PART C2: PRICING DATA

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C2.1 Pricing instructions: Option A

The *conditions of contract*

1.1 How the contract prices work and assess it for progress payments

Clause 11 in NEC3 Term Services Contract (TSC), June 2005 (with amendments June 2006 and April 2013) Option A states:

Identified and defined terms 11 11.2 (17) The Price for Services Provided to Date is the total of

- the Price for each lump sum item in the Price List which the *Contractor* has completed and
- where a quantity is stated for an item in the Price List, an amount calculated by multiplying the quantity which the *Contractor* has completed by the rate.

(19) The Prices are the amounts stated in the Price column of the Price List, where a quantity is stated for an item in the Price List, the Price is calculated by multiplying the quantity by the rate.

1.2 Measurement and Payment

1.2.1 The Price List provides the basis of all valuations of the Price for Services Provided to Date, payments in multiple currencies and general progress monitoring.

1.2.2 The amount due at each assessment date is based on activities and/or milestones completed as indicated on the Price List.

1.2.3 The Price List work breakdown structure provided by the *Contractor* is based on the activity/milestone provided by the Employer. The activities listed by the *Employer* are the minimum activities acceptable and identify the specific activities which are required to achieve Completion. **The Price List work breakdown structure is compiled to the satisfaction of the *Employer* with any additions and/or amendments deemed necessary.**

1.2.4 The *Contractor's* detailed Price List summates back to the activity/milestone provided by the *Employer* and is sufficient detail to monitor completion of activities related to the operations on the Accepted Plan in order that payment of completed activities may be assessed.

1.2.5 The Contractor shall provide their base workshop address where the repairs will be primarily done.

1.2.6 The Contractor shall determine the CSDG, expressed in Rand, which shall not be less than the sub-total multiplied by a percentage (%) factor give in Table 2 of the Standard for the applicable class of construction works. The Employer shall state the percentage (%) factor in the Final Tender Summary section dependant on the Class of Construction Works.

Table 1: Construction skills development goals for different classes of engineering and construction works contracts.

Table 1: Construction skills development goals for different classes of engineering and construction works contracts. Class of construction works as identified in terms of the CIDB regulation		Construction skills development goal (%)
Designation	Description	
EP	Electrical Engineering works (infrastructure)	0.25

C2.2 Pricing

Price List (3kV DC Traction**):** Services in this section shall be performed in accordance with BBB5452 version 7

TABLE 1: DESIGN, MANUFACTURE, REPAIR/MODIFY, SUPPLY, INSTALL, TEST & COMMISSION ELECRICAL EQUIPMENT FOR 3KV DC TRACTION SUBSTATION

ITEM	EQUIPMENT	WORK DESCRIPTION	UNIT	QTY	RATE	AMOUNT
A	**OLD/OBSOLETE SUBSTATON EQUIPMENT**					
1	Obsolete/Old Outdoor Equipment	Dismantle, pack and load all obsolete/old outdoor equipment for scrapping (excl. main traction transformer)	sum	1		
2	Obsolete/Old Indoor Equipment	Dismantle, pack and load all old/obsolete indoor equipment for scrapping	sum	1		
3	Transportation	Transport all indoor and outdoor dismantled equipment to an identified storage facility (excl. main traction transformer)	km	1		
B	**OUTDOOR YARD EQUIPMENT**					
4	Voltage Transformers	Design, Supply and Install 132kV / 110V Voltage Transformers.	each	1		
		Design, Supply and Install 88kV / 110V Voltage Transformers.	each	1		
5	Metal Oxide Primary Surge Arresters	Design, Supply, Install 132kV metal oxide surge arrestors in accordance to TFR's **BBB 0845** specification	each	1		
		Design, Supply, Install 88kV metal oxide surge arrestors in accordance to TFR's **BBB 0845** specification	each	1		
6	High Voltage AC Disconnects	Design, Supply and Install a 132kV, 3-phase High Voltage Disconnecting Switch with earthing switch in accordance to TFR's **BBB 7842** specification	each	1		
7	High Voltage SF6 Primary Circuit Breaker	Design, Supply and Install the 132kV High Voltage AC Primary Circuit Breaker in accordance to TFR's **BBB 1267** specification	each	1		
		Design, Supply and Install the 88kV High Voltage AC Primary Circuit Breaker in accordance to TFR's **BBB 1267** specification	each	1		
8	Main Current Transformers	Design, Supply and Install the Current Transformers in accordance to TFR's **BBB 0937**	each	1		

