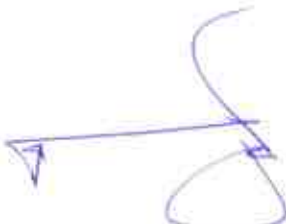


ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	SECTION 2				
	SWITCHYARD				
1	Switch yard				
A	Demolish existing reinforced concrete foundation and cart away the rubbles.	ITEM	1		
B	Scope, load, excavated materils, rubbles and cart away to County designated damping site.	ITEM	1		
C	Clear ALL grown vegetative matter on entire substation yard by pulling up roots removal of soil and spraying of herbicide fumigation and provide copy of guarantree to client	ITEM	1		
D	Allow for scooping the entire existing ballast and later re - use after sieving of vegetative matter, heap as directed and re-spreading the approved as directed.	ITEM	1		
E	Scoop loose top soil by cutting average 200mm deep to recieve imported fill in the new working area	SM	1500		
F	Provide average 150 mm thick selected well compacted imported murram fill, compacted in layers of 150mm thick using a plate compactor to achieve slope	SM	1500		
G	Prepare and apply Gradiator 4TC or equal and approved insecticide to surfaces of blinding as per Manufacturer's written instructions	SM	1500		
H	Apply suitable weed killer, herbicide to surfaces of blinding as per the Manufacture's written instructions	SM	2900		
L	1000 gauge polythene or other equal and approved membrane laid on compacted and treated quarry dust with weltd laps of 200mm wide.	SM	1500		
M	Supply and spread uniformly 150mm thick (1") ballast in switch yard-singly graded	SM	1500		
I	Rehabilitate by making good all other distrubed areas, stone pitching finishes, invert drains and existing trenches, foundations to Engineer's satisfactory.	ITEM	1		
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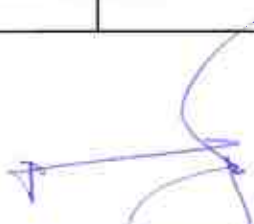
 30/1/18

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	CABLE TRENCH				
	Trench (600x600mm deep)				
A1	Excavate trench commencing from reduced level but not exceeding 1.5m deep.	CM	68		
A2	Load, cart away from site surplus excavated materials and dispose at areas designated by local authority.	CM	68		
	Trench bed				
A	50mm plain concrete(1:3:6) blinding cable trenches bed	SM	90		
	Vibrated reinforced concrete class 20/25 1:2:4/25 as described in;				
B	in 100mm thick trench base	CM	9		
C	in 150mm thick vertical walls	CM	18		
	Sawn form work to				
D	Sides of trench walls	SM	260		
	Steel reinforcement bars including tying bending spacer blocks tying wires and fixing high tensile bars to BS 4461				
E	Y8mm in cable trench	KG	950		
	Precast concrete trench covers (external cable trenches)				
F	Supply and put in place 900x300x75mm thick precast concrete trench covers reinforced Y8 bars spaced at 100mm both ways with handles for ease of lifting,with perimeter angle line nosing with 25mmx3mm M.S. edge protector	NO	340		
	Cable trays				
C	Supply and fix steel fabricated cable trays from 50x50x4mm thick angle iron frame, jointed together with 50x4mm thick , angle iron bar 600mm long dividers and place on top of angle iron spaced at 400C/C to form cable tray and with 200mm high vertical triangular support stand spaced at 1200mm C/C.	LM	100		
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 30/01/18

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
A	Make good existing cable covers by repair with cement slurry and repairing all worn out edges and replacement of totally damaged covers	ITEM	1		
66 KV & 33KV FOUNDATIONS					
The following Switchgear Foundation plinthes for structures steel, as per the General arrangement drawing(GA) and all to structural engineers					
B	Excavate pit foundatins commencing from ground level but not exceeding 1,50 metres deep	CM	99		
C	Return fill and ram selected excavated material	CM	54		
D	Cart away from site surplus excavated materilas to designated county dumping site.	CM	45		
Bed					
E	50mm plain concrete(1:3:6) blinding	SM	59		
Vibrated Reinforced Concrete Class 25/20 mm Aggregate in:-					
F	Foundation bases	CM	14		
G	Stub columns	CM	28		
High yied Steel Reinforcement Bars;					
Cold Worked to BS 4461					
H	D10	KG	535		
I	D12	KG	1612		
Fairface Formwork to:-					
J	Sides of bases	LM	55		
K	Vertical sides of footing	SM	162		
FINISHES					
L	13mm thick cement/sand steel float finish to stub column top surface to receive steel strucrure base plate measured separately.	SM	69		
M	Allow fo KPLC attendance for earthing and bolt setting supervision	ITEM	1		
Total this page and Carried to Summary Page					




