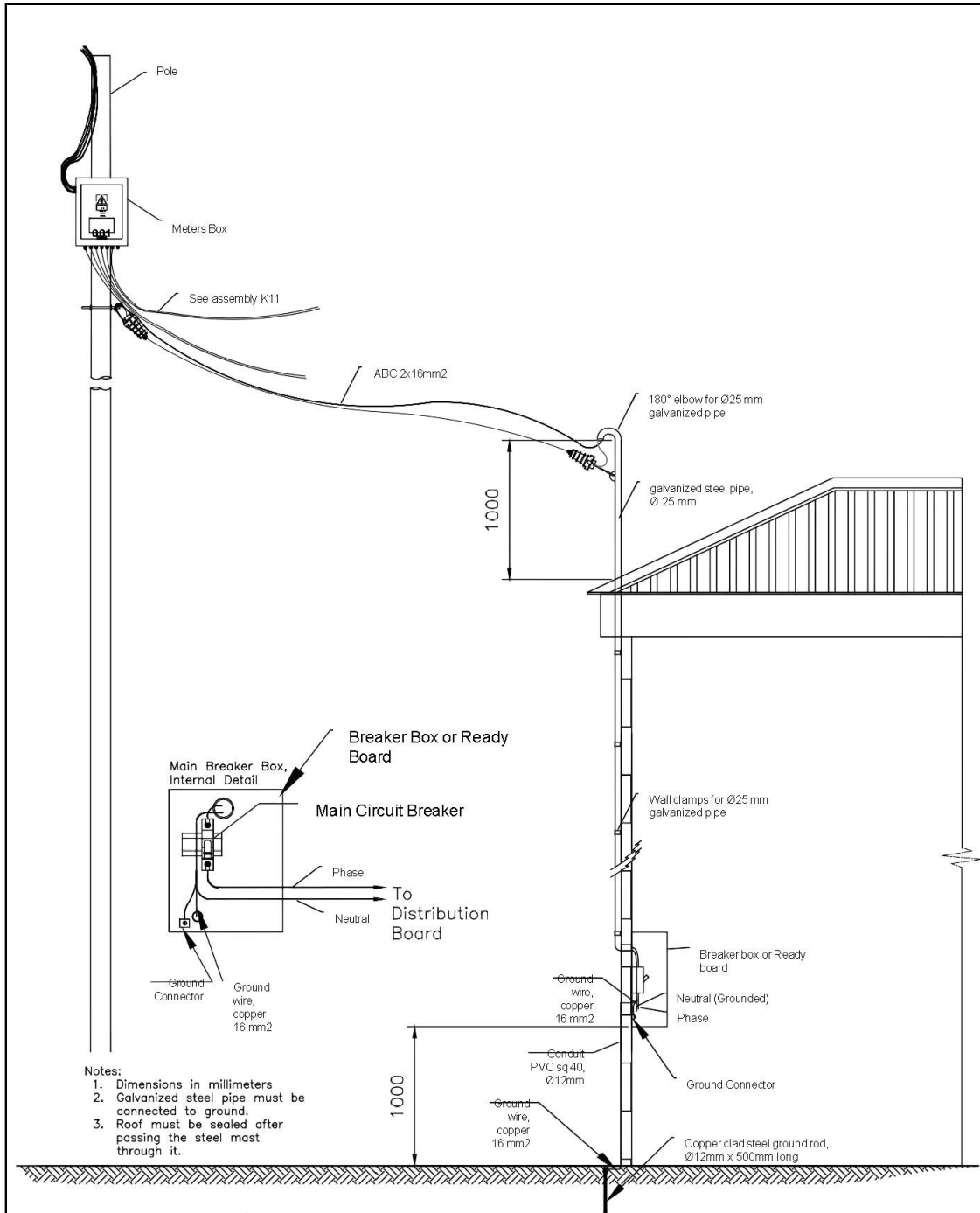
1. Ground wire to be located on same side as neutral conductor and in quadrant opposite climbing space or pole top pin.
2. Ground wire ("cj") to have minimum equivalent conductivity of No 6 Copper.
3. Use either copper plated ground rod and copper ground wire and staples or steel ground wire and galvanized ground rod

ITEM	QTY	UNIT	DESCRIPTION
ai	1	ea	Earth Rod, M16 min. diameter
aj	1	ea	Clamp, earth rod
al	40	ea	Staple, ground wire staples, Hot Dip Galvanized 25x12x4 mm
cj	12	m	Conductor, Earth Wire, Soft Annealed Iron, BB Grade, Class C Galvanizing, 3-wire, 5/16"
p3	1	ea	Connector, Insulation piercing connector, Parallel Groove (7-150 mm <sup>2</sup> bare & 2-95 mm <sup>2</sup> covered)

<p><b>ELECTRIC DISTRIBUTION SYSTEM</b> <b>LOW VOLTAGE</b></p> <p><b>M2-11: GROUNDING</b></p> <p>TITLE</p>		N° Page: 8	<p>Code:</p> <p><b>M2-11</b></p>
		N° Rev: A	
	Date: 10-08-2020		

**Figure 11.33: SVC1: Service Drop Arrangement Single Phase**



- Notes:
1. Dimensions in millimeters
  2. Galvanized steel pipe must be connected to ground.
  3. Roof must be sealed after passing the steel mast through it.

**ELECTRIC DISTRIBUTION SYSTEM  
LOW VOLTAGE**

**SVC1: SINGLE PHASE SERVICE DROP  
ARRANGEMENT**

TITLE

**NRECA International**  
Your Touchstone Energy Partner

N° Page: 16

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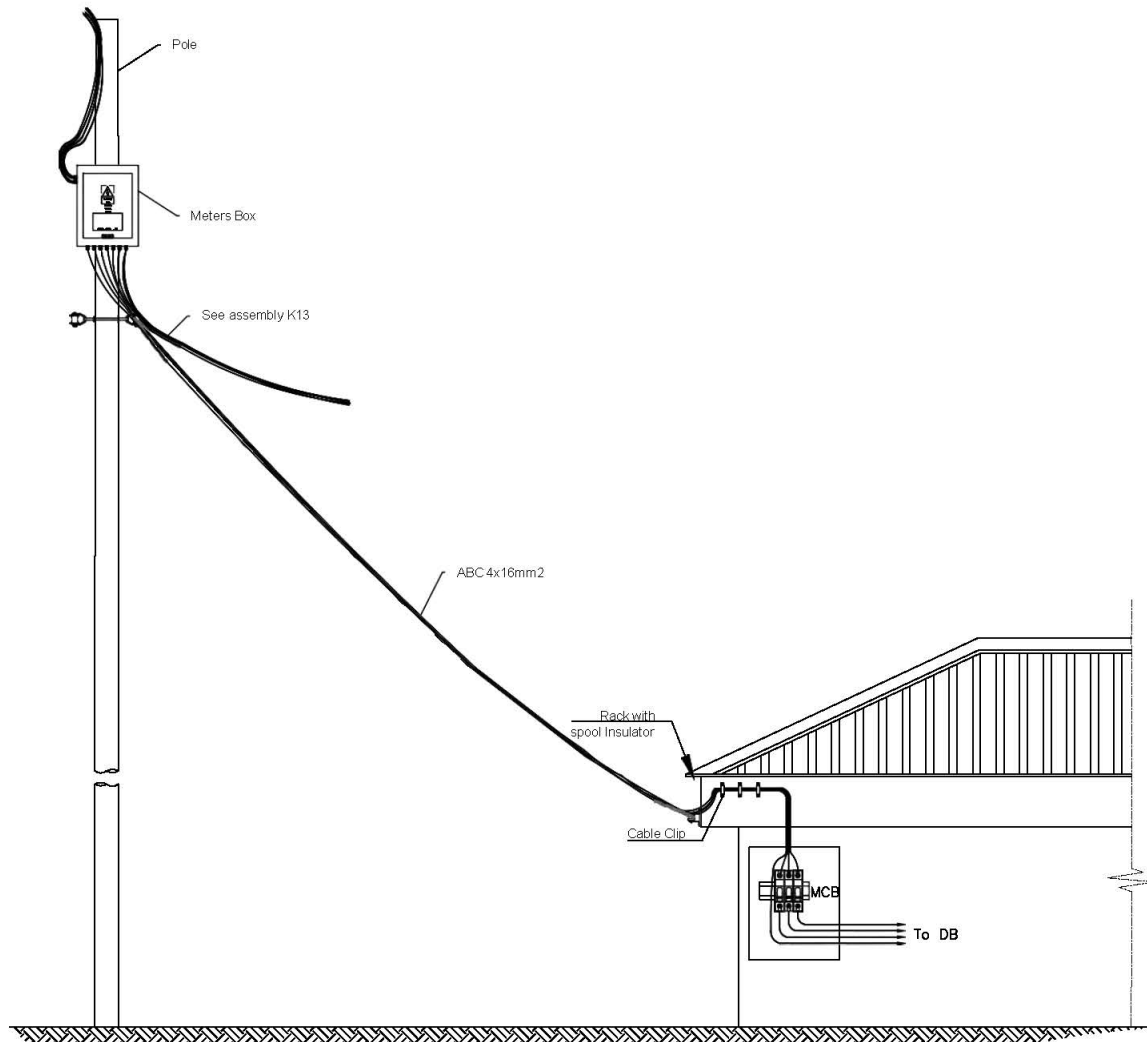
N° Rev: A