		specification				
9	Main Traction Transformer (5MVA) (BBB 5019)	9.1 Dismantle, Pack and Load old/obsolete/faulty main traction transformer for transportation	sum	1		
		9.2 Transport dismantled main traction transformer to workshop for repairs and back to site	km	1		
		9.3 Design, Supply, and Install a new 5MVA, 132kV/1220, main traction transformer (filled with virgin transformer mineral insulating oil). Note: Design and Tests shall be in accordance with the latest SANS 60076 and BBB 5019 standards.	each	1		
		9.4 Design, Supply, and Install a new 5MVA, 88kV/1220, main traction transformer (filled with virgin transformer mineral insulating oil). Note: Design and Tests shall be in accordance with the latest SANS 60076 and BBB 5019 standards.	each	1		
		9.5 Design, Supply, and Install a new 5MVA, 44kV/1220, main traction transformer (filled with virgin transformer mineral insulating oil). Note: Design and Tests shall be in accordance with the latest SANS 60076 and BBB 5019 standards.	each	1		
		9.6 Install a 5MVA Main Traction Transformer.	sum	1		
		9.7 Perform all Site Acceptance Tests (SAT) for the Main Traction Transformer in accordance to TFR's Technical Security standard **BBF 8128, BBB 5019** and **SANS 60076**	sum	1		
		9.8 Sample and Test main traction transformer oil (Dissolve Gas Analysis)	each	1		
		9.9 Perform on site transformer diagnostic electrical testing to determine remedial action	sum	1		
		9.10 Purify transformer mineral insulating oil	litre	1		
		9.11 Supply virgin transformer mineral insulating oil	litre	1		
		9.12 Supply regenerated/refined transformer mineral insulating oil. The oil shall comply	litre	1		

		with the latest requirements specified in **SANS-555** standard.				
		9.13 Deliver the supplied transformer mineral insulating oil	km	1		
		9.14 Pump Transformer with the supplied mineral insulating oil	litre	1		
		9.15 Design, Construct the main Transformer Bund Wall including the oil dam with a capacity of 13 000 litres + 10%.	unit	1		
10	Auxiliary Transformer	Design, Supply and Install a 3-phase 50kVA 1220V/400V Auxiliary Transformer in accordance to **SANS 780** specification. The contractor shall make provision for overload protection of the Primary Winding and Secondary Winding protection.	each	1		
11	Auxiliary Transformer Barrier	Design, Supply and Install metal barrier screen of 25mm – wire mesh or expanded metal around the auxiliary transformer to prevent accidental contact. Barrier to include gate and lock	sum	1		
12	AC Earth Leakage Current Transformer	Design, Supply and Install a Bar Primary Current Transformer for the AC Earth Leakage protection	each	1		
C	**INDOOR EQUIPMENT**					
13	3kV DC Rectifier Equipment	Design, Supply and Install a 6MW 3kV DC Rectifier	each	1		
14	3kV DC Reactor Coil	Design, Supply and Install a 1.8 milli Henry 3 kV DC Reactor. The installation shall include the supply of all the required insulators, foundations, foundation bolts and fasteners	sum	1		
15	Wave Filter Equipment	Design, Supply and Install the Wave Filter Equipment	sum	1		
16	3 kV DC Positive Isolator	Design, Supply and Install the 3 kV DC Positive Isolator	each	1		
17	Primary Circuit Breaker Control Panel	Design, Supply and Install AC Primary Circuit Breaker Panel	each	1		
18	AC/DC Distribution Panel	Design, Supply and Install AC/DC Distribution Panel	each	1		

19	Battery Bank	Design, Supply and Install a 53 cell 110V Plante Lead Acid **Battery Bank**. (Cell nominal voltage: 2.25V, 100-150 Ah) in accordance to TFR's **BBH 3236** specification.	sum	1		
		Supply and Install a 55 cell 110 Volt Valve-Regulated Gel Lead-Acid **Battery Bank**. (Cell nominal voltage: 2V, 100-200 Ah) in accordance to TFR's **BBH 3236** specification.	sum	1		
20	Battery Charger	Supply and Install a Battery Charger in accordance to TFR's **BBB 2502** specification	each	1		
21	Track Feeder High Speed Circuit Breakers	Design, Supply and Install 3 kV DC High Speed Circuit Breakers complete with their cells and breaker trucks in accordance to TFR's **CEE-0099** specification	each	1		
22	Relays	Design, Supply and Install 3kV DC Under-Voltage Relay with a high potential divider in accordance to TFR's **BBB 3005** specification	each	1		
		Supply 7SR11-Argus Relay	each	1		
		Supply 7SR12-Argus Relay	each	1		
		Supply FP04 Relay	each	1		
23	Telecontrol Equipment	Design, Supply and Install Telecontrol Equipment	sum	1		
24	Energy Meter	Design, Supply and Install a 4-Quadrant energy meter	each	1		
25	Isolation Transformer	Design, Supply and Install a 400V/400V (1:1) isolation transformer	each	1		
D	**SUBSTATION EARTHING**					
26	Indoor Earthing	Design, Supply and Install in the substation building all earthing conductors for the earthing of all metal work	sum	1		
27	Outdoor Earthing	Design, Supply and Install Outdoor yard earthing which includes earth spikes, trench earths, earth connections to the support steel structures and fence posts	sum	1		