 30/01/18

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
4	23mva.TRANSFORMER PLINTH				
A	Excavate transformer pit commencing from reduced level but not exceeding 1.5 metres deep	CM	60		
B	Return fill and ram selected excavated material to the sides of the plinths	CM	15		
C	Cart away from site surplus excavated materials to designate County dumping site.	CM	45		
D	Plain concrete 50mm thick blinding 1:4:8 to footing	SM	40		
	Vibrated Reinforced Concrete Class 25/20 mm Aggregate in:-				
E	Base	CM	10		
F	Pedestalls	CM	4		
G	Cover slab	CM	5		
H	High Tensile Steel Reinforcement Bars; Cold Worked to BS 4461 (Provisional)				
I	8 mm diameter	KG	155		
J	12 mm diameter	KG	1413		
	Fairface Formwork to:-				
K	Sides of base 225-300mm high.	LM	26		
L	Ditto slab	LM	16		
M	Vertical sides of concrete surfaces.	SM	60		
	Hardcore filling				
N	Approved hardcore filling compacted to Engineer's approval	CM	16		
O	50mm thick blinding to surface of hardcore with lean concrete	SM	15		
P	1000 gauge polythene sheet laid over hardcore	SM	15		
	Total this page and Carried to Summary Page				



 30/9/18

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	SUMP RCC WALLING				
	Vibrated Reinforced Concrete Class 25/20 mm Aggregate in:-				
A	Walling finished fair face	CM	5		
	Formwork				
B	Vertical sides of base	SM	49		
	High Yield deformed Reinforcement Bars, to BS 4449 including cutting, bending, tying, fixing, and spacer blocks.				
D	D8	KG	71		
E	D10	KG	119		
	Supply and fix fabricated grating, with deformed D16 reinforcement bar welded on 50x50x4mm angle line framing spaced at 25mm centres, as described;				
F	Fabricated grating size, 1.2x1.0m	NO	14		
G	Ditto but 1.0 x 1.0m	NO	2		
H	Ditto but 0.6x1.0m	NO	2		
I	50x50x4mm angle line embedded in concrete sump walling to receive grating	LM	40		
J	OIL sump chamber 2m x 4m x 2m deep; perimeter 200mm thick natural stone walling; internal plaster complete with niru finish; with ring beam with 4 nos. 12mm bars and 8mm shear links at 200mm spacing; cover slab with manhole opening 150mm reinforced with 10mm steel bothways at 150mm spacing; heavy duty man hole covers; including pvc pipe 4" connecting with the main transformer pit not exceeding 6m away. -in two compartments	ITEM	1		
K	Provide galvanized 125 x 75mm U Channels welded to triangular shape (1.5x1.2x1.9metres); placed in reinforced concrete size, 1.0x1.0metres), with approx. of the tip exposed above the concrete, including 50mm diameter hole drilled on exposed section.	NO	2		
	<i>Trench (900x900mm deep) length approx. 50 metres at various locations</i>				
L	Excavate for trench from reduced level not exceeding 1.5 metres deep and cart away	CM	60		
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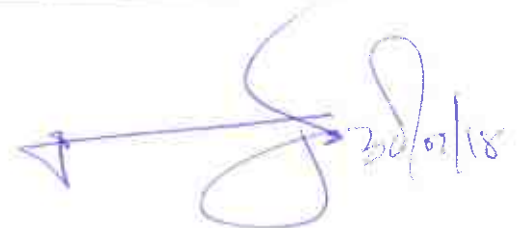