**SVC1**


Date: 10-08-2020



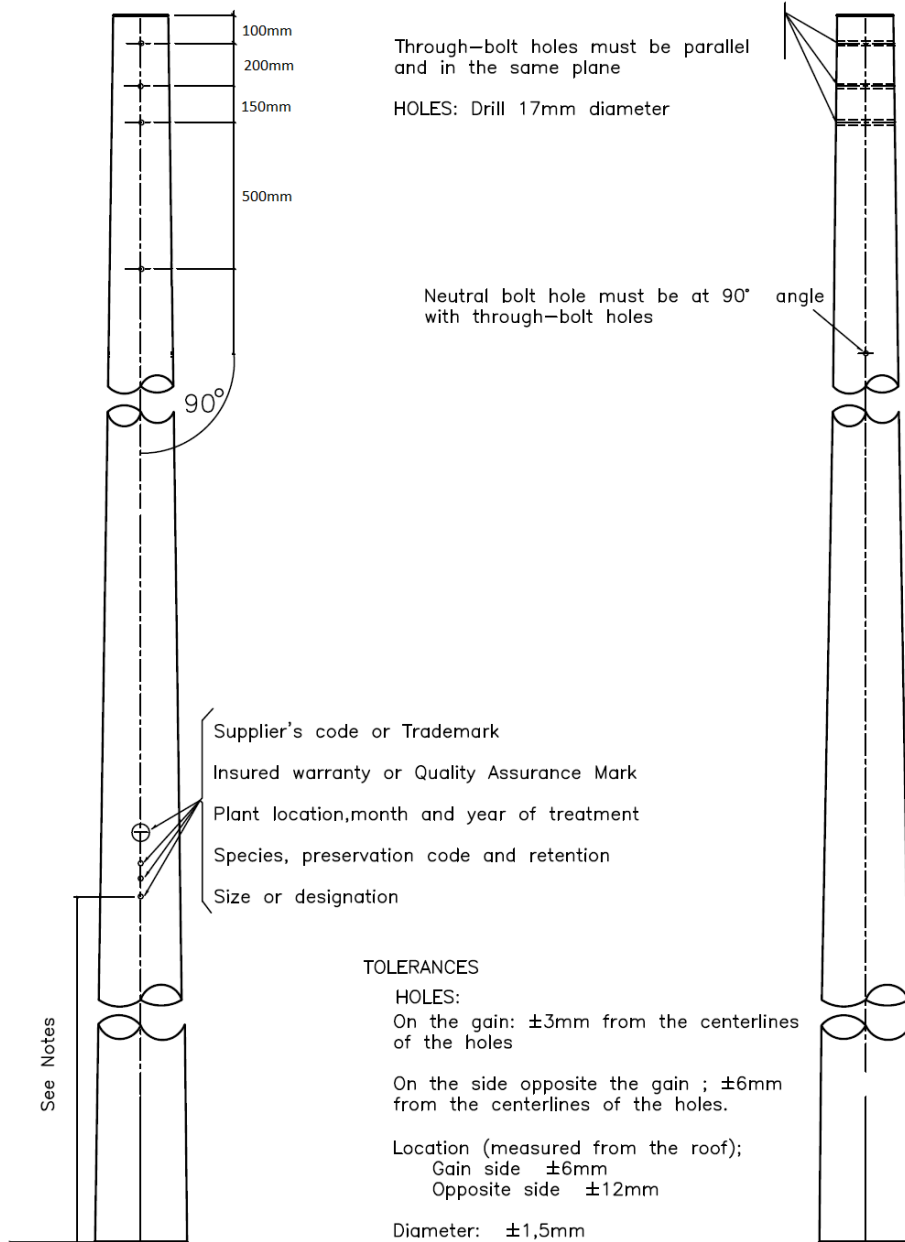
**Figure 11.34: SVC3: Service Drop Arrangement Three Phase**



LEGEND:  
 DB: Customers Distribution Board  
 MCB: Main circuit Breaker

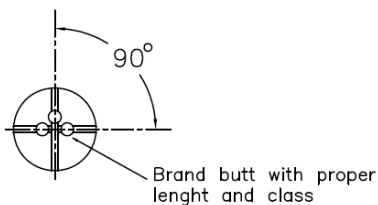
	ELECTRIC DISTRIBUTION SYSTEM LOW VOLTAGE	 NRECA International Your Touchstone Energy® Partner
	SVC3: 3-PHASE SERVICE DROP ARRANGEMENT	
	TITLE	<b>SVC3</b>

**Figure 11.35:M20: Pole Framing Guide**



**NOTES:**

1. All poles shorter than 50 feet must be bored, roofed and gained before treatment, except that Class 7 and smaller poles need not be gained unless required by purchaser. Roofs may be flat or at a 15 degree angle at the producer's option.
2. Bottom of brand or center of metal disk shall be  $3000 \pm 50$  mm from the pole butt for poles less than 16m in length;  $4000 \pm 50$  mm for poles 16m and longer.

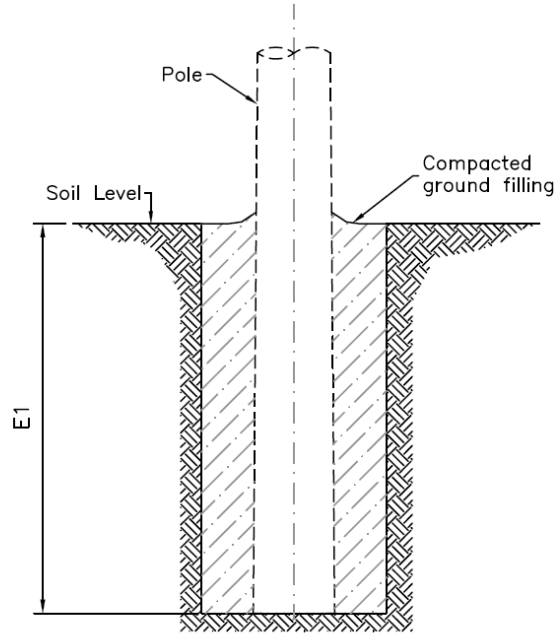


**POLE FRAMING GUIDE**

FEBRUARY 2020

M20

**Figure 11.36: Guide for Embedment Depths for Wooden Pole**



ITEM	DESCRIPTION OF MATERIAL	H (Pole Height) in meters	Height buried
			E1 (m)
1	Wooden pole	9	1,50
2	Wooden pole	11	1,70
3	Wooden pole	12	1,80
4	Wooden pole	14	2,00

**Note:**

1. Dimensions in meters
2. the pole hole should be 2–2.5x diameter of the pole butt, hole should be emptied of water before backfilling, backfill should be clean, without rocks larger than 50mm in diameter, backfill should be tamped to 90% of density of undisturbed soil using iron tampers of 5kg or more, with 2 men tamping for each man shoveling backfill, and backfill should be mounded up 150mm around pole.

**ELECTRIC DISTRIBUTION SYSTEM  
MEDIUM VOLTAGE 30 kV**

**GUIDE FOR EMBEDMENT DEPTHS FOR  
WOODEN POLE**

TITLE



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Code:

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## **Appendix A: Health, Safety, Environmental and Social Requirements**

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## **1 PURPOSE & SCOPE**

The purpose of this document is to define and describe the requirements for managing Health, Safety, Environmental and Social (HSES) during the construction of the project. The requirements apply to all employees, subcontractors and visitors engaged on the project.

## **2 GENERAL REQUIREMENTS**

The Contractor shall take full responsibility for the prevention of unhealthy or unsafe conditions and practices and for the promotion of healthy and safe working practices at the Site.

The Contractor shall be required to include in the Scope of Work all equipment and services necessary for the complete, safe and prudent construction of the Facility, even if certain essential works are not expressly stated in this schedule.

Nothing specified herein shall relieve the Contractor of any obligation or responsibility in this regard and can be considered as the minimum requirements:

- Work in accordance with the Principles and Standards as indicated in Table 1 below;
- Abide by and adhere to all national legislative requirements, including any permits / approvals which the Contractor maybe responsible for obtaining to complete the scope of work;
- Implement the requirements of the IFC accommodation guidelines (where applicable, in the event that worker accommodation is being provided);
- Implement relevant mitigation measures as identified in the Project Environmental and Social Management Framework (ESMF) and associated management plans including but not limited to the Environmental and Social Management and Monitoring Plan (ESMP) provided as part of the Contract documents;
- Develop, maintain and implement an Environmental and Social Management System (ESMS), commensurate with the nature of the works including any supplementary policies, plans and pecedures as required which are aligned to good international industry practice;
- Maintain suitable manpower with tertiary training and experience at all times to manage HSES requirements;
- Conform with reporting requirements as prescribed by the Employer on HSES issues;
- Develop a process for identifying and reporting on any HSES breaches and non-compliances (major environmental, safety and social incidents, as well as large-scale accidents and fatalities), within 24 hours of its occurrence as well as an associated reference to the remedy process, in a format approved by the Employer.
- Ensuring that all the workers have been provided with suitable health and safety induction, Personal Protective Equipment (PPE), information and training;
- Ensuring that all the visitors have been provided with suitable health and safety induction and have adequate PPE.

### 3 CODES, STANDARDS & REGULATIONS

The Contractor will adhere to the environmental, social and governance principles and standards in regard to sustainability aspects as listed below. For any specific code mentioned and used it shall be understood that the latest revision shall apply:

Table 2: Environmental, Social and Governance Principles and Standards

Standard / Convention	Duties Imposed
<b>International Standards</b>	
IFC Performance Standards	Cornerstone standard for environmental and social performance
IFC Guidelines and Good Practice Notes	Reference guides published by IFC (e.g. Stakeholder Dialogue, Resettlement Action Plan Handbook);
World Bank EHS Guidelines	Guidelines and standards to ensure optimal practical environmental and social performance in portfolio companies.
World Bank Environmental and Social Safeguards (ESS)	The World Bank Environmental and Social Safeguards (ESS) are a framework designed to manage and mitigate environmental and social risks and impacts of projects financed by the World Bank.
ILO Core Conventions	<p>All applicable conventions ratified in the host country, including but not limited to standards for labour, namely:</p> <ul style="list-style-type: none"> <li>○ Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87);</li> <li>○ Right to Organise and Collective Bargaining Convention, 1949 (No. 98);</li> <li>○ Forced Labour Convention, 1930 (No. 29), Abolition of Forced Labour Convention, 1957 (No. 105);</li> <li>○ Minimum Age Convention, 1973 (No. 138), Worst Forms of Child Labour Convention, 1999 (No. 182);</li> <li>○ Equal Remuneration Convention, 1951 (No. 100);</li> <li>○ Discrimination (Employment and Occupation) Convention, 1958 (No. 111).</li> <li>○ The ILO Basic Terms and Conditions of Employment refer to: <ul style="list-style-type: none"> <li>○ Hours of Work (No. 1)</li> <li>○ Minimum Wage (No. 26, 131) and</li> <li>○ Occupational Safety and Health (No. 155).</li> </ul> </li> <li>○ Code of practice - Safety and health in building and civil engineering work</li> </ul>

<b>Cranes and Lifting Equipment</b>	
BS EN 12385-1:2001+A1:2008	Steel wire rope. Safety General requirements
BS EN 12385-4:2001+A1:2008	Steel wire rope. Safety Stranded ropes for general lifting applications
FEM standard 1.001	Rules for the Design of Hoisting Appliances, Booklets 1 to 5 and 7 to 9.
<b>Local Regulations</b>	
	All applicable Burundi Laws and regulations
<b>Project HSES Reference Documentation</b>	
Ananza Electric Group ESMS	All applicable Anzana Electric Group HSES policies and procedures.
Project ESMF	Weza Power ESMF and all associated Management plans and procedures including as appropriate RAP, LRP, BMP, LALRP.
Weza Power ESMS	All applicable Weza Power ESMS policies and procedures

*Note: The standards listed above can be downloaded from there various websites.*

## **4 PERMITTING**

The Contractor shall be required to prepare, file and conclude the appropriate applications and documents to comply with all requirements of Projects of this nature, including all rules and regulations, and the obtainment of all approvals of the local government and national government as required for completion of the works. The Contractor shall ensure that all the relevant approvals & permits have been obtained prior to the start of the construction as required. These shall be captured in a permit register. The Contractor shall maintain a Legal Register pertinent to the laws of Burundi.

## **5 CONTRACTOR'S HSES TEAM**

The contractor shall maintain an HSES organizational structure responsible for the effective management of HSES risks and impacts of the Project, including GBVH risks, staffed with qualified staff and sufficient resources. Key resources are described further below.

## **5.1 HSES Manager**

The Contractor shall have in the HSES team lead by a suitably qualified (minimum diploma from a tertiary recognised institution) and experienced (minimum 5 years) HSES Manager who shall be responsible for managing the day-to-day on-site implementation of this Specification, and for the compilation of the required HSES Reports. In addition, he or she will be required to act as liaison and advisor on all HSES and related issues, seek advice from the Employer when necessary and ensure that any complaints received from the public are duly recorded and forwarded to the Employer. The HSES Manager shall be "on-call" on a 24-hour basis and shall carry out regular and random checks of all parts of the site where work is taking place. The SHES Manager with his team shall be permanently on site during 24 hours working or when any activities of the Contractor are underway without exception.