28	Interlocking System	Design, Supply and Install mechanical interlocking system; preferably the "Castell" or other approved key type	sum	1		
D	**INDOOR CABLING, BUSBARS AND ASSOCIATED EQUIPMENT**					
29	Low Voltage cabling	Supply and Install all low voltage PVC insulated supply and control cables. Cables from the AC Circuit Breaker, CTs, main and auxiliary transformers to the substation control panels; also cabling from Current Transformers, Voltage Transformers to the energy meter Cables from the rectifier cubicle to their respective control panels; cables from the auxiliary equipment to the substation control panels; connections and cabling between control panels, etc.	sum	1		
30	3kV DC Aluminium Busbars	Design, Supply and Install the following 3kV DC Grade 6063 50mm x 25mm Aluminium Busbars:				
		30.1 Main traction transformer to anode wall bushing (~3m)	each	1		
		30.2 Anode wall bushing to rectifier (~2m)	each	1		
		30.3 Rectifier to DC smoothing reactors (~2m)	each	1		
		30.4 DC Smoothing reactors to Positive Isolator (~2m)	each	1		
31	500 mm2 Single Core XLPE Cable	Design, Supply and Install 500 mm2 XLPE positive cable from Positive Isolator to Busbar Chamber	m	1		
32	Wall Plates with Wall Bushings	Design, Supply and install hot dip galvanised anode wall plates in the wall of the substation building, at the rectifier bay. The wall plate galvanising shall comply with SANS 121. Wall plates shall be fitted with wall bushings, one for each phase and neutral	sum	1		
33	3 kV DC output positive busbar system	Design, Supply and Install the busbar system, which includes High Speed Circuit Breaker busbars, and where required the outgoing feeder cables between the HSCB busbars and wall bushings	sum	1		
34	Barriers	The Contractor shall ensure that all indoor equipment, which may be energised at a potential of more than 1,0 kV shall be protected by metal barriers, mesh type screens or panels	sum	1		

35	Chequer Plates	Supply and install all metal Chequer Plates required for the covering of cable trenches inside the substation. Earthing studs suitable for the fitting of 95mm2 copper cable shall be welded to each chequer plate	sum	1		
E	**OUTDOOR CABLES, BUSBARS AND CONNECTIONS**					
36	Inter-connection cables or conductors	Supply and Install "all aluminium" stranded conductors used as interconnection conductors between the Eskom supply, AC disconnects, surge arrestors, VT's, CT's, and to the main traction transformer	sum	1		
37	Cables or Conductors for Auxiliary Transformer	Supply and Install cables or busbars from the main traction transformer's tertiary windings to the Auxiliary Transformer	sum	1		
38	3 kV DC Positive Cables/Conductors	**38.1 Aerial Conductors**: Design, Supply and install 800mm2 aerial feeder cable.	m	1		
		38.2 Buried XLPE Insulated Cable: Design, Supply and install single core 6,6 kV, 500mm2 armoured medium voltage XLPE insulated cables with stranded copper conductors	m	1		
39	3 kV DC Feed and Negative Return wall plate bushings	Supply and install wall bushings for the 3 kV DC supply and negative return feeders	each	1		
F	**OUTDOOR YARD**					
40	Foundations	Design, Supply and Install foundations (concrete plinths) for the portal and support structures in the traction substation high voltage outdoor yard	m^3	1		
41	Support Structures	Design, Supply and Install all steel structures for the support of the following equipment:				
		41.1 Voltage Transformers	each	1		
		41.2 Surge Arrestors	each	1		
		41.3 AC Disconnects	sum	1		
		41.4 Current Transformers	each	1		
		41.5 Primary Circuit Breakers (3-pole)	sum	1		

42	Soil Rehabilitation	Assess oil depth/contamination in the outdoor yard and perform the appropriate on-site soil rehabilitation in line with applicable environmental regulations	m^3	1		
43	Weed Killer	Clean and remove existing vegetation in the outdoor yard including the application of a suitable herbicide	m^2	1		
44	Crusher Stone	After treatment with the weed killer, a 100mm layer of 25mm crusher stone shall be laid over the whole area of the Transnet Freight Rail high voltage outdoor yard. Adherence to the stone sizes is mandatory	m^2	1		
45	Fencing	**45.1** Design, Supply and Install a hot dipped galvanised steel palisade fence with a minimum height of 2.4 meters around the specified perimeter of the substation	m	1		
		45.2 Design, Supply and Install a "clearview" (anti-climb) fence with a minimum height of 2.4 meters around the specified perimeter of the substation	m	1		
		45.3 Design, Supply and Install a 2.5m high Concrete Fence around the specified perimeter of the substation. Composition of this fence: reinforced concrete slabs and pillars	m	1		
		45.4 Design, Supply and Install an electric fence around the perimeter of the substation fence, including power unit and certificate of compliance	m	1		
		45.5 Design, Supply and Install coiled barbed wire, with a diameter of 500mm, around the substation fence	m	1		
46	Gates	**46.1** Design, Supply and Install a 4.6 meter wide x 2.4 meters minimum height lockable gates in the perimeter fence. The frame of the substation gate shall be 80 x 60 x 5mm	each	1		
		46.2 Design, Supply and Install a 6 metre wide x 2.4 meters minimum height lockable steel Anti-theft Gate	each	1		
47	Safety Barriers	Design, Supply and install a fence barrier with height of 1.2m in accordance with Transnet Freight Rail's Engineering Instruction S.016	m	1		
48	Painting of Outdoor Steel structures	Paint all outdoor steelwork, metal screens and barriers in accordance with TFR's Specification CEE.0045	sum	1		