 30/11/18

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	PROPOSED CONTROL ROOM MODIFICATION WORKS				
	ENABLING WORKS				
A	Demolish existing reinforced concrete ground floor slab approximately 15 metres square to create trench and cart away rubbles.	ITEM	1		
C	Provide an approved fire,water and dust proof hoarding or barrier between the wall being demolished and the control room installed equipment.	ITEM	1		
D	Secure from any damage or mishandling the existing control cables during the entire construction period	ITEM	1		
E	Supply and fix 600x600x6mm thick chequered plate trench covers, including notching and making holes where necessary.	NO	67		
F	Ditto but 1000x500x6mm and reinforcing underth with 25x25mm square tube along the edges and a cross the sides.	NO	21		
G	Ditto but 600x400x6mm	NO	27		
H	Prepare and apply undercoats of metal primer	SM	83		
I	Ditto but two finishing coats of first quality gloss aluminium paint.	SM	83		
J	Prepare and apply two coats of first grade paint to internal walls and soffit.	ITEM	1		
K	Ditto but externally	ITEM	1		
L	Ditto but gloss paint to metal surfaces.	ITEM	1		
M	Allow for widening cable entry points and making good the final surfaces	ITEM	1		
N	Allow for draining all water in existing trenches; BOTH INTERNAL and EXTERNAL, by providing class 41 PVC drain pipe approximately 100m at various locations including all bends joints to drain in soakpit not more than 30m away	ITEM	1		
	Total this page and Carried to Summary Page				



 30/01/18

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
A	Rehabilitate existing rainwater gutter, including the down pipes.	ITEM	1		
B	Supply and fix downpipe to the existing ground mounted water tank	LM	4		
C	Rehabilitate and repair the entire water supply system in the control room and gate house, supply and fix new valves, taps and changing all worn out and leaking accessories.	ITEM	1		
Gate House & Toilet					
D	Rehabilitate the roof by redoing it with steel roof members to Engineer's approval	ITEM	1		
E	Ditto but celtes board ceiling, on 50x50mm cypress timber branderings placed at 600mm centres.	SM	9		
F	Remove and dispose existing window frames	ITEM	1		
G	Composite purpose made mild steel casement window, frame size 1500x1200mm, 25mm 'Z' bar ,25mm mullion with 63x3mm flat flat bar welded on the back and 25mm 'T' bar for window pane panels of maximum 275x225mm complete with 5mm glass with putty all to client approval.	NO	2		
H	Ditto but size, 800x6600mm	NO	2		
I	Prepare and apply 2 coats of red oxide primer and apply 2 coats of matt finish paint on windows frame of 63mm girth	SM	9		
J	250 x 50mm thick precast concrete weathered and throated window sill, reinforced, finished fair face on all exposed surfaces, bedded and jointed in cement sand motar (1:4)	LM	5		
K	Single leaf steel doors 1000x2100mm high panels 500mm wide consisting of 16mm gauge plate welded into 50x25x3mm frames, 50x50x6mm main frame with wall anchors;	NO	2		
L	Prepare and apply 2 coats of red oxide primer and apply 2 coats of matt finish paint on steel doors internall and externally.	SM	9		
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 30/01/18

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	Cable trays				
A	Supply and fix steel fabricated cable trays from 50x50x4mm thick angle iron frame, jointed together with 50x4mm thick , angle iron bar 600mm long dividers and place on top of angle iron spaced at 400C/C to form cable tray and with 200mm high vertical trainglular support stand spaced at 1200mm C/C.	LM	10		
	ACCESS ROAD				
B	Excavate for 5.0 metres wide access road depth not exceeding 1.50m and cart away the spoil	CM	90		
C	Backfill average 300mm thick with selected well compacted hardcore fill, compacted in layers of 150mm thick using 10 tonne vibrating roller to receive paving blocks	CM	70		
D	50mm thick approved and well compacted quarry dust blinding on hardcore surfaces	SM	200		
E	Heavy duty industrial concrete paving blocks size (210x105x80mm) minimum strength 49N/mm square laid to slope on quarry dust and compacted	SM	200		
F	125 x 250 mm Splayed kerb to BS 340 including 125 x 100 mm channel on and including concrete Class 'E' foundation and 100 mm haunching to back of a kerb including all necessary excavation, formwork and disposal.	LM	77		
G	Ditto extra over for curved to plan.	LM	6		
H	Extra over for junction between straight and curved kerbs.	NO	6		
	Prepare surfaces and apply three coats of approved road marking paint: to				
I	Kerb stones and parking 75 to 150mm girth with black and yellow road paints.	SM	23		
J	Ditto but existing road kerds after repair and replacement of worn out.	ITEM	1		
	Total this page and Carried to Summary Page				