Particular attention shall be given by the HSES Manager to aspects such as electrical installations, lighting, handrails, especially around all dangerous openings, access stairs, blasting procedures, removal of construction waste, GBVH and internal grievance redress mechanism, orderly storing and stacking of construction equipment and materials and general cleanliness of the Works. In addition, the HSES Manager shall accompany the Employer on weekly HSES inspections of the works and shall take due account of his requirements concerning matters of HSES.

## **5.2 HSE Officers**

The Contractor shall appoint HSE Officer(s) (with suitable education (minimum diploma) and training and experience (minimum 1 years' experience as a Health and Safety Officer) who shall be responsible for ensuring that the health and safety and environmental requirements and codes of practice are adhered to. An HSE Officer must be present whenever any works are being undertaken on site.

## **5.3 E&S Safeguard Officer**

The Contractor shall appoint an E&S Safeguard Officer (with suitable education (minimum diploma) and training and experience (minimum 3 years' experience) where required per the conditions of the contract, who shall be responsible for ensuring that the environmental and social safeguards are being adhered to on site.

## **5.4 Human Resource Officer**

The Contractor shall appoint a Human Resource Officer (with suitable education (minimum diploma) and training and experience (minimum 3 years' experience) who shall be responsible for managing human resource in accordance with the Labour and working conditions plan and applicable national laws and guidelines.

# **6 ENVIRONMENTAL AND SOCIAL INSTRUMENTS**

The contractor shall adopt and implement the Environmental and Social Impact Study (ESIA) and the corresponding Environmental and Social Management Plan (ESMP) for the Project.



## **7 INFORMATION TO BE PROVIDED BY THE CONTRACTOR**

### **7.1 The HSES file**

Prior to the start of works the contractor must prepare a Safety Health Environmental and Social (HSES) file that contains important HSES documentation and records. The File shall contain the key HSES elements and acts as a guide to where the relevant information is stored.

The file is to be updated with HSES records that become available during the contract. All documents required under legislative requirements and management plans must be available in the file.

The Contractor is required to submit the templates of the Contractors HSES file to the Employer within 30 days after signing of the Contract for approval. On completion of construction work the Contractor shall submit to the Employer the HSES file. This shall be a record of information focusing on HSES aspects of the project during the period of construction. The contents of the File will be agreed with the Employer including all the procedures.

### **7.2 HSES Specific Submittals**

The Contractor shall, within 30 day window period of commencement of contract, prepare a site specific Environmental and Social Management and Monitoring Plan (ESMP), in compliance with the Contract and all the applicable government/local laws, the ESIA for the project, the regulations in Burundi and the standards which are listed in table 1 of this Schedule.

The ESMP shall be an umbrella document that encompasses various sub-parts as described in this document, encompassing the following sub-plans:

- Occupational health and safety plan;
- Emergency preparedness and response plan;
- Explosives and blasting management plan;
- Hazardous materials management plan;
- Spill management procedure;
- Construction waste management plan (waste water and solid waste);
- Erosion control management procedure;
- Air quality management procedure;
- Workers Code of Conduct;
- Noise & vibration management procedure;
- Community health and Safety Plan;
- Biodiversity management plan (including the rehabilitation and landscaping procedures);
- Labour management plan including workers grievance redress procedures and disciplinary procedures;
- Workers accommodation plan aligned to the IFC workers' accommodation handbook (where necessary);
- Traffic management plan;

- Site security management plan;
- Any standard operating procedures necessary for the implementation of the plans listed above.

The above documents shall be reviewed by Employer and submitted back to the Contractor on/and within 30 day window period from the date of submission. The employer may at any time order that the Contractor's HSES Plans and procedures be supplemented or revised completely or in part.

### **7.3 Contractors HSES Policies**

The contractor shall prepare, adopt and implement workforce management procedures (PGMO) for the Project, including, among others, provisions relating to working conditions, management of relations with workers, health and safety at work (including personal protective equipment, emergency preparedness and response), code of conduct (including in relation to GBV/EAS/HS), forced labour, child labour, grievance provisions for Project workers, and requirements for contractors, subcontractors and supervisory companies.

The Contractor will develop and implement policy(s) addressing Health, Safety, Environmental and Social management which address the following as a minimum:

- Ensure eliminating (where possible), reducing and managing the HSES risks;
- Continually improve the HSES performance as an integral part of the business strategy and operating methods by carrying out regular evaluations of the performance and setting objectives and targets to achieve this;
- Ensure he complies with all relevant and applicable national and international legislations, regulations and conventions on HSES, as per the Requirements listed in Table 1 above;
- Avoid, or where this is not possible, minimise adverse impacts while enhancing positive effects of the activities of its employees on the natural, physical and social environments, workers, communities and all stakeholders;
- Prevent pollution, reduce waste and minimise and ensure efficient consumption of resources;
- Support the reduction of greenhouse gas emissions from all aspects of the operations;
- Educate, train and motivate the employees, and sub-contractor's employees, to value the natural, physical and social environment in which they work, so that they can carry out their duties in an environmentally and socially responsible manner;
- Work in line with international best practice standards for health and safety following international occupational health and safety management system specifications, and industry specific international good practice standards related to the safety.

### **7.4 Method Statements**

The contractor shall compile and provide Method Statements to the Employer for approval prior to the construction works commencing. Method statements will be required for specific activities that are deemed or identified to pose a risk to Safety, Environment and Social aspects

and/or which require site specific details beyond that contained in the project ESMP or when requested by the Employer.

A Method Statement is a "live document" in that modifications are negotiated between the Contractor and the Employer team, as circumstances unfold. Changes to, and adaptations of, Method Statements can be implemented with the prior consent of all parties. All Method Statements will form part of the Construction works of the ESMP documentation and are subject to terms and conditions contained within the ESMP.

## **8 MEETINGS AND COMMUNICATION**

### **8.1 HSES Meetings**

Regular meetings with small groups of workers on specific HSES topics shall be organised and chaired by the HSES team. These "tool box talks" shall be regularly scheduled and the Employer shall be informed about the agenda and the topics registered as well as the participants.

### **8.2 HSES Coordination**

For the purpose of implementing the health, safety and environment protection policy, the Contractor shall constitute a duly empowered committee designated as the Health, Safety, Environment and Social Committee which shall include, but not be limited to:

- The HSES Manager
- Nurse or paramedic
- HSE Officer(s)
- E&S Safeguard Officer (where applicable)
- One senior representative of the Contractor's supervisory staff
- Two representatives of the labour force representing the various categories of workers.

The composition of the committee shall be submitted to the approval of the Employer who may, if in his opinion the committee is not carrying out its duties with due diligence, order that a new committee be constituted.

### **8.3 Notification**

Should the Contractor become aware of any apparent non-compliance with HSES laws or regulations, or other HSES requirements, the Employer shall be notified by the Contractor immediately in writing.

The Contractor shall notify the Client within 24 hours in case of any of the below incidents occur for the Project:

- a. Worker strikes;
- b. Civil unrest, community protest, etc.;
- c. Environmental damage such as large fuel spills, contamination of water bodies; etc.;

- d. Fines, violation notice, injunction from any E&S authority;
- e. Significant personnel or third-party accident resulting in a fatality or hospitalization of more than three (3) days; and
- f. Adverse media (including social media) or communication about the project in relation to poor E&S performance, allegation of human rights breach, etc.
- g. Any incident or accident in connection with the Project, or is likely to have a significant adverse effect on the environment, affected communities, the public or personnel, including, among others, cases sexual exploitation and abuse (SEA), sexual harassment (SH).

Within five (5) working days after the incident, the Contractor shall issue a comprehensive report to the client detailing the circumstances of the incident, the root cause and corrective actions taken (immediate and medium terms action).

The Contractor shall provide sufficient information on the nature, seriousness and possible causes of the incident or accident, indicating the immediate measures taken or planned to remedy it, as well as any information provided by a contractor and/or a management company, if applicable.

Should the Employer become aware of any apparent non-compliance with environmental laws or regulations, or environmental protection requirements stated herein, the Contractor shall be notified by Employer in writing. The Contractor shall, after receipt of such notice, immediately inform the Employer of the proposed corrective action and shall take action as may be approved. If the Contractor fails or refuses to comply promptly, the Employer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be the subject of either an extension of time or reimbursement for additional costs or damages.

The Contractor shall be liable for the costs of mitigating any non-compliance issues or any breaches of the requirements of the IFC Performance Standards as well as the requirements of the local requirements, within its scope of work. The Contractor shall also be liable for any penalties, fines or infringements as a result of the Project's HSES programs.

The Employer may also serve on the Contractor a Notice of Contravention of the HSES requirement. Such a notice will specify the nature of the contravention, and the time limit for rectification. In the event of failure to comply with a Notice of Contravention the Employer may arrange for work to be done to rectify the cause or order removal or suspension of the offending persons from site or close down the work area, as appropriate, at the Contractor's expense.

The Contractor may appeal to the Employer for modification of the terms of any Notice of Contravention before the expiry of the notice. Upon such appeal the Employer at his/her sole discretion may modify, withdraw or confirm the Notice.

## **9 GENERAL SCOPE OF REQUIREMENTS AND FACILITIES**

### **9.1 General**

Particular attention shall be paid to health and safety for labor-intensive operations and shall include but not be limited to the minimisation of hazards, establishment of safe working practices and blasting procedures, provision and use of protective equipment and clothing, provision for first-aid equipment and care, transport of accident victims, and on-site welfare arrangements such as sanitation and drinking water.

The Contractor shall provide and maintain all temporary walkways, ladders, staging and covers for protection against falling objects and debris on and about the site necessary for the purposes of the Contract and shall remove such walkways, ladders, staging and protective covers when no longer required.

### **9.2 Contractors Construction Camp**

The contractor shall develop a site management plan guided by the relevant principles and requirements outlined in the ESIA/ESMP and other standards as required to meet the conditions of the contract. The plan shall be submitted to the employer for review and approval within 30 days of contract signing.

### **9.3 Site Access and Safety Signage**

The Contractor shall erect and maintain all necessary temporary fencing, barricades, barriers, signs and lights for the prevention of accidents or unsafe practices to the satisfaction of the Employer. Signs shall include but not be limited to standard road signs, warning signs, danger signs, control signs and direction signs in addition to the safety notices specified elsewhere in this Clause. All such signs shall be clearly legible in both local languages and French, to the approval of the Employer, and the Contractor shall maintain them in a clean and legible condition for the duration of the works.

### **9.4 Welfare Facilities**

The contractor shall ensure there are adequate sewage and sanitation facilities at the site and these shall conform to all relevant health and safety standards and codes.

