

Appendix I

PROPOSED CIVIL WORKS & STRUCTURES FOR EPZ ATHIRIVER 66/33KV, 2ND 23 MVA TX.

Item	Description	Unit	Quantity	Unit Rate(Ksh.)	Amount (Kshs)
ELEMENT No.1: PRELIMINARIES AND ENABLING WORKS					
B	Allow for material storage, working sheds, workmen shelter against adverse weather, changing rooms & Temporary wash facilities	ITEM	1		
C	Allow for a temporary site office (approx 100sqm) with provision for site office meeting room complete with portable seats, table, white board, washroom for Project team, including all works and fittings	ITEM	1		
D	Allow for a qualified safety Officer with OSHA and conversant with Kenya Power safety rules for the entire contract period	ITEM	1		
E	Allow for security and insurance for the proposed works, materials and personnel for the entire contract period	ITEM	1		
F	Allow for clean water suitable for drinking for the works	ITEM	1		
G	Allow for temporary sign post for the proposed works	ITEM	1		
H	Allow for power for the works	ITEM	1		
I	Allow for all the necessary statutory approvals for the works by relevant county departments, replication of drawings to required formats, Endorsement by relevant professional persons; and submit a set of approved drawings before commencement to the client, including site and project registration with NCA.-provisional 400,000	ITEM	1		
N	Allow attendance for Kenya power personnel to Check earthing prior to blinding & backfilling all the excavated bases & earth grids including tests for resistivity to acceptable levels. And Carry out earthing as per KPLC standards	ITEM	1		
O	Allow for AS ABUILT DRAWINGS including stamped hard copies and Soft copies and submit the same to the Client after project commissioning	ITEM	1		
Q	Allow for materials samples testing from time to time including mill Certificates for all reinforcements and structural steel works delivered for the works. Copies to be attached at every stage of inspection for payment and as may be requested by the Client	ITEM	1		
R	Allow for visitors book and site diary.	ITEM	1		
	TOTAL (PAGE 1) CARRIED TO SUMMARY PAGE				

Item	Description	Unit	Quantity	Unit Rate(Ksh.)	Amount (Kshs)
	ELEMENT No 3: 66KV LILO BAYS				
	SWITCH - GEAR FOUNDATION PLINTHS(Substructure Works -All provisional) 66K & 33kv SWITCH-GEAR PLINTHS: (The following i CT/CVT/SD/PI/NCT/LIGHTENING MASTS & ISOLATORS Foundations type F-Total 32Nos..				
B	Excavate foundation pits commencing from stripped level and not exceeding 1.5m deep	CM	90		
C	Ditto Exceeding 1.5m but not exceeding 3.0m	CM	20		
D	Extra -Over for excavating in all classes of rocks at any depth	CM	10		
E	Allow for all necessary plunking and strutting	ITEM	1		
F	Allow for disposal of general water by pumping, bailing or otherwise	ITEM	1		
G	Return, Fill and Ram Selected Excavated materials around the foundations	CM	80		
H	Load and Cart-Away surplus excavated materials from site to County Government Approved dumping site	CM	40		
I	Level and Compact bases of pits to receive blinding.	SM	70		
	<u>Blinding(Plain Concrete Class 15)</u>				
J	50mm thick (1:3:6) Concrete blinding to pit bottoms	SM	80		
	<u>Vibrated Reinforced Concrete Class 25/20 mm Aggregates In:</u>				
K	Bases	CM	15		
L	Stub columns	CM	27		
	<u>High yielded steel reinforcement bars including cutting, bending, tying and fixing in place, spacer blocks and tying wires to BS 4449.</u>				
M	D8-16mm	KG	3000		
	<u>Fair - Face FormWork to:</u>				
N	To vertical sides of bases (225-300mm)	LM	150		
O	To vertical sides of stub-Columns	SM	140		
	<u>Rendering & finishes</u>				
P	Rendering to Plinth top surface and any other suffeces exposed to weatherelements finished smooth trowelled including 50mm chamfer all round on all plinths.	SM	60		
	<u>Substation and Foundations Earthing:</u>				
Q	Excavate earth grids 300mm wide x 600mm deep average and cart-away including red-soil backfilling after laying the earthing materials (earthing to be sourced and done by kplc)	SM	1500		
	TOTAL (PAGE 2) CARRIED TO SUMMARY PAGE				