 30/01/18

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	SOAKPIT				
A	Excavation soak pit commencing from ground level but not exceeding 1.5m deep and cart away.	CM	9		
B	Ditto over 1.5m deep but not exceeding 3.0m deep and cart away.	CM	3		
C	Ditto over 3m deep but not exceeding 4.5m deep and cart away.	CM	3		
D	Ditto over 4.5m deep but not exceeding 6.0m deep and cart away.	CM	3		
E	Ditto over 6m deep but not exceeding 7.5m deep and cart away.	CM	3		
F	Ditto over 7.5m deep but not exceeding 9.0m deep and cart away.	CM	3		
G	Ditto over 9m deep but not exceeding 10.5m deep and cart away.	CM	3		
H	Ditto over 10.5m deep but not exceeding 12.5m deep and cart away.	CM	3		
I	50mm plain concrete(1:3:6)blinding	SM	4		
	Vibrated reinforced concrete class 20/25 1:2:4/25 as described in;				
J	In 150mm thick trench base	CM	1		
K	200mm thick natural stone foundation walls; machine dressed square; bedded and jointed in cement and sand(1:4) mortar; reinforced with 20SWG Hoop iron in every alternate course	SM	6		
	Vibrated reinforcement insitu concrete class 20/20: with minimum cube crushing strength of 20N/mm at at 28 days:in				
L	150mm thick slab	SM	6		
M	Mesh reinforcement No.A142 size 200x200 mm weighing 2.22kg per square meter; in floor slab; including all necessary supports	SM	6		
	Sawn formwork in:				
N	soffit formwork on curved plan	SM	6		
O	Vertical sides of floor slab	LM	7		
P	Necessary boxing for manhole cover	Sm	1		
	Total this page and Carried to Summary Page				



 2/10/18

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	PIT LATRINE & GUARD HOUSE COMBINED 3.5 M X 5 M PLAN AREA) AT ATHIRIVER 220/66KV SITE 1km AWAY				
	Excavation				
A	Oversite excavation to reduce levels commencing from existing ground level; 150mm deep	SM	40		
B	Excavate from reduced level strip foundation and not exceeding 1.5 m deep	CM	23		
C	Excavate from reduced level strip foundation and not exceeding 3.0m deep	CM	23		
D	Excavate from reduced level strip foundation and not exceeding 4.5m deep	CM	23		
E	Excavate from reduced level strip foundation and not exceeding 6.0m deep	CM	23		
F	Extra over excavation in rock	CM	2		
G	Remove surplus soil from site to a place approved by local authority	CM	94		
	Mass concrete mix(1:4:8)in				
H	50mm thick blinding in strip foundations	SM	15		
	Vibrated reinforcement insitu concrete class 20/20: with minimum cube crushing strength of 20N/mm at 28 days:in				
J	150mm thick ground floor slab	SM	18		
K	strip foundations and footings 200mm	CM	5		
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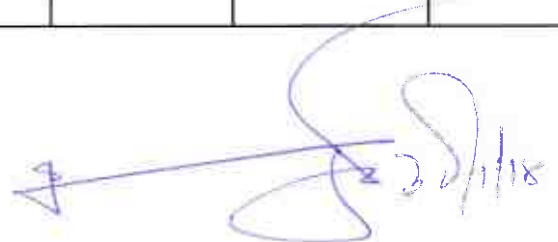
 20/01/18

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	Supply and fix steel bar structural concrete work including cutting,bending,hoisting,tying,wire, spacer blocks and supporting all in position				
A	8-12 MM bars	KG	400		
	Mesh fabric reinforcement				
B	Mesh reinforcement No.A142 size 200x200 mm weighing 2.22kg per square meter; in floor slab; including all necessary supports	SM	18		
	Sawn formwork to:				
C	Edges: slabs 75-150mm girth	M	16		
D	Vertical sides; strip footing;200mm high	M	60		
	Walls				
E	200mm thick natural stone foundation walls; machine dressed square; bedded and jointed in cement and sand(1:4) mortar; reinforced with 20SWG Hoop iron in every alternate course	SM	70		
	Anti-terminate treatment				
F	Approved anti-termite chemical treatment; applied by approved professional pest control specialist; applied strictly in accordance with the manufacturers' instructions; ten (10) year guarantee	SM	18		
	DPM				
G	Gauge 1000 polythene damp proof membrane	SM	18		
	25mm thick cement/sand(1;4) rendering on concrete or stonework; wood float finished to plinths; externally				
G	Plinths; externally	SM	5		
	Prepare surfaces and apply undercoat and two finishing coats black bitumastic or othe equal approved water resistant paint on rendered surface				
	Total this page and Carried to Summary Page				