Mobile chemical toilets and septic tank and/or conservancy tanks systems shall be permissible with the following provisions:

- Toilets must be easily accessible with separate toilets for men and women;
- Toilets shall be placed outside areas susceptible to potential flooding and shall not be placed within 100m of any wetland or watercourse.
- Toilets shall be located a sufficient distance from any offices or eating areas to prevent nuisance from offensive odours.
- Toilets must be kept in a clean, neat and hygienic condition.
- Disposal of sewage from septic tank/conservancy tanks shall be in a safe and responsible manner and at an approved facility specifically for that purpose.

- Provision of one (1) toilet provided per 15 persons.
- The toilets shall be of a neat construction and shall be provided with doors and locks.
- Sanitary arrangements shall also be to the satisfaction of the Employer.

The Contractor shall designate eating areas to the approval of the Employer, which will be clearly demarcated. Sufficient bins will be present in this area. Any cooking on site will be done in a designated area with well-maintained cookers with fire extinguishers present. The contractor must ensure that there adequate potable water for all employees on site at all times. The contractor shall undertake water quality analysis monthly as a minimum and ensure that potable water quality meets the WHO drinking water standards.

### **9.5 Location of Storage Facilities**

The Contractor's storage and other construction buildings, which are required for the performance of the work, shall be located upon cleared portions of the Work Areas. The preservation of the landscape shall be an essential consideration in the selection of all such sites and in the construction of buildings.

### **9.6 Location of Other Work Areas**

The Contractor shall receive written approval from the Employer prior to establishment of any other lay down areas, stockpile or waste areas, and other work areas besides the ones that will have been established by the Employer.

Quarries, borrow and spoil disposal areas shall be so excavated that water will not collect and stand therein. During construction, excavated areas shall be maintained in such a condition that they will be well-drained or pumped dry at all times. Surface water, subsurface and groundwater shall be prevented from flowing into and accumulating in excavations.

### **9.7 Maintenance of Pollution Control Equipment and Facilities**

During the Contract Period, the Contractor shall maintain all erosion, sediment and pollution control facilities as long as the operations creating the particular pollutants are being carried out or until the materials concerned have become stabilized to the extent that the pollution is no longer being created.

### **9.8 Spillages and Disposal of Pollutants**

Special measures, as approved by the Employer, shall be taken to prevent chemicals, fuels, oils, greases, bituminous materials, waste washings, and cement from entering water bodies. Disposal of any materials in areas adjacent to water bodies shall require the prior written approval of the Employer and will be in accordance with the National waste management regulations. If any waste material is dumped in unauthorised areas, the Contractor shall remove the material and restore the area to the condition of the adjacent undisturbed area.

## **9.9 Stockpiling of Topsoil**

Excavated material suitable for topsoil shall be stockpiled separate from other materials at such places that the topsoil can be reused for landscaping and reclamation purposes. No topsoil shall be removed from Site without prior written approval from the Employer.

## **9.10 Traffic Management**

The contractor must develop a traffic management plan that includes road use training for drivers and traffic marshals, adoption of proper road use that ensures the safety of the community members and other road users, dust controls along the roads, and use of speed bumps to control the speed of project vehicles. The traffic management plan should be guided by and adhere to the relevant principles and requirements outlined in the ESIA/ESMP and reference standards.

## **9.11 Workers accommodation**

If the contractor intends to provide accommodation for employees, the contractor must develop a workers accommodation plan which shall meet minimum requirements of the IFC workers' accommodation handbook. The plan must be submitted within 30 calendar days of contract signing for the Employer's review and approval.

## **9.12 Use of Security Personnel**

Where private or public security are required on the project, it is necessary to:

- Promote the use of existing security services in the Project area.
- If security services are required, ensure that a formal agreement is signed, including clauses on compliance with the code of conduct.
- Train security personnel on human rights and gender-based violence, including GBV/EAS/SH plans .

Before calling on security personnel to protect Project workers and property, particularly around living and technical bases, the Beneficiary ensures that (i) their background has been duly checked to ensure that they have not engaged in illegal or threatening behavior, including but not limited to GBV/EAS/SH , or been involved in abuse or rebellion; (ii) they have received appropriate training and instructions, including in relation to the use of force and appropriate behavior or conduct, in a manner acceptable to the employer.

The contractor shall initiate diligent investigations to verify all allegations of illegal and threatening acts committed by security personnel deployed to protect Project personnel and assets and take appropriate action or urge relevant parties to take necessary action to prevent such acts from recurring and, if necessary, report them to the competent authorities.

## **10 HEALTH AND SAFETY MANAGEMENT**

### **10.1 Health and Safety Management Plan**

The Contractor is to submit to the Employer a written Health and Safety Management Plan, specific to the Work under this Contract, for review within twenty-one (21) calendar days following the Commencement date and always prior to commencing on site.

Contractor shall not commence any construction activities until their H&S Plan is reviewed and approved by the Employer.

The plan shall be amended when operations or conditions require, and such amendments shall be submitted to the Employer for review. Such Plan shall be prepared by an appropriate health & safety professional and shall describe anticipated hazards and control methods. Contractor Health and Safety Plan should provide adequate safeguards for all construction employees, Employer's Engineer & Employer Personnel, site visitors, and the public.

The Health and Safety Plan provisions shall not be less than those required by the Laws and Regulations of the Republics of Burundi and will include but not be limited to the following components:

- Project scope of work,
- Roles and responsibilities of key project staff ,
- appointments of key staff who have health and safety responsibilities,
- register of project risks,
- risk assessments to cover current and immediate future activities,
- good order and site security,
- stability of structures,
- demolition or dismantling,
- blasting and explosives,
- excavations,
- confined spaces,
- reports of inspections,
- accident reporting,
- incident investigation,
- energy distribution installations,
- prevention of drowning,
- traffic routes,
- vehicles
- prevention of risk from fire,
- emergency procedures,
- emergency routes and exits,
- fire detection and firefighting,
- temperature and weather protection,
- lighting,



- welfare facilities including but not limited to sanitary conveniences, washing facilities, drinking water, changing rooms, lockers and facilities for rest.

## **10.2 Code of Practice within the Health and Safety Management Plan**

The procedures described in the Health and Safety Management Plan shall be of no less a standard than that of the ILO Codes of practice for Safety and Health in Building and Civil Engineering.

### 10.2.1 Vital Safety requirements

The Contractor shall ensure the health and safety of all its workers.

- a) The Contractor will be responsible to ensure that PPE is worn by all workers and Subcontractors whilst undertaking construction activities and whilst on the construction Site.
- b) The Contractor shall not employ forced labour, which consists of any work or service not voluntarily performed that is exacted from an individual under threat of force or penalty.
- c) The cost of ensuring the health and safety of the workers shall be part of the construction cost.
- d) When using public roads, the Contractor shall take all necessary measures to minimise the risk of accidents, injuries to local people and damages to public and private properties. No workers shall be allowed to travel in the back of flatbed trucks or pickup trucks.
- e) The Contractor shall liaise and coordinate with the local administration as it might be necessary under the guidance of the Employer.

### 10.2.2 Personal Protective Equipment (PPE)

Safety equipment of "Approved Standard" shall be worn by all persons at all times whilst on the Works. "Approved Standard", for the purpose of this section, shall mean that are in accordance with the requirements of the prevalent laws enforced in Burundi.

The Contractor shall be responsible for equipping the workers including unskilled labours with as a minimum the following Personal protective equipment (PPE) of acceptable quality approved by the Employer:

- Safety Hard Hat equipped with a chin strap;
- Safety boots with steel toe caps or equivalent safety toe caps;
- Reflective vest
- Leather construction gloves;
- Safety glasses.

Suitable clothing (overalls or two piece work suits with reflectors), helmets, cap-lamps if working at night, waterproofs footwear (gum boots), safety glasses, ear protectors, dust masks, gloves, goggles, harnesses etc., appropriate to the work being undertaken, shall be issued free of charge to and worn by all workers on and from the day of commencement of work. The

workers shall be trained in the use of all such equipment before entering working areas or relevant designated areas.

If the Contractor fails to provide such clothing and equipment and training, the employer shall be entitled to provide the same and recover the cost from the Contractor. Safety equipment and clothing issued to workers shall be replaced free of charge when no longer serviceable.

#### 10.2.3 Transport of workers

The Contractor shall be responsible for, and make provision for, the safe vehicular transport of all his workers between their site accommodation area and their work areas, and vice versa. The Contractor shall also be responsible for, and make provision for, the safe vehicular transport of all workers who are not in close proximity to the site or living in the Contractor's labour accommodation (if applicable) from their private accommodation areas and their work areas, and vice versa. Under no circumstances shall workers be transported on flat bed trucks, rail or similar vehicles without acceptable form of side restraints and adequate seating. Weather proof covers shall be available for use at all times. The Contractor shall prevent overloading of vehicles.

#### 10.2.4 Emergency Preparedness and Response

##### **Emergency Preparedness and Response Plan**

Plans and procedures for emergency situations are established and maintained to identify the potential for, and responses to, incidents and emergency situations, and for preventing and mitigating the likely illness and injury that may be associated with them. The contractor shall prepare a site specific Emergency Preparedness and Response Plan (EPRP) in line with the IFC Performance Standards and all local relevant health and safety legislation. The contractor shall undertake a baseline risk assessment to inform the development of the EPRP. The baseline risk assessment shall be documented in a site risk register.

The contractor shall review the scope of its operations and identify all foreseeable emergencies and update this emergency risk register and adopt within this procedure. The type of anticipated emergencies considered in this procedure includes, but is not limited to:

- Letter/parcel bombs,
- Labour unrest situations
- Injury or accidents
- Property damage
- Environmental situations - Hazardous substance spill
- Lightning strikes
- Flooding
- Fires/Explosion
- Hostage situations, etc.

## **Fire**

The Contractor shall take all reasonable precautions against outbreaks of fire and ensure that persons trained in the use of firefighting equipment are included in each section of work on each shift.

Appropriate firefighting devices shall be provided by the Contractor, particularly at electrical installations, fuel stores and explosives magazines. The Contractor shall allow for these provisions within the billed rates.

The Contractor and the employees or Subcontractors must take all reasonable measures to ensure that any accidental bush fires are not started. The Contractor shall be responsible for any liability whatsoever.

In the event of a fire, the Contractor shall take all necessary steps in its control to extinguish the outbreak.

## **Epidemics**

In the event of any outbreak of illness of a highly contagious or epidemic nature the Contractor shall comply with and carry out such regulations, orders and requirements as given in the Health Acts of the Republics of Burundi, or the local medical or sanitary authorities for the purpose of dealing with and overcoming the same

## **Infirmary**

The Contractor shall provide and maintain an infirmary for the Projects' construction workers during the construction phase. The facility shall be operational prior to the commencement of the Projects' construction. It shall be equipped to the satisfaction of the Employer and as a minimum the following:

- Hot and cold running water;
- Electrical power facilities;
- A refrigerator for keeping medicines at a constant temperature (if required);
- A private examination room;
- Sufficient equipment and supplies for the number of staff on site;
- A lockable cupboard for the storage of medicines.

The infirmary shall be staffed and managed by a qualified and experienced Paramedic or nurse of acceptable qualification and experience to the satisfaction of the Employer.

Records shall be kept of every medical treatment and patient's condition. The records will be classified as kept confidential. The Contractor and Employer shall be entitled to receive summarised and anonymous information from the records, not the actual workers record themselves.