G	**SUBSTATION BUILDING, POWER AND LIGHTING**					
49	Indoor Wall and Floor Cleaning	Clean all walls, floors and roof pillars.	sum	1		
		Clean all walls, floors and roof pillars by sandblasting to remove carbon content	sum	1		
50	Indoor Painting	50.1 Paint all indoor walls white and the floor red with flame retardant and acid proof (battery room) paint, in accordance with TFR's Specification CEE.0045	sum	1		
		50.2 Paint all indoor steelwork, metal screens and barriers in accordance with TFR's Specification CEE.0045	sum	1		
51	Plugs, Switches and Distribution board in accordance with SANS10142	51.1 Design, Supply and Install plugs.	each	1		
		51.2 Design, Supply and Install switches.	each	1		
		51.3 Design, Supply and Install distribution board.	each	1		
		51.4 Supply Certificate of Compliance (COC).	each	1		
52	Substation Lighting	52.1 Design, Supply and Install indoor light fittings and 220 V AC fluorescent light tubes (per pair)	each	1		
		52.2 Design, Supply and Install 400 W High Pressure Sodium Flood Lights (incl. fittings) with day/night switch for Outdoor lighting	each	1		
53	Cooling Fan	Design, Supply and Install a 3-phase cooling fan for the main building and/or battery room	each	1		
54	Steel Safety Doors	**54.1** Design, Supply and Install steel safety **single** doors	each	1		
		54.2 Design, Supply and Install steel safety **double** doors	each	1		
H	**SECURITY**					
55	Outdoor Solar Lights	Design, Supply and Install Solar Lighting System in accordance to TFR's **BBH 4466** specification, clause 10	each	1		

56	Pepper Spray Security System	Design, Supply and Install Pepper Spray Security System as per TFR's Technical Security standard **BBC 8787**	sum	1		
56	Security	Provide 24-hour security for the entire duration of the project, i.e. From site handover to contractor from Transnet, to site handover from contractor back to Transnet	day	1		
60	Testing & Pre-Commissioning	Perform all necessary tests and pre-commissioning as per TFR's Technical Standard **BBF 8128** and Engineering instructions **CEE-GI_019**	sum	1		
					TOTAL AMOUNT (Excl. VAT)	**R**
					VALUE ADDED TAX @15%	**R**
					TOTAL AMOUNT (Incl. VAT)	**R**

Price List (25kV AC Traction): Services in this section shall be performed in accordance with CEE.0111.2019

TABLE 2: DESIGN, MANUFACTURE/REPAIR, SUPPLY, INSTALL, TEST & COMMISSION ELECRICAL EQUIPMENT FOR 25 kV AC, 20 MVA TRACTION SUBSTATIONS

ITEM	EQUIPMENT	WORK DESCRIPTION	UNIT	QTY	RATE	AMOUNT
A	**OUTDOOR YARD EQUIPMENT**					
1	Obsolete/Old Outdoor Equipment	1.1 Dismantle pack and load old/obsolete equipment for scrapping (AC disconnects, PCB, CTs, VCBs and Surge Arrestors)	sum	1		
		1.2 Transport all dismantled equipment to an identified storage facility	km	1		
2	Metal Oxide Primary Surge Arresters	Design, Supply, Install 132kV metal oxide surge arrestors in accordance to TFR's **BBB 0845** specification	each	1		
		Design, Supply, Install 88kV metal oxide surge arrestors in accordance to TFR's **BBB 0845** specification	each	1		
3	Primary Isolators	Design, Supply and Install double pole Primary Isolators and earthing switches in accordance with IEC129.	sum	1		
4	High Voltage SF6 Primary Circuit Breaker	Design, Supply and Install the 132 kV High Voltage AC Primary Circuit Breaker. The breaker shall be of double-pole type.	each	1		
		Design, Supply and Install the 88 kV High Voltage AC Primary Circuit Breaker. The breaker shall be of double-pole type.	each	1		
5	Main Current Transformers	Design, Supply and Install the Current Transformer.	each	1		
6	Voltage Transformers	Design, Supply and Install 132kV / 110V Voltage Transformers.	each	1		
		Design, Supply and Install 88kV / 110V Voltage Transformers.	each	1		
7	Main Traction Transformer (20MVA) (BBG 2415)	7.1 Dismantle, Pack and Load old/obsolete/faulty main traction transformer for transportation	sum	1		
		7.2 Transport dismantled main traction transformer to workshop for repairs and back to site	km	1		
		7.3 Design, Supply, and Install a new 20MVA, 220/25kV AC single phase, main traction transformer (filled with virgin transformer mineral insulating	each	1		