 20/06/18

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
A	Plinths, externally Sawn formwork to	SM	6		
B	sides and soffits beams Supply and fix square twisted steel bars in structural concrete including cutting, bending, hoisting, tie wire, spacer blocks and supporting all in position	SM	10		
C	8mm bars	KG	300		
D	12mm bars Vibrated reinforcement insitu concrete class 20/20: with minimum cube crushing strength of 20N/mm at at 28 days:in	KG	250		
E	Ring beams External walls Machine dressed natural stone walling bedded in cement/sand mortar 1;4) with minimum stone crushing strength of 7N/mm ² ; reinforced with 20SWG Hoop Iron in every alternate course	CM	2		
F	200mm thick walls	SM	40		
E	Extra over external walling for horizontal key pointing Bitumious felt or other equal approved damp proof course ; in cement/sand(1:3) mortar	SM	40		
F	200mm wide SUNDRIES	SM	6		
G	Make holes on 100mm thick concrete slab for 150mm dimeter PVC pipe	NO	1		
h	Provide and fix 100mm thick PVC vent with cap.	M	3		
	Total this page and Carried to Summary Page				



 22/1/18

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
A	Allow for roof slab 150mm thick with 10mm and 8mm steel with ring beam 300mm deepmnat all walls complete with all concrete,formwork ,proping and the like as unit	SM	15		
	The following in 3 No; Steel Structural rof spanning 3.2m ; hoisted to a height of approximately 2.4m from ground level.				
B	150 x 150 x 2mm Z purlins bedded in masonry wall with cement sand mortar	M	15		
C	Drill holes in steel members for 12mm bolts in Z purlins	NO	23		
D	12mm bolts	NO	23		
E	Supply and fix 26g mild steel trough roofing sheets type	SM	35		
F	LT5; factory prepainted to approved standard colour; laid with 150mm end lap and 94mm side laps; fixed to metal purlins including hook bolts, washers and nuts at 1000mm centresincluding perimeter cladding with 450mmm eaves				
	Wrot Cypress; Prime grade				
G	200x 25mm fascia board; chamfered one edge	M	15		
	Prepare surfaces; apply three coats first grade gloss paint to approval; on timber surfaces to				
H	200mm girth; on fascia board	SM	3		
	OPENINGS				
	Concrete Louvres				
I	150x150x150mm concrete louvre blocks fixed with cement/mortar	SM	2		
	Window cill				
J	Supply and fix 200mm clay window cill; bedded and jointed in cement/sand (1:3) mortat; pointed in matching coloured cement to windows	M	6		
	Total this page and Carried to Summary Page				



 20/1/18

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	DOORS				
A	Mild steel light door size 965 x 2100mm complete with all iron mongery as per drawing SK.No.06249	NO	4		
	Iron mongery				
	Supply and fix 'Assa Abloy' or equal approved iron mongery; matching screws; locks to include a set of 3 keys; available from their authorised local dealers to APPROVAL				
B	100mm mild steel butt hinges	NO	12		
C	3 lever steel casement rebated door lock with handles	No	4		
	Prepare surfaces, three coats gloss oil paint to metal SURFACES				
D	Doors internally and externally	SM	10		
	FINISHES				
	FLOOR FINISHES				
	screed; cement/sand (1:3) on concrete				
E	30mm thick to receive floor tiles	SM	18		
	Supply and fix approved ceramic floor tiles on screed; joints pointed in matching cement grout to approval				
F	300x300x10mm thick approved ceramic tiles	SM	18		
	WALLING				
	Backing: 10mm cement/sand (1:4); on masonry or concrete: wood float finished to				
G	walls to receive Ceramic tiles	SM	75		
	Supply and fix coloured glazed ceramic wall tiles; on backing; joints pointed in matching cement grout				
H	300x300x10mm thick tiles	SM	60		
	Total this page and Carried to Summary Page				