## **Dedicated Emergency Vehicle/Ambulance**

When any work is being carried out a fully functional and suitably equipped and dedicated emergency vehicle/ambulance (Minibus or van type) with a driver and a paramedical staff/nurse trained in First Aid shall be available as close to the site of works as is convenient

and not obstruct with movement of construction machinery and personnel or performance of construction activity. This vehicle must have provision to carry an injured employee on a stretcher. No high risk works shall be undertaken by the contractor during any period when the site emergency vehicle/ambulance is offsite.

### **First Aid Provisions**

The Contractor shall provide and maintain in ready condition (a regular register of checking the contents) boxes of first aid materials together with stretchers at prominently marked locations within 100 metres of each working site on the surface or as required by the Employer. The contents of each first aid box shall be submitted to the employer for approval, but shall typically include, but not be limited to:

- Wound cleaner (500 ml)
- Swabs for cleaning wounds
- Cotton wool for padding (250 g)
- Sterile gauze (5 packets)
- 1 pair forceps (for splinters)
- 1 pair scissors (100 mm)
- 2 cards of 6 safety pins
- 24 triangular bandages
- Sterile eyewash
- pairs disposable gloves
- Wound cleaner (500 ml)
- Swabs for cleaning wounds
- Cotton wool for padding (250 g)
- Sterile gauze (5 packets)
- 1 pair forceps (for splinters)
- 1 pair scissors (100 mm)
- 2 cards of 6 safety pins
- 6 roller bandages (80 mm x 5 m)
- 6 roller bandages (100 mm x 5 m)
- 2 rolls elastic adhesive (25 mm x 3 m)
- 2 anti-allergenic adhesive strip (25 mm)
- 2 packets adhesive dressing strips
- 6 large dressings (75 mm x 100 mm)
- 6 shell dressings (150 mm x 200 mm)
- 4 straight splints
- Eye pads

### **First Aid Training**

The Contractor shall operate a basic first aid training programme to ensure that each foreman or work crew leader in control of 20 or more workmen is trained in first aid and possesses a valid certificate to that effect issued by the competent authorities, or equivalent qualification,

within 3 months of his appointment. All First Aid qualified personnel will be identified to the Employer and will be issued with a green and white sticker to be worn on their hard hat. Alternatively, other workmen with aptitude shall be similarly trained, so that there is at least one person qualified in first-aid present on site within each group of 20 workmen.

## **11 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING DURING CONSTRUCTION**

For the purposes of this Contract, environmental protection is defined as the retention of the environment in its natural state to the greatest extent possible during construction to preserve or improve the area's natural appearance or to near its original ecological condition. Environmental protection requires consideration of air, water and land resources, the management of pollutants, solid and liquid wastes, hazardous wastes and the minimisation of dust and noise. In addition, social management is defined as the adoption of good labour working conditions and proper community interactions and considerations within the project construction areas and surrounding community.

The Contractor's attention is directed to the necessity of protecting the environment that includes but is not limited to: trees and vegetation, farms, water sources, and all natural features on or adjacent to the site, whether or not shown on the Drawings

### **11.1 Environmental and Social Management System**

The Contractor shall develop, maintain and implement an Environmental and Social Management System (ESMS) in line with IFC Performance Standard 1 which will draw on the elements of the established business management process of "plan, do, check, and act". The ESMS will present a methodological approach to managing safety, environmental and social risks and impacts in a structured way on an ongoing basis, appropriate to the nature and scale of the project, and which promotes sound and sustainable environmental and social performance. The ESMS will include/address, among others:

- Environmental, social, health and safety policies;
- A system for routinely identifying and managing risks and impacts and preparation of an ESMP, and regularly updating the same;
- Management plans and standard operating procedures as necessary for avoiding, mitigating compensating or offsetting risks and impacts;
- Sufficient implementation budget;
- Organisational capacity and competency, assigning roles, responsibilities and authorities in order to properly implement the ESMS;
- Emergency preparedness and response;
- Stakeholder engagement with people within and outside the Contractor's firm;
- Communications and grievance mechanisms;
- Monitoring and review procedures to assess E&S performance and progress.

## **11.2 Air Pollution Prevention**

The Contractor shall take all reasonable steps to minimise air pollution, whether from exhaust emissions, construction processes, construction traffic, or site operation.

The Contractor shall at all times operate his equipment and vehicles so as to minimise exhaust emissions and in any case within the limits established by the Burundi Environmental Protection Agency or other government authorities. If in the opinion of the Employer the exhaust gas emissions of any of the Contractor's equipment or vehicles are excessive, whether due to poor engine adjustment, poor maintenance, low fuel quality, inefficient operating conditions or other rectifiable cause, the Employer may instruct that such equipment or vehicles cease operation until adequate corrective actions have been carried out, and the Contractor shall comply with such instruction immediately.

Burning of materials resulting from site clearance and grubbing, and burning of combustible construction waste, will not be permitted on site.

The Contractor shall take appropriate measures to minimise the generation of dust as a result of his activities, and to prevent dust originating from his operations from causing nuisance or health hazard to persons or animals and from damaging crops, orchards and dwellings. For work in confined spaces and for specific activities giving rise to potentially hazardous airborne particulates or fumes, these measures shall include a risk assessment and an appropriate response to the assessment to prevent hazards to health, including but not limited to the use of dust extractors, wet drilling, dust suppression techniques and personal protective equipment. For generalised dust including but not limited to dust from construction traffic, excavations, stockpiles, backfill areas and materials handling, these measures shall include but not be limited to sheeting loads, watering stockpiles and access roads, and the establishment of temporary vegetative cover on soils and soil like materials.

The Contractor shall not locate any hot-mix, screening, crushing or similar potentially polluting plant closer than 500 m to any settlement. Any such plant must be fitted with dust suppression equipment and operated and maintained at all times in conformity with the manufacturer's specifications, instructions and manuals.

The Contractor shall monitor dust levels and control the generation of dust to below the limits specified by the ESMP from time to time and record these readings and supply these readings to the Employer on a monthly basis.

The Contractor shall take appropriate measures to avoid the release to the atmosphere of chlorofluorocarbons (CFCs). All new air-conditioning, refrigeration, freezing and cooling units supplied by the Contractor for use on or off the Site including those in vehicles shall be CFC-free.

The cost of all measures required to comply with the requirements of this Clause shall be deemed to be included in the Contractor's rates.

### **11.3 Noise and Vibrations**

The Contractor shall ensure noise levels are kept within acceptable limits as stipulated in the Burundi environmental management noise and excessive vibration pollution, control rules. The Contractor shall indemnify the Employer from any liability damages due to noise, vibrations and/or other disturbances caused by the construction operations and also from all claims relating to such liability.

Night-time blasting shall not be permitted, while pile driving or other operations producing a high level of noise and/ or vibration shall be performed only at times and places approved by the Employer and people living within potentially impacted areas shall be notified ahead of time of the length and noise intensity of the proposed night-time construction.

### **11.4 Pollution Prevention**

The Contractor shall not pollute any rivers, ponds, marshes, streams or waterways with fuels, oils, sewerage, bitumen, acids, concrete residues or other harmful materials. The Contractor shall not pollute Mulembwe River and any other water bodies with sediments emanating from the Projects' construction.

The Contractor shall investigate and comply with all applicable Burundi laws and regulations, applicable international standards and guidelines and the Project's ESMP that concern the pollution of water bodies and waterways.

### **11.5 Soil Erosion and Sediment Control**

The Contractor shall conduct operations in conformance with the approved Soil Erosion and Sediment Control Plan. The area of bare soil exposed at any given time by construction shall be restricted to a minimum. Vegetated areas shall not be cleared until immediately prior to construction occurring in the area. Cuts, fills and cleared areas within the limits of work shall be graded and drainage installed to prevent and control erosion.

Work areas, construction roads, quarries, and borrow and spoil areas shall be located and constructed in a manner that will keep sediment from entering Mulembwe River or other bodies of water. Construction roads and the excavations that are located on the steep valley sides will be constructed in a manner that will keep excavated soil and blasted rock from falling on to down-gradient areas.

Soil and rock excavated from these areas shall be loaded into trucks, covered and hauled to the designated spoil disposal area. The features of the Work areas, construction roads, quarries, and borrow and spoil areas shall be so controlled, both during and after completion of the work, so that erosion will be minimized and sediment will not enter bodies of water. This may require segregating such areas by a dyke or other barrier, treating sediment polluted water prior to discharge by the use of a settling basin or other means sufficient to reduce the sediment content to the adopted guideline.

The Employer has the authority to limit the surface areas of erodible materials exposed by clearing and grubbing, and to direct immediate permanent or temporary sediment control measures to prevent the transport of sediment. This includes, but is not limited to, the

construction of berms, dykes, dams, drains, sediment, collection ponds or basins, and the use of temporary seeding, mulches, matting, stone, riprap or other control devices as necessary to control erosion and the transport of sediment.

The Contractor shall install all necessary drainage and sediment control devices prior to the start of any land disturbance activities during the construction of the access road. Soil erosion and sediment control facilities shall be adapted or expanded as construction proceeds to meet the requirements specified. Temporary erosion and sediment control measures shall be provided and maintained until the permanent drainage and erosion control facilities are completed and operative. The Contractor shall inspect and maintain all erosion and sediment control facilities on a daily basis.

Sediment-laden water shall not be pumped from trenches or excavations into surface waters drainage channels (including seasonal streams) or either natural or man-made leading to any waterbodies. Sediment-laden water shall be discharged into settling basins located away from watercourses so that only clear water enters the watercourse after the silt has settled out in the settling basin.

The Contractor shall take appropriate measures to manage storm water originating in and flowing across and from the Site so as to avoid causing damage to the works or to other property whether by runoff or flooding or erosion or sedimentation, such property to include fields, water channels, dwellings and other tangible assets. The Contractor shall repair any such damage at his own cost to the satisfaction of the Employer and pay full compensation to any affected party.

Excavated soil shall not be stockpiled adjacent to any river or watercourse in a manner that will not cause siltation of the water body. Fills and waste areas shall be constructed by selective placement of materials to eliminate silts or clays on the surface which may erode and contaminate any river.

All erosion and sediment control facilities shall be left in place until construction is completed or the area is stabilised, or as directed by the Employer. At the completion of the work, the Contractor shall remove any sediment deposited behind any sediment control facilities which are to remain and shall repair or replace all damaged facilities as directed by the Employer. The Employer will direct the Contractor as to which facilities shall remain, and which shall be removed.

## **11.6 Waste Management**

The Contractor shall develop a waste management plan, which will detail the use, storage and disposal of all solid waste materials.

All the waste on site shall be categorised and stored in specific containers before off site disposal. Disposal in or adjacent to the site of any debris, wastes, effluents, trash, oil grease, chemicals, etc. will not be permitted, except as authorized in writing by the competent authority(s) and in accordance with IFC. Unless written authorization or burning or on-site disposal is received from the competent authority, all wastes and debris resulting from construction operations shall be removed and disposed off the Site. The Contractor shall make



all necessary arrangements with the appropriate local authorities for obtaining suitable disposal locations and the cost involved shall be at the Contractor's expense.