		oil). Note: Design and Tests shall be in accordance with the latest SANS 60076 and BBG 2415 standards.				
		7.4 Design, Supply, and Install a new 20MVA, 132/25kV AC single phase, main traction transformer (filled with virgin transformer mineral insulating oil). Note: Design and Tests shall be in accordance with the latest SANS 60076 and BBG 2415 standards.	each	1		
		7.5 Design, Supply, and Install a new 20MVA, 88/25kV, main traction transformer (filled with virgin transformer mineral insulating oil). Note: Design and Tests shall be in accordance with the latest SANS 60076 and BBG 2415 standards.	each	1		
		7.6 Install a 20MVA Main Traction Transformer.	sum	1		
		7.7 Perform all Site Acceptance Tests (SAT) for the Main Traction Transformer in accordance with **BBF 8128**, **BBG2415** and **SANS 60076**	sum	1		
		7.8 Sample and Test Main Traction Transformer oil (Dissolve Gas Analysis)	each	1		
		7.9 Perform on site transformer diagnostic electrical testing to determine remedial action	sum	1		
		7.10 Purify transformer mineral insulating oil	litre	1		
		7.11 Supply virgin transformer mineral insulating oil	litre	1		
		7.12 Supply regenerated/refined transformer mineral insulating oil. The oil shall comply with the latest requirements specified in **SANS-555** standard.	litre	1		
		7.13 Deliver the supplied transformer mineral insulating oil.	km	1		
		7.14 Pump Transformer with the supplied mineral insulating oil	litre	1		
		7.15 Design, Construct the main Transformer Bund Wall including the oil dam with a capacity of 16 000 litres + 10%.	unit	1		

8	Auxiliary Transformer	Design, Supply and Install a 16 kVA, 27 500V/240V Auxiliary transformer in accordance with SANS 780	each	1		
9	Secondary Vacuum Circuit Breakers	Design, Supply and Install 44kV, 1200A Vacuum Circuit Breakers in accordance with CEE.011.99.	each	1		
10	Interconnection of Equipment	Supply and install all aluminium flying busbars to interconnect outdoor equipment.	sum	1		
11	Conductors, Cables and Small Wiring	Supply and Install all control cables from the AC Circuit Breaker, CTs, main and auxiliary transformers to the substation control panels; also cabling from Current Transformers, Voltage Transformers to the energy Meter. Cable types and sizes shall be in accordance with clause 29 of CEE-0111_ISS2019	sum	1		
12	Outdoor Earthing	A main earth mat shall be installed in the substation yard in accordance with Drawing No. CEE-TBD-8. The earth mat shall be a trench earth system consisting of copper conductor with a cross sectional area of 90mm2 buried in trenches at a depth of 700mm.	sum	1		
B	**INDOOR EQUIPMENT**					
13	Control Panels	Design, supply and install a 25kV control panels for Primary and Secondary circuit breakers provided in the substation. These control panels shall contain all the protective relays and circuit control equipment required for the operation of the associated breaker. The design shall be in accordance with clause 26.0 of CEE-0111_ISS2019	sum	1		
14	DC Battery and Charger	Design, Supply and Install the DC Battery and Battery Charger in accordance with TFR's Technical Specification **CEE.0085** and **CEE-0111**	sum	1		
15	Telecontrol Equipment	Design, supply and install Telecontrol equipment	sum	1		
16	Energy Meter	Supply and Install a 4-Quadrant energy meter	each	1		
17	Relays	16.1 Supply 7SR21-Argus Relay	each	1		

		16.2 Supply 7SR22-Argus Relay	each	1		
		16.3 Supply P122-Micom Relay	each	1		
		16.4 Supply P125-Micom Relay	each	1		
		16.5 Supply P127-Micom Relay	each	1		
		16.6 Supply 7SRS24-Argus Relay	each	1		
		16.7 Supply 7SR542-Argus Relay	each	1		
		16.8 Supply 7SR543-Argus Relay	each	1		
		16.9 Supply E4 - DRFP-EP +48VDC Relay	each	1		
		16.10 Supply E4 - DRFP-EP +110VDC Relay	each	1		
18	Pre-Testing and Commissioning	Perform all necessary tests and pre-commissioning as per TFR's Technical Specification **CEE-0111**. Commissioning will include the energising of equipment from primary isolator to the track feeder circuits. The successful tenderer must prove the satisfactory operation of all equipment under live conditions.	sum	1		
19	Drawings, Instruction Manuals and Spare Lists	Supply Drawings, Instruction manuals and spare parts catalogues in accordance with the latest version of Transnet specification **CEE.0224**	sum	1		
				TOTAL AMOUNT (Excl. VAT)	**R**	
				VALUE ADDED TAX @15%	**R**	
				TOTAL AMOUNT (Incl. VAT)	**R**	

Price List (Distribution): Services in this section shall be provided in accordance with BBD 6774, version 1.