 30/1/18

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
A	300x50x10mm thick bordertile	LM	26		
B	Supply and fix matching pvc tile strip to tile edges	LM	100		
	Plaster; 13mm cement/lime putty/sand;wood float on masonry and concrete to				
C	Walls and concrete surfaces; externally	SM	50		
	Prepare surfaces; apply three coats First grade vinyl emulsion paint or other equal approved: on wood float plaster				
D	Walls and concrete surfaces	SM	100		
E	Allow for supply and fixing european type WC Complete with 9litre cisteren .to include all connections and plumbing works-seek approval from client	NO	3		
F	allow connection of water from 800lm away with 3/4 inch pipe to OHT and full commision ing of water system to toilets	ITEM	1		
G	Supply and fix water tank 3000 lts to heights not existing 4m high including all connection ,overflow valves and level indicator(ABOVE building)	ITEM	1		
H	allow provision for shower complete with shower tray ,water input point,and 1/2 inch tap complete with all plumbing works including gulley trap and drain	ITEM	1		
I	2.4m high x 10 gauge chainlink fence, complete with 4mm diameter5 strands of galvanized plain wire pass through 3.0m high 50x50X3mm cranked SHS posts placed at 3.0m centers, 12 gauge barbed wire on 450mm cranks, including, excavation and erection works, 1:3:6 mix mass concrete surround at 600mm deep	LM	15		
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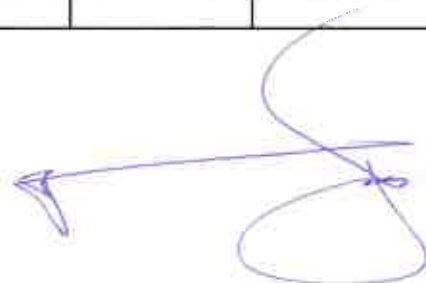


 30/1/18

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
A	septic tank 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		
	GALVANIZED FOUNDATION HOLDING MILD STEEL BOLTS				
	Supply, fix and grout Mild steel foundation holding bolts, size (600mm long, 25mm diameter, with 125mm long hook bend on one end, 100mm long barrel threads, 2No. M25 nuts, 1No. spring washer and 1No. ring washer) in reinforced concrete stubs columns including precision setting and securing the bolts in place when pouring concrete.	NO	124		
	GALVANIZED MILD STEEL STRUCTURES				
	Supply, erect and assemble fabricated Square Hollow Section (SHS) 150x150x6mm thick but not exceeding 7.0 metres high, including 95 microns hot dip galvanization, top cross members, top and base plates, necessary stiffers, making necessary holes, complete with necessary bolts, nuts and double washers as described in the attached drawings				
C	Drawing No.08409G	No.	2		
D	Drawing No.08409 sheet 3C	No.	9		
E	Drawing No.08409 sheet 3D	No.	6		
F	Drawing No.08409 sheet 3F	No.	3		
G	Drawing No.09769 sheet 3	No.	10		
H	33kv Busbar as per the existing lattice structure on site	No.	1		
I	Excavate trench to receive PVC ducts commencing from reduced level but not exceeding 1.5m deep.	CM	3		

30/01/18

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	SUMMARY PAGE				
	TOTAL FROM PAGE 1				
	TOTAL FROM PAGE 2				
	TOTAL FROM PAGE 3				
	TOTAL FROM PAGE 4				
	TOTAL FROM PAGE 5				
	TOTAL FROM PAGE 6				
	TOTAL FROM PAGE 7				
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	TOTAL FROM PAGE 9				
	TOTAL FROM PAGE 10				
	TOTAL FROM PAGE 11				
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	TOTAL FROM PAGE 16				
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	TOTAL FROM PAGE 18				
	TOTAL FROM PAGE 19				
	TOTAL FROM PAGE 20				
	TOTAL FROM PAGE 21				
	SUBTOTAL				
	ALLOW 16% VAT				
	TOTAL CARRIED TO FORM OF TENDER				
Amount in words:					
.....					
	Company Stamp				
	Signed:				
	Name:				
	Address:				
	Contract Period: Weeks				


 30/4/18



The Kenya Power & Lighting
Co. Ltd.