Item	Description	Unit	Quantity	Unit Rate(Ksh.)	Amount (Kshs)
	ELEMENT NO.4: CABLE TRENCHES				
	Trench (600mmX600 DEEP) length Approx. 601M				
A	Excavate for cable trench 1.2m wide from ground level not exceeding 1.0m metres deep.	CM	60		
B	Load and cart- away excess excavated materials from site to County Government Approved dumping site	CM	70		
C	Backfill and ram selected IMPORTED materials around trench walls.	CM	25		
D	50mm plain concrete(1:4:8) blinding on cable trench base	SM	70		
E	Allow for all necessary plunking and strutting	ITEM	1		
F	Allow for disposal of general water by pumping. Bailing or otherwise.	ITEM	1		
	<i>Vibrated reinforced concrete class 25/20 1:1.5:3 as described in;</i>				
G	150mm thick trench base.	CM	12		
H	150mm thick trench walls with fair face finish internally and external rendering	CM	16		
	<i>High yielded steel reinforcement bars including cutting, tying, bending and fixing in place, spacer blocks and tying wires to BS 4449.</i>				
I	D 8 in cable trench @ 150mm C/C Both ways	KG	1000		
	<i>Fair Face - Form work to:</i>				
J	Vertical sides of trench walls.(Internally and Externally)	SM	180		
K	Vertical side of trench base-(75-150mm)	LM	130		
L	Allow screeding/sloping and water drainage including all outlet pipes at cable trench ends	ITEM	1		
M	Provide and put in place (900x300x75mm) thick precast concrete trench covers reinforced with Y8 bars spaced at 100mm both ways with fair face finish on both sides.	No.	210		
N	Ditto But 1500mm x 400mm x50mm -REPLACE BROKEN	No.	50		
P	Allow concrete for bedding and thickenings (class 25 /20 mm aggregates) along the full length of trench bases	CM	20		
Q	Supply and install 150mm diameter medium duty PVC pipes as ducts. with and including 150mm thick concrete class 20 surround and murrum compaction underlying pipe bases as per as per engineer's instructions at various places	LM	60		
R	Ditto but terminating at all equipments with lengths not exceeding 3.0m per equipment	LM	30		
	TOTAL (PAGE 3) CARRIED TO SUMMARY PAGE				

Item	Description	Unit	Quantity	Unit Rate(Ksh.)	Amount (Kshs)
O	Supply and fix for 600x600mm cable trench, galvanized 300-400mm wide x50mm deep x 2mm thick galvanized perforated steel cable trays(samples subject to kplc approval) for control cables including mounting on the trench and all joints and bends on galvanized mild steel support brackets 40mm wide x 5mm thick with a mean girth of 1200mm as supports to detail, secured to the trench walls using 100mm long x14mm dia. rawl bolts spaced at 1.0m center to center (Contractor to submit details of cable tray support bracket for approval by kplc before fabrication and galvanizing including samples of rawl bolts)	LM	60		
S	Allow for 150mm diameter, 90 degrees medium duty PVC bends, Tees and the like not exceeding 50 nos. including all bulders work and connection from equipment to trenches and the like.	LOT	1		
	REHABILITATION WORKS				
1	Rehabilitate guard house ,make good all damaged elements ,and repaint	ITEM	1		
2	Rehabilitate 2NO. Main gates in cluding all painting,closing mechanism ,all colums and the like	ITEM	1		
3	Extend cable trench to empty room and include all demolition,cart builders works and finishesincluding 6mm chekerplate cover to the 600x600mm internal trench	LM	10		
4	Replace all internal control room covers that are broken aprox 40lm 300mm wide with 12mm bars at 100c/c	LM	40		
5	Overal rehabilitation of external walls with painting and skirting to make good control building 25x10m	ITEM	1		
	TOTAL (PAGE 4) CARRIED TO SUMMARY PAGE				

Item	Description	Unit	Quantity	Unit Rate(Ksh.)	Amount (Kshs)
	ELEMENT No. 5: 66& 33KV KV GALVANIZED STEEL STRUCTURES				
	Fabricate and Supply to site, Steel Structures for Bus Bars, Voltage and Current Transformers(CT's & VT's), Surge Diverters(SD's), Post Insulators (PI's), Lightning Arrestors and Lighting Masts. The structures shall be made from hot -rolled structural steel sections As per drawings & other specifications, and GTPs including all connections, weldings, nuts & washers, base and top plates, Stiffener plates, gussets, bolts and the like, including transport and delivery to site in well coded manner handed over to client for erection to match bolt assembly in foundations with galvanizing minimum 95 microns. Fabricator to allow for qualified steel erectors on site during the full erections of Vertical gantries and Horizontal booms AS follows-;				
	a. 66KV STRUCTURES				
A	CT/vt Structure-165 Kgs.	PCS	3		
C	Post Insulator Structure-420 Kgs.	PCS	1		
D	Isolator/Air Break Switch Structure - 500kg	PCS	1		
E	Surge Diverter Structure-120Kgs.	PCS	3		
F	Diito but 3.0 m for 66kv NCT Structure - 120Kg	PCS	1		
C	Terminal Post Insulator Structure-420 Kgs.	PCS	1		
K	Lightening Mast & Security Lights Structure - 365kg	PCS	1		
	b. 33kv STRUCTURES				
A	CT/vt Structure-165 Kgs.	PCS	3		
C	Post Insulator Structure-420 Kgs.	PCS	1		
D	Isolator/Air Break Switch Structure - 500kg	PCS	2		
E	Surge Diverter Structure-450kg	PCS	1		
	c. TX GRATING				
A	steel grating in portable 1mx1m pieces made of 50x50x6mm framing with 25mm dia twisted bars at not more than 20mm intervals	PCS	16		
B	Allow for grouting after KPLC Erection of structures	ITEM	1		
C	Allow for A Provisional Sum of Ksh.350,000.00 for Factory Visit, Inspection, and Tests before, during and after in the workshop/factory fabrication and galvanization process to check then accept/reject every process, quality, workmanships, precision and the like as per specifications. Including all facilitations/transport, communication for 6no. Client Teams (Project Supervisor, IAC members, P & PM)	ITEM	1		
	TOTAL (PAGE 5) CARRIED TO SUMMARY PAGE				