TABLE 3: DESIGN, MANUFACTURE, REPAIR/MODIFY, SUPPLY, INSTALL, TEST & COMMISSION ELECRICAL EQUIPMENT FOR 11kV AC AND 6.6 kV AC DISTRIBUTION SUBSTATIONS

ITEM	EQUIPMENT	WORK DESCRIPTION	UNIT	QTY	RATE	AMOUNT
A	**OUTDOOR YARD EQUIPMENT**					
1	Obsolete/Old Outdoor Equipment	1.1 Dismantle pack and load old/obsolete equipment for scrapping (AC disconnects, PCB, CTs, Surge Arrestors)	sum	1		
		1.2 Transport all dismantled equipment to an identified storage facility	km	1		
2	Metal Oxide Primary & Secondary Surge Arrestors	Design, Supply, Install 88kV metal oxide surge arrestors in accordance to TFR's **BBB 0845** specification	each	1		
3	High Voltage AC Disconnects	Design, Supply and Install 88kV, 3-phase High Voltage Disconnecting Switch with earthing switch in accordance to TFR's **BBB 7842** specification	sum	1		
4	High Voltage SF6 Primary Circuit Breaker	Design, Supply and Install the 88kV High Voltage AC Primary Circuit Breaker in accordance to TFR's **BBB 1267** specification	each	1		
5	Main Current Transformers	Design, Supply and Install the Current Transformers in accordance to TFR's **BBB 0937** specification	each	1		
6	Main Distribution Transformer	6.1 Dismantle, Pack and Load old/obsolete/faulty main traction transformer for transportation	sum	1		
		6.2 Transport dismantled main traction transformer to workshop for repairs and back to site	km	1		
		6.3 Design, Supply, and Install a new 3MVA, 88/11kV, main distribution transformer (filled with virgin transformer mineral insulating oil). Note: Design and Tests shall be in accordance with the latest SANS 60076 and BBB 8205 standards.	each	1		
		6.4 Design, Supply, and Install a new 1MVA, 88/11kV, main distribution transformer (filled with virgin	each	1		

		transformer mineral insulating oil). Note: Design and Tests shall be in accordance with the latest SANS 60076 and BBB 8205 standards.				
		6.5 Install a 3MVA Main Distribution Transformer.	sum	1		
		6.6 Perform all Site Acceptance Tests (SAT) for the Main Distribution Transformer in accordance with **BBB8205** and **SANS 60076**	sum	1		
		6.7 Sample and Test Main Distribution Transformer oil (Dissolve Gas Analysis)	each	1		
		6.8 Perform on site transformer diagnostic electrical testing to determine remedial action	sum	1		
		6.9 Purify transformer mineral insulating oil	litre	1		
		6.10 Supply virgin transformer mineral insulating oil	litre	1		
		6.11 Supply regenerated/refined transformer mineral insulating oil including. The oil shall comply with the latest requirements specified in **SANS-555** standard.	litre	1		
		6.12 Deliver the supplied transformer mineral insulating oil	km	1		
		6.13 Pump Transformer with the supplied mineral insulating oil	litre	1		
		6.14 Design, Construct the main Transformer Bund Wall including the oil dam with a capacity of 6790 litres + 10%.	unit	1		
7	Auxiliary Distribution Transformer	Design, supply and install the 50 kVA, 11kV/400V, 3-phase, 50Hz auxiliary distribution transformer in accordance with the latest version of Specification **BBB8204.**	each	1		
8	Overhead Feeders/Conductors	Design, supply and install the interconnecting feeders (HV yard – from AC disconnect to the transformer) and conductors of the correct size, rating and material. Clamps shall be of the correct material and properties to prevent any corrosive action between the different materials.	sum	1		

9	Control Cables	Supply and Install all control cables from the AC Circuit Breaker, CTs, Distribution transformer to the substation control panels; also cabling from Current Transformers, Voltage Transformers to the energy Meter	sum	1		
10	Outdoor Earthing	Design, supply and Install Outdoor yard earthing which includes earth spikes, trench earths, earth connections to the support steel structures and fence posts.	sum	1		
B	**INDOOR EQUIPMENT**					
11	Medium Voltage Switchgear	Design, supply and install the 11 kV Medium Voltage Switch gear. The 11 kV AC metal enclosed switchgear panels (one incomer and two feeders) shall be equipped with indication and protection devices in accordance with the latest version of TFR's Specification **BBB4182**	sum	1		
12	Low Voltage Switchgear/Board	Design, Supply and Install A 400V AC Switchboard	each	1		
13	Telecontrol Equipment	Supply and Install Telecontrol equipment	sum	1		
14	Energy Meter	Supply and install a 4-Quadrant energy meter	each	1		
15	Relays	16.1 Supply 7SR11-Argus Relay	each	1		
		16.2 Supply 7SR12-Argus Relay	each	1		
		16.3 Supply REX521 Relay	each	1		
		16.4 Supply P122-Micom Relay	each	1		
		16.5 Supply P127-Micom Relay	each	1		
		16.6 Supply REF541 Relay	each	1		
C	**TRANSMISSION LINES**					
16	Cable fault location	Trace a cable fault for underground cable	each	1		
17	Medium voltage cable	Supply and Install a 95mm² 3 core XLPE MV cable in accordance with **CEE0023**	m	1		