If any waste material is dumped in unauthorized areas, the Contractor shall remove the material and restore the area to its original condition. If necessary, ground contaminated from such unauthorized disposal operation shall be excavated, disposed as directed by the Employer, replaced with suitable fill material, compacted and finished with topsoil, and planted as required to re-establish vegetation, all at no additional cost to the Employer.

The Contractor shall not create, cause or allow to be caused by construction activities or those of the employees or Subcontractors the burning of waste or other materials as a method of disposal. **Burning or Burial of waste is strictly prohibited.**

#### 11.6.1 Hazardous Waste

The Contractor shall avoid the generation of hazardous and non-hazardous waste materials (e.g. waste oil filters, tyres, batteries, bulbs and chemical wastes).

Where waste generation cannot be avoided, the Contractor shall reduce the generation of waste, and recover and reuse waste in a manner that is safe for human health and the environment.

Where waste cannot be recovered or reused, the Contractor will liaise with the competent authority to treat, destroy, or dispose the waste in an environmentally sound manner that includes the appropriate control of emissions and residues resulting from the handling and processing of the waste material. Waste will be treated in accordance with the National waste management regulations.

If the generated waste is considered hazardous, the Contractor shall adopt Good International Industry practise alternatives for its environmentally sound disposal.

When hazardous waste disposal is conducted by Subcontractors or third parties, the Contractor shall use Subcontractors that are reputable and legitimate enterprises licensed by the relevant government regulatory agencies.

The Contractor shall obtain chain of custody documentation to track the waste to its final disposal destination. The Contractor shall conduct an assessment to ascertain whether licensed disposal sites are being operated to acceptable standards and are deemed acceptable by the Employer.

If the disposal site is not acceptable the Contractor and Employer together, in consultation with the competent authority shall consider alternative disposal options, including the possibility of developing their own recovery or disposal facilities at the project site.

### 11.7 Hazardous Materials

Hazardous materials can be classified according to the hazard as explosives; compressed gases, including toxic or flammable gases; flammable liquids; flammable solids; oxidizing substances; toxic materials; radioactive material; and corrosive substances.

The Contractor shall construct a storage area for the projects hazardous materials and fuel. The storage area shall have an impermeable surface and shall be walled or banded to reduce

potential surface and ground water pollution in the event of a spill. The design of contained storage areas shall conform to national regulations and international best practices.

The Contractor shall regularly collect and store all used oil and lubricants, which will be collected into drums/barrels or tanks.

The storage of liquid hazardous wastes shall be in a roofed and bunded well ventilated enclosure or should have a lockable valve in the drainage system so that rainwater can be checked for contaminants prior to discharge.

### **11.8 Blasting & Explosives**

The Contractor shall develop an blasting & explosives management plan (where necessary) and appoint a competent full-time employee to be in charge of storage, transportation, and use of explosive material (explosives manager). The plan shall ensure the projects compliance with Burundi legislation.

The explosives management plan and credentials of the manager shall be submitted to the Employer at the start of the construction phase for acceptance prior to any blasting occurring at the site.

The nominated employee (in charge of explosives) shall have sufficient knowledge and experience in:

- storage, transportation, and use of explosives
- the handling and use of explosives
- Burundi laws and regulations that apply to the importation, handling, storage, transport and use of explosives.

He shall be responsible for:

- the purchase of all explosives
- The transportation of all explosives
- Liaisons with the Burundi police or army and officials of the mines and geological department regarding the transportation and storage of all explosives.
- Planning and conducting all blasting required for the construction of the project
- Undertaking regular audits on stocks
- Monitoring recording and the reporting of explosive handling and usage
- Maintaining the permits issued by regulating agencies

The Contractor shall ensure that adequate resources have been provided to the person in charge of explosives to carry out the work effectively

### **11.9 Vegetation clearing**

Limits of clearing shall be within the boundaries shown on the construction drawings or to the limits staked on the ground by the Employer. Except in areas specified to be cleared as indicated on the Drawings the Contractor shall not deface, injure or destroy trees or shrubs, nor remove or cut them without the written approval of the Employer. Trees in construction zones

that interfere with the movement of the Contractor's equipment shall not be removed until inspected and/or tagged by the Employer.

All trees bordering any construction zone shall be protected by acceptable methods. Trees shall be felled in such a manner as to avoid damage to trees left standing. Where, in the opinion of the Employer, trees that are to remain may be defaced, bruised, injured or otherwise damaged by the Contractor's equipment or operations, the Contractor, shall adequately protect such trees. When earthwork operations are liable, in the opinion of the Employer, to cause rock, earth or other materials to be displaced into uncleared areas, the Contractor shall protect the trees. Rock, earth or other material that is displaced into uncleared areas shall be removed and any resulting vegetation or infrastructure damage will be required to be rehabilitated, replaced or compensated as appropriate.

Ropes, cables or guys shall not be fastened to or attached to any nearby trees for anchorages unless specifically authorized by the Employer. Where such use is authorized, it shall be performed in such a manner as to avoid damage to the trees. The Contractor shall be responsible for any damage resulting from such use.

All timber, logs, and branches 50 mm in diameter or larger removed or cut by the Contractor shall be stockpiled and utilized in construction or as fuel wood. Cleared and grubbed materials smaller than 50 mm in diameter, with the approval of the Employer, may be disposed of by removal from the Site. The location and procedures utilized to dispose of materials must be approved by the Employer.

#### **11.10 Restoration of Landscape Damage**

Any tree, grassed or other landscape feature which has been scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original conditions and to a condition satisfactory to the Employer. Restoration of scarred and damaged trees shall be performed in a manner approved by the Employer. When directed by the Employer, trees shall be trimmed to remove branches or roots which interfere with or were damaged by construction traffic.

Trees determined by the Employer to be damaged beyond restoration shall be removed and utilized in construction or provided to the labour camps. Such trees shall be replaced at the Contractor's expense by nursery-grown trees of the same or alternative species, the species size and quality being approved by the Employer. Any disturbed grassed areas shall be seeded and mulched as directed by the Employer.

#### **11.11 Biodiversity protection**

Management of biodiversity on the project shall be in line with the provisions of the ESIA and ESMP for the project.

The harvesting of plants by construction workers is prohibited. This includes the harvesting of plants for firewood, construction material, the making of crafts and medicinal purposes. Alien vegetation occurring on the site should be controlled as far as reasonably practicable. The area should be monitored for the establishment and spread of alien invasive species during and all phases of the project and control of alien vegetation shall be undertaken where required.

The aim is to prevent illegal activities potentially perpetrated by site staff and to prevent the unnecessary disturbance or killing of any animals trapped in construction works or discovered on the construction site or surroundings

No construction workers may disturb, hunt, set traps/snares, utilise dead or alive fauna/livestock/wildlife/fish. This includes the killing of any animal caught in construction works.

On no account shall any animal, reptile or bird of any sort be killed. This specifically includes snakes or other creatures considered potentially dangerous. If such an animal is discovered on site an appropriately skilled person should be summoned to remove the creature from the site. Consideration should be given to selection and nomination of such a person prior to site establishment.

### **11.12 Historical, Archaeological and Cultural Resources**

The contractor shall implement and raise awareness on the project chance finds procedure (included in the ESMP). No existing historical, archaeological resources within the site was identified during the ESIA process, however, if the Contractor discovers archaeological sites, historical sites, remains and objects, including during excavation or construction, the Contractor shall: (a) Stop the construction activities in the area of the chance find; (b) Delineate the discovered site or area; (c) Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, the Contractor shall immediately notify the Employer for the appropriate instruction.

Where appropriate, by reason of chance find, the Employer may order delays in the time of performance, or changes in the work, or both. If such delays, or changes, or both, are ordered, the time of performance and Contract price shall be adjusted in accordance with applicable sections of this Contract.

### **11.13 Resource Efficiency**

The Contractor will implement technically and financially feasible and cost-effective measures for improving efficiency in its consumption of energy, water, as well as other resources and material inputs, with a focus on conserving raw materials, energy, and water.

### **11.14 Reclamation of Quarries, Borrow and Spoil Disposal Areas**

The Contractor will ensure final restoration of quarries, borrow and spoil disposal areas. This shall include grading, establishment of vegetative cover, or other necessary treatments that will blend into the surrounding area. Overburden shall be stripped from all quarries, borrow and spoil disposal areas and stockpiled for later use in reclamation of the sites. After an excavation has served its purpose, all waste material that may have been temporarily stored outside of the excavation shall be moved back into the excavation. The excavation shall be neatly sloped and trimmed, and side slopes flattened to the maximum extent possible, consistent with the slope of the natural ground surface. The stockpiled overburden material shall then be spread uniformly over the sides and bottom of the excavation area. No separate payment will be made for this work.

### **11.15 Post Construction Clean-Up**

The Contractor shall, as far as reasonably possible, remove all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, debris and any other vestiges of construction, to the approval of the Employer. The Site shall be restored as necessary to permit the growth of vegetation thereon. Disturbed areas shall be graded, and 150 mm of topsoil applied to the extent that topsoil is available from stockpile.

### **11.16 Community Relations**

The contractor must commit to complying with the project's stakeholder engagement plan that ensures positive relations with the communities and affected persons and convey respect for the community culture and traditions. The contractor must also adhere to non-discrimination policies when dealing with communities and affected persons during engagements, employment, and any other forum when interacting with communities and the employees. The contractor shall participate in handling grievances that involve them, including responding to and resolving complaints in a timely manner.

In locating and operating his plant and facilities and in executing the works the Contractor shall at all times, bear in mind and to the extent practicable minimise the impact of his activities on local communities. To this end, he shall liaise with the Employer. Any problem that cannot be resolved by the Contractor shall be referred to the Employer. If required by the Employer, a senior representative of the Contractor's staff shall participate in any meeting and sit on any committee set up to deal with community relations and social issues.

Where the Public could be exposed to danger by any of the Site activities the Contractor shall as appropriately provide suitable warning horns or sirens and flagmen, barriers and/or warning signs in the local languages and French and close off access all to the approval of the Employer.

### **11.17 Community Health, safety, and security**

The contractor will develop a plan to ensure the community is protected from health and safety issues emanating from project activities. Such a plan will include dam safety, infrastructure safety, emergency response and preparedness, and general health issues such as disease outbreaks.

The community health, safety, and security plan should be guided by, and adhere to, the relevant principles and requirements outlined in the ESIA/ESMP and IFC Performance Standards.

## **12 TRAINING AND AWARENESS**

The Contractor shall ensure that all sub-contractor, employees, suppliers, agents etc. are fully aware of the SHES requirements. The Contractor shall conduct Health, safety environmental and social awareness programmes and campaigns throughout the duration of the Contract, including the use of prominent and strategically placed posters, audio-visual methods, etc.

Throughout the construction period, the Contractor shall conduct and keep records of comprehensive training sessions for the personnel on occupational health, safety, environment and social protection and the code of conduct for project employees. Scheduling of training sessions shall be as follows:

- Session for all employees at the initiation of construction;
- Sessions for new employees;
- Bi-annual review sessions;
- Topical sessions at the request of the Employer at any time.