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Item	Description	Unit	Quantity	Unit Rate(Ksh.)	Amount (Kshs)
	ELEMENT No. 6: 1X23 MVA TX. PLINTH & OIL-SUMP WALL WORKS				
A	General excavation 0-2m	CM	110		
B	Extra Over for excavating in All Classes of rocks at any depth excavation	CM	14		
C	Allow for soil stabilization /bottom soiling with parked boulders	CM	20		
D	Allow for 'Plum' stabilization concrete -30mm aggregates-150mm-1.3.6	CM	10		
	<u>Reinforced Concrete</u>				
E	BASE concrete Class 25 to footings 300mm deep	CM	20		
F	Concrete Class 25 to upstand beam & walls	CM	10		
G	Concrete Class 25 to Top Cover Slab	CM	8		
	<u>Steel Reinforcement</u>				
H	Steel -Ribbed 8-16mm dia. to base and beam and wall	Kg	4000		
I	Allow for INSERT plates 12mm thick 300x300 Including anchors and fixing to receive angle line framing and gratings (m.s)	PC	10		
J	Allow for Harcdore filling to Tx. voids including blinding to receive Top cover slab	CM	30		
	<u>Formwork</u>				
K	Fair face Formwork to vertical sides of all bases (225-300mm)	LM	30		
L	Fair face Formwork to vertical walls	SM	120		
M	Fair face Formwork to Vertical sides of Top cover	LM	20		
N	Allow Concrete class 25 to perimeter sump wall 150mm thick	CM	8		
	<u>23 MVA Tx. Oil Sump Chamber</u>				
P	Construct OIL sump chamber 2m x 5m x 2m deep; perimeter 200mm thick block walling; internal plaster complete with niru finish; with ring beam at every 2m interval 250x200mm with 4 nos.12mm bars and 8mm shear links at 200mm spacing; cover slab with manhole opening 150mm reinforced with 8mm steel bothways at 150mm spacing; heavy duty steel cover; including pvc pipe 4"connecting with the main transformer pit not exceeding 6m away.-in two compartments and connect to soakpit	ITEM	1		
Q	Provide galvanized 125 x 75mm x 8mm U Channels welded to triangular shape (1.5x1.2x1.9metres); placed in reinforced concrete size, 1.0x1.0metres (m.s), with the top portion exposed above the concrete aproximately 200mm, including 50mm diameter hole drilled on exposed section.	ITEM	1		
	TOTAL (PAGE 7) CARRIED TO SUMMARY PAGE				

Item	Description	Unit	Quantity	Unit Rate(Ksh.)	Amount (Kshs)
ELEMENT No. 7: SWITCHYARD REHABILITATION LEVELLING & BALLASTING					
A	Oversite general excavation to Reduce levels averagely 150mm deep and Cart Away all loose soil and clean and heap ballast for re use	SM	600		
C	Fill in with approved imported marrum to make up levels and compact to 95% MDD (AASHTO T99) in layers of 150mm in the entire proposed substation area	CM	100		
E	Apply suitable weed killer, herbicide to surfaces of blinding as per the Manufacture's written instructions with a guarantee of more than 5 years	SM	600		
F	1000 gauge polythene or other equal and approved membrane laid on compacted and treated quarry dust with weltd laps of 200mm wide.	SM	1200		
G	spread uniformly 150mm thick, 1" - 2.5", singly graded and approved ballast in the switch - yard-existing	SM	600		
H	allow top up ballast as above -supply and spread well graded 30-40mm	Tons	100		
ELEMENT 8: ACCESS ROAD, DRIVEWAY & PARKING(Concrete Paving Blocks)					
A	Mass excavation to reduce levels not exceeding 1m deep commencing from stripped level average 750mm deep.	CM	200		
B	Load and cart away excavated material from site.	CM	200		
C	Ram and compact sub-grade ready to receive sub-base	SM	200		
Filling					
D	Imported filling material to make up levels	CM	75		
E	300mm Thick handpacked hardcore, filling leveled, well rammed and consolidated in 150mm thick layers	CM	75		
F	50mm Thick quarry dust blinding	SM	200		
G	250 x 125mm High pre-cast concrete kerb bedded and jointed in cement and sand (1:4) mortar including 325x100mm thick mass concrete class 20/20 in foundation and haunching at the back, including all necessary formwork and excavations.	LM	140		
H	Extra-over ditto but curved on plan to various radii	LM	40		
I	250 x 125mm High pre-cast concrete channels	LM	140		
	Extra-over ditto for curved on plan to various radii	LM	40		

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