18	Cable Joint kit	Supply and install the cable joint kit for medium voltage cable in accordance with **CEE0023**	sum	1		
19	Cable Pressure Test	Conduct pressure test on an MV cable (pressure test certificate to be issued after pressure testing)	sum	1		
20	Trenching	Trench for MV cable installation in accordance with **CEE0023**	m	1		
21	Current Transformer	Supply and install 300/5 15VA 10P10 current transformers for the incomer panel	each	1		
22	Pre-Testing and Commissioning	Perform all necessary tests and pre-commissioning as per TFR's Technical Standard **BBF8128**	sum	1		
					TOTAL AMOUNT (Excl. VAT)	R
					VALUE ADDED TAX @15%	R
					TOTAL AMOUNT (Incl. VAT)	R

TABLE 4: PRICE LIST FOR SPECIFIC TRACTION AND DISTRIBUTION SUBSTATION SUB-COMPONENTS.

ITEM	EQUIPMENT	WORK DESCRIPTION	UNIT	QTY	AMOUNT
A	**3 kV DC SUBSTATION**				
1.0	**Transformer**				
1.1	Buchholz Relay	Supply	Each	1	
1.2	245kV Bushing (System Voltage = 220 kV)	Supply	Each	1	
1.3	145kV Bushing (System Voltage = 132 kV)	Supply	Each	1	
1.4	100kV Bushing (System Voltage = 88 kV)	Supply	Each	1	
1.5	36kV Bushing (System Voltage = 25 kV)	Supply	Each	1	

1.6	12kV Bushing (System Voltage = 11 kV)	Supply	Each	1	
1.7	7.2kV Bushing (System Voltage = 6.6 kV)	Supply	Each	1	
1.8	3.6kV Bushing (System Voltage = 1220V)	Supply	Each	1	
1.9	Winding Temperature Indicator (WTI)	Supply	Each	1	
1.10	Oil Temperature Indicator (OTI)	Supply	Each	1	
1.11	Silica Gel Breather and crystals	Supply	Sum	1	
2.0	**Rectifier**				
2.1	6MW Rectifier Diode	Supply	Each	1	
2.2	5MW Rectifier Diode	Supply	Each	1	
2.3	4.5MW Rectifier Diode	Supply	Each	1	
2.4	Diode Monitoring Card – Cathode Left Dual	Supply	Each	1	
2.5	Diode Monitoring Card – Cathode Left Single	Supply	Each	1	
2.6	Diode Monitoring Card – Anode Left Dual	Supply	Each	1	
2.7	Diode Monitoring Card – Anode Left Single	Supply	Each	1	
2.8	Resistor 54kΩ, 50W	Supply	Each	1	
2.9	0.47µF 2500VAC/4200VDC Capacitor	Supply	Each	1	
2.10	4kA, 50MV Ammeter	Supply	Each	1	
2.11	4000VDC Voltmeter	Supply	Each	1	
2.12	4000A, 50MV Shunt	Supply	Each	1	
2.11	110 V DC Fan	Supply	Each	1	
3	**Primary Circuit Breaker**				
3.1	Opening Spring	Supply	Each	1	
3.2	Closing Spring	Supply	Each	1	
3.3	Complete Pole	Supply	Each	1	
3.4	Spring Charging geared motor	Supply	Each	1	
3.5	Operating Mechanism auxiliary contacts	Supply	Each	1	
3.6	Additional Spring Contacts	Supply	Each	1	
3.7	Under-voltage release	Supply	Each	1	
3.8	Geared motor limit switch contact	Supply	Each	1	
3.9	K63 Instantaneous Relay	Supply	Each	1	
3.10	K163 Instantaneous Relay	Supply	Each	1	

3.11	Anti-condensation heater	Supply	Each	1	
3.12	Shunt opening release	Supply	Each	1	
3.13	Shunt closing release	Supply	Each	1	
3.14	Thermostat	Supply	Each	1	
3.15	No Volt Coil	Supply	Each	1	
4	**Positive Isolator**				
4.1	Voltage Divider	Supply	Each	1	
4.2	Copper flexible connector	Supply	Each	1	
4.3	Switching Handle	Supply	Each	1	
5	**High Speed Circuit Breaker**				
5.1	Breaker mechanism	Supply	Sum	1	
5.2	Arc Chute	Supply	Each	1	
5.3	Breaker Trolley	Supply	Each	1	
5.4	Finger Contacts	Supply	Sum	1	
5.5	Mounting plate	Supply	Each	1	
5.6	Resistor bank	Supply	Sum	1	
5.7	Control Switch	Supply	Each	1	
5.8	Holding Coil	Supply	Each	1	
5.9	Closing Coil	Supply	Each	1	
5.10	Closing Motor	Supply	Each	1	
5.11	Cabinet Terminal	Supply	Sum	1	
5.12	Cable Plug	Supply	Each	1	
5.13	Trolley Plug	Supply	Each	1	
6	**AC Disconnects (6.6 – 220 kV)**				
6.1	Finger Contact	Supply	Sum	1	
6.2	Opening and Closing Lever	Supply	Sum	1	
6.3	Mechanism Box	Supply	Sum	1	
B	**25 kV AC Substation**				
7	**Vacuum Circuit Breaker**				
7.1	Mechanical Indicator operating counter	Supply	Sum	1	
7.2	Electrical Opening & Closing push button	Supply	Sum	1	