TITLE:

**SPECIFICATION FOR STEEL
STRUCTURES FOR
SUBSTATIONS**

DOC. NO.	KPLC/SCD/107/00/000
Issue No.	1
Revision No.	0
Date of Issue	2007-02-14
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0.2 Amendment Record

FOREWORD

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2. REFERENCES
3. TERMS AND DEFINITIONS
4. REQUIREMENTS
5. TESTS AND INSPECTION
6. MARKING, LABELLING AND PACKING

ANNEX A: DRAWINGS

Issued by: M. Kanini Ag. R&D Manager

Authorized by: D. Mwangi, CM - PR&PM

Signed: 

Signed: 

Date: 2007-02-14

Date: 2007-02-14



The Kenya Power & Lighting
Co. Ltd.

TITLE:

SPECIFICATION FOR STEEL
STRUCTURES FOR
SUBSTATIONS

Doc. No. KPLC1/3CB/TSP/03/002

Issue No. 1

Revision
No. 0

Date of
Issue 2007-02-14

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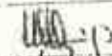
0.1 Circulation List

COPY NO.	COPY HOLDER
1	Supplies Manager
2	Stores & Stock Control Manager
3	Distribution Manager
4	Research & Development Manager
5	Assistant Manager, Technical Audit


0.2 Amendment Record

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)

Issued by: M. Kanini Ag. R&D Manager

Signed: 
Date: 2007-02-14

Authorized by: D. Mwangi, CM - PR&PM

Signed: 
Date: 2007-02-14



The Kenya Power & Lighting
Co. Ltd.

**SPECIFICATION FOR STEEL
STRUCTURES FOR
SUBSTATIONS**

Doc. No.	KPLC/304/157/03/002
Issue No.	1
Revision No.	0
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FOREWORD

This specification has been prepared by the Research and Development Department of The Kenya Power & Lighting Company Limited (KPLC) while drawings were prepared by the KPLC Central Office Design, Distribution Department.

This specification is based on the latest revisions of the standards quoted on the drawings and the relevant Kenya Standard. Where an equivalent standard has not been quoted in the specification, then the standard (including its revision) quoted on the drawings prevails.

The specification lays down requirements for Steel Structures for Substations and is intended for procurement. It supersedes all specifications for Steel Structures for Substations issued before the revision date.

If the Specifications and/or Drawings do not contain particulars of materials or components which are necessary for the proper and safe completion, operation and maintenance of the structure in question, all such materials shall be deemed to be included in the supply.

It shall be the responsibility of the manufacturer to ensure adequacy of the design and good engineering practice in the manufacture of the steel structures for KPLC. The manufacturer shall submit information which confirms satisfactory service experience with products which fall within the scope of this specification.

1. SCOPE

1.1. This specification is for Steel Structures for Substations.

1.2. The specification covers the following Steel Structures:

- (i) Steel Structures for 132kV Equipment including Post Insulators, Surge Diverters, Isolators, Gentries, Steel Boom Structures and Current Transformer Structures.
- (ii) Steel Structures for 66kV Equipment including Bus Bars, Voltage Transformers, Current Transformers, Surge Diverters, Post Insulators and Air Break Switches/Isolators.
- (iii) Steel Structures for 33kV Equipment including Voltage Transformers, Air Break Switches/Isolators, Bus Bars, Gentries, and Current Transformers.

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- (iv) Steel Structures for 11kV Equipment including Neutral Link, Heat Shrink Structure/Double Sealing ends and Local Transformer.
- (v) Steel Structures for Lighting Masts, Working/Security Lights and other associated equipment/fittings.

2. REFERENCES

The following documents were referred to during the preparation of this specification. In case of conflict, the requirements of this specification takes precedence.

KS 02 - 572: Kenya Standard Specification for Hot-Rolled Structural Steel Sections

ISO 1461: Metallic Coatings - Hot dip galvanized coatings on fabricated ferrous products - Requirements

BS EN 1011: Welding. Recommendations for welding of metallic materials

ESI 43-95: Steelworks for Overhead Lines

KPLC Central Office Design - Drawings for Steel Structures for Substations.

3. TERMS AND DEFINITIONS

For the purpose of this specification, the definitions in the reference standards shall apply.

4. REQUIREMENTS

4.1. Service Conditions


The steel structures shall be suitable for continuous operation outdoors in tropical areas at altitudes of up to 2200m above sea level, humidity of up to 90%, average ambient temperature of +30°C with a minimum of -1°C and a maximum of +40°C.