The curricula shall be based on the IFC Performance Standards and the Project's Environmental and Social Management and Monitoring Plan and include, as a minimum:

- Application of labor management procedures, including the Employer's and Contractor's code of containing GBV/EAS/HS provisions;
- Protection of vegetation and plants, soil and erosion management;
- Detecting and avoiding pollution and appropriate measures for disposing of waste;
- Community health and safety and the prevention of communicable diseases such as HIV/AIDS;
- GBVH and internal grievance mechanism, including code of conduct prohibiting GBV/EAS/SH behavior and sanctions for non-compliance and any other mitigation measures established in the GBVH/EAS/SH action plan.;
- Reporting incidents, sexual exploitation and abuse, and sexual harassment;
- Emergency response;
- Health emergencies linked to climate change;
- Firefighting and prohibitions against the killing of wildlife; and
- Other issues identified by the Employer.

The Contractor shall maintain a training matrix for all its employees and provide reports to the employer on monthly basis.

### **12.1 Safety Notices, Signs, Posters and Information Notice Boards**

The Contractor shall obtain, erect, and maintain all the required notice boards for surface and underground works in the form of pictograms to the approval of the Employer. These includes all HSES signs.

The Contractor shall erect and maintain notice boards for the dissemination of relevant safety information and safe work procedures. Notices should be published both in local languages as Approved by the Employer and French.

The boards shall be made up from durable materials to the satisfaction of the Employer that will not warp from variations in temperature or weathering, protected from rainfall if erected in outside locations. The board shall be a minimum of 2 m x 1.5 min size and be mounted at a height of 1.5 m.

The Contractor shall keep the notice boards in good order with legible notices for the duration of working in any given contract area.

The relevant statutory regulations with respect to blasting shall be displayed at the entrance of the Project and other areas where blasting may take place.

### **13 Supply Chain Risk Management**

The Contractor will be required to produce a supply chain analysis of its primary supply chain within the first three months of Contract of civil works commencing as required by IFC Performance Standard 2, section 24-26, and monitor subcontractor(s) performance in compliance with section 27-29. The contractor shall develop a suitable plan for the management of E&S supply chain risks which shall be submitted to the employer for approval 30 days prior to commencement of the works.

## **14 LABOUR AND WORKING CONDITIONS**

The Contractor is required to protect the fundamental rights of its workers in the course of economic growth, employment creation, and income generation. The Contractor is expected to treat workers fairly and provide them with safe and healthy working conditions.

In this connection the Contractor will develop and implement a Human Resources Policy that will encompass the requirements contained in this section. Relationships between the Contractor and his general labour shall be formalised. Talks, discussions and negotiations with elected worker representatives shall be convened at regular intervals, but not less than every three months. The Employer shall be granted observer status.

The Contractor shall provide free protective clothing to staff as appropriate to their respective duties and replace the same free of charge when worn-out and returned to stores.

The Contractor shall review wages and allowances at least annually. The minimum wage is applicable will be based on survey country wide for similar construction works which will be approved by the Employer and the "highest" must be used since Burundi has no clear minimum wage set by government. The Contractor and their subcontracting tiers are expected to meet national laws and international standards with the timely payment of wages. Where wages are not paid in a timely manner, the Employer shall contractually reserve the right to use withheld funds to pay workers' wages which would then be deducted from the Contractor disbursements.

### **14.1 Contracts of Employment**

All employees of the Contractor shall be issued with an employment contract in Kirundi and French that is to be signed by the employee and the Contractor. All employees shall attend an induction programme at which their terms of employment, site safety procedures, and environmental policies will be addressed.

The Employment Contract shall cover the personal particulars, job title, probation period, employment period, wages, overtime, deductions, payment method, hours of work, leave arrangements (paid/unpaid, public holidays), sick leave provisions, accommodation provisions, free meal or food allowance provisions, transport provisions, company rules, regulations and procedures, termination of employment and agreement clause. This must be for both general workers and skilled workers.

### **14.2 International Labour Organisation (ILO) Requirements**

ILO is an international organisation responsible for developing and overseeing international labour standards. ILO aims to promote rights at work, encourage decent employment opportunities, enhance social protection and strengthen dialogue on work-related issues, giving an equal voice to workers, employers and governments to ensure that the views of the social partners are closely reflected in the labour standards developed. Burundi has ratified 31 ILO Conventions. The Contractor shall familiarise himself with the conventions, determine which conventions are applicable and ensure that they and their Subcontractors comply with the requirements.

### **14.3 Employment of Labour**

The Contractor's HSES Manager shall also be responsible for monitoring the labour rights for the Contractor and Subcontractors' workers and to support with skills development and training. The Human Resource Officer shall also make arrangements for the engagement of staff and labour, local or otherwise, and for their payment, feeding, transport and when appropriate accommodation.

The Contractor shall be solely responsible for recruiting the labour force and satisfying the relevant obligations under the Contract and the laws and regulations in force in Burundi. Notices shall be posted in conspicuous places and work places to inform the workers of their rights and the conditions of work.

The Contractor is encouraged to recognize that, in order to maintain good community relations as required under the Contract, to the extent that suitable options for recruiting labour locally exist and provided that other selection factors are equal he should make every reasonable effort to recruit the workforce according to the priorities of the local population and in particular those affected directly by the Project.

Where feasible and appropriate, the Contractor should coordinate with the local / national / government administration(s) to organise and set-up a recruitment programme under the guidance of the Employer. The Contractor shall strictly comply with the agreed recruitment programme to avoid discord among the local communities. The announcement for hiring can be done through the government offices where appropriate or the project hiring set up procedures and actual hiring done by the Contractor. The Contractor shall provide the Employer with a copy of the agreed system for prioritizing hiring of the host communities.

The cost of hiring shall be part of the construction costs. The Contractor shall indemnify the Employer in respect of all claims that may be made against the Employer of non-compliance thereof by the Contractor.



The Contractor shall not hire ‘at the gate’ or allow workers to be employed on a Contract that does not allow sufficient time for appropriate induction and health and safety training. The Contractor shall therefore be required to provide:

- Each member of staff or labour force with a letter of employment or Contract;
- Appropriate insurances covering the employees prior to entering the site;
- Upon termination of Contract, provide an end of work certificate to each employee detailing their employment duration, position, job description and other relevant details.

The Contractor is required to keep proper wages books and such other records as are required by the prevailing Laws of Burundi governing the employment of labour.

The Contractor shall pay wages that are reasonable and in alignment with best practices to ensure a decent living wage. Given the absence of a national minimum wage in Burundi, wage rates shall be benchmarked against those paid for similar construction projects in the region to ensure fairness and competitiveness. The Contractor shall also observe conditions of labor as defined by the National Employment Laws of Burundi and strive to align wage practices with recognized standards for decent work, as far as feasible and appropriate.

#### **14.4 Working Hours**

The contractor shall develop policies regarding the Projects’ working hours, overtime and holiday pay and conditions. These shall be in accordance with the relevant Burundi Legalisation and the ILO conventions.

The ILO conventions require that staff must have a period of rest comprising at least twenty-four consecutive hours in every period of seven days worked. It also states that the period of rest shall, wherever possible, be granted simultaneously to the whole of the staff.

As a minimum the Contractor shall give workers thirty-minute rest and/or refreshment period every five hours of work, which may be extended to a 60-minute break for each work day.

The normal working hours shall be 8 hours or 48 hours a week (over a 6-day period), beyond that all work shall be considered as overtime. The employer shall not be allowed to work or make the workers to work on Public Holidays unless where necessary and upon communication and approval by the Employer. Where necessary, the workers’ wages upon working on a public holiday shall adopt the Burundi Legislation.

Construction activities shall be undertaken during the days and hours in accordance with the Contract and national guidelines, unless the relevant Authorities have provided approval for activities beyond the stipulated hours. Where the contractor needs to work beyond the stipulated hours, he shall give the employer adequate notice (three weeks) prior to the works for adequate planning and seeking permission from relevant government authorities if required.

#### **14.5 Internal Grievance Mechanism**

The Contractor shall develop and provide a grievance mechanism for workers (and their organisations, where they exist) to raise workplace concerns. The Contractor shall also ensure

that the Sub contractors (including all other tier Contractors) develop their Grievance Mechanisms.

The Contractor and the Sub-contractors will inform the workers of the grievance mechanism at the time of recruitment and make it easily accessible to them. The mechanism should involve an appropriate level of management and address concerns promptly, using an understandable and transparent process that provides timely feedback to those concerned, without any retribution. The mechanism should also allow for anonymous complaints to be raised and addressed. The mechanism should not impede access to other judicial or administrative remedies that might be available under the law or through existing arbitration procedures, project grievance redress mechanism or substitute for grievance mechanisms provided through collective agreements.

#### **14.6 Equal Opportunities Employment**

The Contractor shall adopt and implement Virunga Power Equal Opportunities Employment policy and Burundi Employment legislation and adopt the recommendations detailed in the IFC's Good Practice Note; non-discrimination and equal opportunity.

The Contractor shall adopt the principle that all employment decisions have to be based on the ability of the individual to do the job in question without regard to personal characteristics that are unrelated to the inherent requirements of the work.

The Contractor shall not discriminate with respect to:

- Recruitment and hiring;
- Compensation (including wages and benefits);
- Working conditions and terms of employment;
- Access to training;
- Job assignment;
- Promotion;
- Termination of employment or retirement; and
- Disciplinary practices.

The Contractor shall undertake the following to ensure it is an equal opportunity employer:

- Identify need for non-discrimination strategy;
- Prepare baseline information;
- Review and change recruitment policies;
- Assess its payment practices;
- Implement an anti-harassment policy (GBVH);
- Develop family-friendly policies;
- Understand cultural and religious diversity;
- Involve underrepresented groups in the workforce;
- Devise a strategy to deal with disability and health issues;
- Communicate its policies to all workers.

## **14.7 Labour Organisations**

The Contractor and its Subcontractors must allow workers to belong to worker's organisation or unions as per the ILO convention.

The Contractor will not discourage workers from electing worker representatives, forming or joining workers' organisations of their choosing, or from bargaining collectively, and will not discriminate or retaliate against workers who participate, or seek to participate, in such organisations and collective bargaining. The Contractor shall not discriminate against unionized workers.

The Contractor shall allow access for representatives of workers' organisations to the workers they represent. Workers should be free to meet and discuss workplace issues on the premises during scheduled breaks, and before and after work. Furthermore, workers should be allowed to choose representatives to speak with management, inspect working conditions in an appropriate manner and in a way that does not disrupt productivity, and carry out other organising activities.

The Contractor shall provide workers information on worker's rights to join worker's unions.

## **14.8 Child and Forced Labour**

The Contractor shall comply with Burundi Employment Legislation, ILO Convention ,1999 No 182 and the ILO Minimum Age Convention, 1973 (No. 138).

The Contractor shall not employ children in any manner that is economically exploitative, or is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development.

The Contractor shall use a minimum work age of 18 and shall develop a corporate policy against employing, using, or benefiting from child labour. The policy shall include procedures for age verification in hiring that also includes their Sub-contractors. The Contractor shall review and retain copies of verifiable documentation concerning the age and employment profile of all people under 18 working on the Project and retain copies of the documentation.