7.3	Electrical indicator "Ready"	Supply	Sum	1	
7.4	Local / remote Switch	Supply	Sum	1	
				TOTAL AMOUNT (Excl. VAT)	**R**
				VALUE ADDED TAX @15%	**R**
				TOTAL AMOUNT (Incl. VAT)	**R**

TOTAL PRICING FOR CAPE AND ORE CORRIDORS

GRAND TOTAL Table 1 +Table 2+ Table +3 Table 4 - (Excl. VAT)	R
CONTRACT SKILLS DEVELOPMENT GOAL (CSDG (0.25% FACTOR OF THE SUB-TOTAL	R
15% VAT	R
GRAND TOTAL (Inc. VAT)	R

ANNEXURE A: **ORIGINAL EQUIPMENT MANUFACTURERS (OEMs)**

Example

Item	Equipment	OEM Identification	OEM Name	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
A.	**6 MW Rectifier**	OEM 1	X Engineering PTY LTD	R 280 000'00	5%	R 294 000'00	R12500
		OEM 2	Y Rectifiers PTY LTD	R 380 000'00	5%	R 399 000'00	R9400
		OEM 3	Z Electrical Suppliers PTY LTD	R 420 000'00	5%	R 441 000'00	R11500

NB: **OEM** – Denotes Original Equipment Manufacturer

EQUIPMENT PRICE LIST

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
1	**132 kV Metal Oxide Surge Arrestors**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
2	**88 kV Metal Oxide Surge Arrestors**	OEM 1					
		OEM 2					

		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
3	**Surge Arrestors for Low Voltage**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
4	**High Voltage AC Disconnects**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
5	**Medium Voltage AC Disconnects**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost

		Identification					
6	**Voltage Transformers for High Voltage**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
7	**Voltage Transformers for Medium Voltage**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
8	**Voltage Transformers for Low Voltage**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
9	**Current Transformers for**	OEM 1					

	High Voltage	OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
10	**Current Transformers for Medium Voltage**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
11	**Current transformers for Low Voltage**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
12	**High Voltage Primary Circuit Breaker (SF6)**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
13	**Medium Voltage Switchgears (Input Voltage 11kV AC, 3 MVA capacity)**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
14	**Tractions Transformer (20 MVA, 25 kV AC)**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
15	**Traction Transformers (10 MVA) for 3 kV DC**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
16	**Traction Transformers (6 MVA) for 3 kV DC**	OEM 1					
		OEM 2					
		OEM 3					
Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
17	**Traction Transformers (5 MVA) for 3 kV DC**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
18	**Distribution Transformers High Voltage (88/11kV, 3 MVA)**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost

19	**Distribution transformers Medium Voltage (11kV/400V 500kVA)**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
20	**Auxiliary Transformer (1220V/400V, 200 kVA)**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
21	**Auxiliary Transformer (1220V/400V, 150 kVA)**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
22	**Auxiliary Transformer**	OEM 1					

	(1220V/400V, 100 kVA)	OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
23	**Auxiliary Transformer (1220V/400V, 50 kVA)**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
24	**Rectifier 18/24 Diode 10 MW**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
25	**Rectifier 18/24 Diode 6 MW**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
26	**Rectifier 18/24 diode 5 MW**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
27	**Reactor Coil (1.8 mH) 3kV DC**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
28	**Positive Isolator 3kV DC**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
29	**Wave filter equipment (Complete)**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
30	**3kV DC Copper Bus bars (100 mm x 10 mm)**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
31	**3kV DC Aluminium Busbars (127 mm x12.5 mm)**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost

32	**3 kV DC High Speed Circuit Breakers (Complete)**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
33	**Vacuum Circuit Breakers for 25 kV AC**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
34	**500 mm² Aluminium conductor per metre**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
35	**800 mm² Aluminium conductor per**	OEM 1					
		OEM 2					

	metre	OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
36	**AC DC Distribution panel**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
37	**PCB Panel**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
38	**25 kV Indoor Panels**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
39	**500 mm² single core XLPE positive feeder cable**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
40	**3 kV DC Feeder Protection Relay**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
41	**25 kV AC feeder protection relay**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
42	**3 kV DC Under voltage relay**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
43	**Mechanical Interlocking (Castell type)**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
44	**Battery Charger**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost

45	**Battery Cells (100 - 150 Ah, Plante Lead Acid)**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
46	**Battery Cells (100 -250 Ah Valve-Regulated Gel Lead Acid)**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
47	**Telecontrol Equipment**	OEM 1					
		OEM 2					
		OEM 3					

Item	Equipment	OEM Identification	OEM Name/Equipment Manufacturer	OEM Selling Price	Mark up %	Your Selling Price	Installation/Labour Cost
48	**4 - Quadrant**	OEM 1					

	Energy meter	OEM 2					
		OEM 3					