Prior to employment, the Contractor shall seek approval from the Employer for any employee under the age of 18. In addition, the Contractor shall ensure that these employees are not employed in hazardous work. All work undertaken by persons under the age of 18 shall first be subject to an appropriate risk assessment and the Contractor shall undertake regular monitoring of their health, working conditions, and hours of work.

The Contractor shall comply with Burundi Employment Legislation, the ILO Forced Labour Convention, 1930 (No. 29), and the ILO Abolition of Forced Labour Convention, 1957 (No. 105).

The Contractor shall not engage in, or benefit from, any form of forced, compulsory, or bonded labor. This includes any work or service that is exacted from an individual under the threat of any penalty and for which the individual has not offered themselves voluntarily.

The Contractor shall implement a corporate policy explicitly prohibiting the use of forced labor in any form, including debt bondage, trafficking, or involuntary prison labor. This policy shall extend to all subcontractors and associated entities. The Contractor must establish and maintain

procedures to ensure that all workers, including those employed by subcontractors, are working under conditions free from coercion and are fully informed of their rights and terms of employment.

The Contractor shall regularly review employment practices and contracts to ensure compliance with these standards and retain verifiable documentation confirming that all workers have freely chosen their employment and are not subject to any form of coercion. The Contractor shall also provide workers with clear, understandable written contracts in a language they understand, detailing their rights, obligations, and working conditions.

If any instances of forced labor are identified, including within the primary supply chain, the Contractor shall immediately notify the Employer and take corrective actions in accordance with the relevant legal and contractual obligations. Regular monitoring shall be conducted to ensure ongoing compliance with these requirements.

#### **14.9 Labour Audit**

The Employer reserves the right to conduct a labour audit as may be determined by himself which will be undertaken by the employer or its appointed representative (such as an independent consultant) to assess conformance with national regulatory requirements as well as IFC PS2 Labour and Working Conditions. The Contractor will be expected to cooperate fully with the consultant or its appointed representative through the appointed labour government official and the results shall be verified by the Employer.

The audit will verify that the Contractor:

- Has established, maintains and improves the worker-manager relationships;
- Develops and maintains records of labour inspections and compliance status as per monitoring indicators developed in the ESMP;
- Promotes the fair treatment, non-discrimination and equal opportunity of workers, and compliance with national labour and employment laws;
- Protects the workforce by addressing child labour and forced labour;
- Promotes safe and healthy working conditions; and
- Protects and promotes the health of workers.

The audit will review employment contracts, establish proof of salaries, overtime payment, labour grievance etc. for all staff on site.

#### **14.10 Gender-based violence and sexual harassment**

A Gender-Based Violence, Sexual Exploitation and Abuse, and Sexual Harassment (GBV/EAS/HS) action plan will be developed for all projects to manage sexual exploitation and abuse (SEA) and sexual harassment (HS) risks based on the results of a preliminary EAS/HS assessment and screening EAS/SH, and in accordance with the national provisions in force and the conventions ratified by the Republic of Burundi in the fight against sexual violence, the sexual exploitation of women and the elimination of all forms of discrimination against women, etc.) as well as the requirements of ESS 4 (GBV/EAS/HS Action Plan).. The contractor must adhere to policies that protect the employees, community, and affected persons from gender-based violence and sexual harassment including but not limited to the GBH policy and GBV/EAS/HS Action Plan. As part of the human resource policies or a stand-alone plan,

contractors should indicate how they will deal with sexual abuse, harassment, and violence, including what qualifies as sexual abuse, how sexual abuse and harassment issues will be handled with reporting processes and protection of aggrieved persons. The contractor must include gender-based violence, sexual abuse, and harassment in the employees' code of conduct and train its employees on how to report such cases consequences of engaging in them.

The policy or plan should be guided by, and adhere to, the relevant principles and requirements outlined in the ESIA/ESMP in as well as Anzana Electric Group's GBVH Policy and GBV/EAS/HS Action plan.

## **15 MONITORING AND REPORTING**

It is the responsibility of the Contractor to monitor certain criteria as outlined in the Project ESMP for the project. The monitoring shall include all the parameters as outlined in the project ESMP which are to be done by the Contractor. The ESMP may be revised and updated by the Employer from time to time and re-issued to the Contractor for implementation.

### **15.1 Required Reports**

The Contractor shall develop an HSES summary report that will form part of the monthly progress reporting that is issued to the Employer in accordance with the provisions specified in the respective tender documents and contracts. The contents of the report shall be agreed with the Employer and may include but not be limited to the details below:

**a. Construction Progress:**

- Identify major activities undertaken in each area in the reporting period and highlights of environmental and social protection (land clearing, boundary marking, topsoil salvage, traffic management, decommissioning planning, decommissioning implementation);

**b. Compliance:**

- Status of all licences, permits, agreements and consents;;
- List areas/facilities with permits required (quarries, asphalt & batch plants), dates of application, dates issued (actions to follow up if not issued), dates submitted to resident engineer (or equivalent), status of area (waiting for permits, working, abandoned without reclamation, decommissioning plan being implemented, etc.);
- list areas with landowner agreements required (borrow and spoil areas, camp sites), dates of agreements, dates submitted to resident engineer (or equivalent);
- Compliance status for conditions of all relevant consents/permits, for the Work, including quarries, etc.): statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance;
- Compliance status of C-ESMP/ESAP requirements: statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance
- Compliance status of SEA and SH prevention and response action plan: statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance

- Compliance status of Health and Safety Management Plan re: statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance.
- Report on implementation of the ESMP including highlighting any significant changes in the ESMP (significant changes include but are not limited to the number and type of Contractor's equipment, changes in the construction programme and mitigation measures);
- other unresolved issues from previous reporting periods related to environmental and social: continued violations, continued failure of equipment, continued lack of vehicle covers, spills not dealt with, continued compensation or blasting issues, etc. Cross-reference other sections as needed

**c. Health, Safety and Environmental Statistics:**

- Number of employees on site, workers, work hours, metric of PPE use (percentage of workers with full personal protection equipment (PPE), partial, etc.), worker violations observed (by type of violation, PPE or otherwise), warnings given, repeat warnings given, follow-up actions taken (if any);
- Gender (for expats and locals separately): number of female workers, percentage of workforce, gender issues raised and dealt with (cross-reference grievances or other sections as needed);
- Health and safety incidents, accidents, injuries that require treatment and all fatalities
- Environmental incidents or non-compliances with contract requirements, including contamination, pollution or damage to ground or water supplies;
- Safety officer: number days worked, number of full inspections & partial inspections, reports to construction/project management;

**d. Stakeholder Engagement;**

- Interactions with regulators: identify agency, dates, subjects, outcomes (report the negative if none);
- Interactions with external stakeholders including community and other external parties: identify agency, dates, subjects, outcomes (report the negative if none);

**e. Worker accommodations:**

- number of expats housed in accommodations, number of locals;
- date of last inspection, and highlights of inspection including status of accommodations' compliance with national and local law and good practice, including sanitation, space, etc.;
- actions taken to recommend/require improved conditions, or to improve conditions.

**f. Health services**

- Provider of health services, information and/or training, location of clinic, number of non-safety disease or illness treatments and diagnoses (no names to be provided).

**g. Training**

- number of new workers, number receiving induction training, dates of induction training;
- number and dates of toolbox talks, number of workers receiving Occupational Health and Safety (OHS), environmental and social training;
- number and dates of communicable diseases (including STDs) sensitization and/or training, no. workers receiving training (in the reporting period and in the past); same questions for gender sensitization, flag person training.
- number and date of SEA and SH prevention, sensitization and/or training events, including number of workers receiving training on Code of Conduct for Contractor's Personnel (in the reporting period and in the past), etc.

#### **h. Environmental and Social Supervision**

- Environmentalist: days worked, areas inspected and numbers of inspections of each (road section, work camp, accommodations, quarries, borrow areas, spoil areas, swamps, forest crossings, etc.), highlights of activities/findings (including violations of environmental and/or social best practices, actions taken), reports to environmental and/or social specialist/construction/site management;
- Sociologist: days worked, number of partial and full site inspections (by area: road section, work camp, accommodations, quarries, borrow areas, spoil areas, clinic, HIV/AIDS center, community centers, etc.), highlights of activities (including violations of environmental and/or social requirements observed, actions taken), reports to environmental and/or social specialist/construction/site management; and
- Community liaison person(s): days worked (hours community center open), number of people met, highlights of activities (issues raised, etc.), reports to environmental and/or social specialist /construction/site management.

#### **i. Grievances**

- A summary of any grievances lodged in relation to the Project, the Contractor, Employer and/or workers involved in the construction of the Project including a list new grievances (e.g. number of allegations of SEA and SH) received in the reporting period and number of unresolved past grievances by date received, complainant's age and sex, how received, to whom referred to for action, resolution and date (if completed), data resolution reported to complainant, any required follow-up (Cross-reference other sections as needed):
  - i. Worker grievances;
  - ii. Community grievances
- Appended copy of latest up-to-date grievance/complaints registers.

#### **j. Traffic, road safety and vehicles/equipment:**

- Traffic and road safety incidents and accidents involving project vehicles & equipment: provide date, location, damage, cause, follow-up;

- Traffic and road safety incidents and accidents involving non-project vehicles or property (also reported under immediate metrics): provide date, location, damage, cause, follow-up;
- Overall condition of vehicles/equipment (subjective judgment by environmentalist); non-routine repairs and maintenance needed to improve safety and/or environmental performance (to control smoke, etc.).

**k. Environmental mitigations and issues**

- Dust: number of working bowsers, number of waterings/day, number of complaints, warnings given by environmentalist, actions taken to resolve; highlights of quarry dust control (covers, sprays, operational status); % of rock/ spoil lorries with covers, actions taken for uncovered vehicles;
- Erosion control: controls implemented by location, status of water crossings, environmentalist inspections and results, actions taken to resolve issues, emergency repairs needed to control erosion/sedimentation;
- Quarries, borrow areas, spoil areas, asphalt plants, batch plants: identify major activities undertaken in the reporting period at each, and highlights of environmental and social protection: land clearing, boundary marking, topsoil salvage, traffic management, decommissioning planning, decommissioning implementation;
- Number of blasts (and locations), status of implementation of blasting plan (including notices, evacuations, etc.), incidents of off-site damage or complaints (cross-reference other sections as needed);
- spill clean-ups, if any: material spilled, location, amount, actions taken, material disposal (report all spills that result in water or soil contamination);
- Details of rehabilitation/grass/tree plantings and other mitigations required undertaken in the reporting period;
- Details of water and wetland/watercourse protection mitigations required undertaken in the reporting period.

**l. Waste management:**

- Quantities of general solid waste generated and managed, including amount taken offsite (and by whom) or reused/recycled/disposed on-site;
- Types and quantities of hazardous waste generated and managed, including amount taken offsite (and by whom) or reused/recycled/disposed on-site;
- Quantities of sewage waste taken offsite (and by whom and final destination for treatment/disposal).

**m. E&S Monitoring and Sampling:**

- The results of any sampling or monitoring that occurred (e.g. water quality sampling, Noise monitoring etc).

**n. Next Month Lookahead:**



- The planned environmental and social works to be undertaken in the next one month;