4.2. Materials and Construction

4.2.1 Angle sections (equal and unequal angles), channels and flats shall be hot-rolled and shall comply with the requirements of Kenya Standard KS 02-572.

4.2.2 The tensile strength and yield stress of the steel shall be not less than 430 N/sq. mm and 255 N/sq. mm respectively.

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- 4.2.3 The dimensions and sectional properties, tolerances on mass and dimensional tolerances shall all be in accordance with KS 02-572.
- 4.2.4 All materials before and after fabrication shall be straight and free from twists. The material shall be free from blisters, scale and other defects.
- 4.2.5 Cutting may be by shearing, cropping, sawing or machine flare cutting. Sheared or cropped edge shall be dressed to a neat finish and be free from distortion where parts are to be in metal contact.
- 4.2.6 All holes shall be drilled in one operation and burrs shall be removed. Holes shall not be formed by a gas cutting process. All matching holes for bolts shall register with each other so that a gauge 2mm less in diameter than the diameter of the bolt shall pass freely through the assembled members in a direction at right angle to such members.
- 4.2.7 Erection clearance for cleated ends of members connecting steel to steel shall not be greater than 2mm at each end.
- 4.2.8 Bending of flat straps shall be carried out cold.
- 4.2.9 Welding
- a) Welding where specified, shall be by metal-arc welding and shall be as per BS EN 1011.
 - b) After welding and before galvanizing, welds shall be thoroughly cleared by sand blasting to remove slag and spatter.
- 4.2.10 Galvanizing
- a) All materials to be galvanized shall be of the full dimensions shown or specified and all punching, cutting, drilling, screw tapping and the removal of burrs shall be completed before the galvanizing process commences.
 - b) All galvanizing shall be done by the hot dip process with spelter, not less than 98% of which must be pure Zinc and in accordance with ISO 1461.
 - c) Bolts shall be completely galvanized including the threads, but the threads shall be left uncoated in the case of nuts.

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d) The Zinc coating shall be uniform, clean, smooth and as free from spangle as possible.

e) Where specifically requested by KPLC, galvanized steel structures shall be treated after galvanizing with Sodium Dichromate Solution.

Table 1: Galvanizing

	Steel Structures for Inland installations	Steel Structures for installation along the coast
Minimum Average Coating Weight	610 g/m ²	800 g/m ²
Post-treatment (chromating)	See Tender Requirements	See Tender Requirements

5 TESTS AND INSPECTION

5.1 The tensile strength, yield strength and elongation tests shall be done in accordance with the requirement of KS 02-572. It shall be the responsibility of the manufacturer to perform or to have performed all the tests specified.

5.2 Tests on galvanizing shall be carried on the finished steel in accordance with the requirement of ISO 1461. It shall be the responsibility of the manufacturer to perform or to have performed all the tests specified.

5.3 Certified true copies of previous test reports by the relevant International or National Testing/Standards Authority of the country of manufacture (or ISO/IEC 17025 accredited laboratory) shall be submitted with the offer for evaluation (all in English Language). A copy of accreditation certificate for the laboratory shall also be submitted.

5.4 KPLC authorized Engineers shall have access at all reasonable time to all places of work and when work is being carried out and shall be provided with all necessary facilities (by the manufacturer) for inspection during fabrication.

Test reports shall be completed (by the manufacturer) and submitted to KPLC for approval before shipment/delivery of the materials.

5.5 On receipt of the goods KPLC may perform any of the tests specified in order to verify compliance with this specification. The supplier shall replace without charge to KPLC

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ANNEX A


TABLE 1: STRUCTURES FOR 132kV EQUIPMENT

Item No.	Item Description	Drawing SK No
1.	132kV Post Insulators Structure, 4m high	09162 sheet 1
2.	132kV Surge Diverters Structure, 3m high	09162 sheet 2
3.	132kV Gantry Structure, 10m high	09907
4.	132kV Isolators Structure, 4m high	09774 sheet 13A
5.	132kV Isolator Structure, 10m high	09909
6.	132kV Steel Boom Structures, 10m high	09908
7.	132kV Current Transformer Structure, 3m high	08409/A sheet 1
8.	132kV Isolator Structure 5000mm high	08841
9.	132kV Current Transformer Structure	09774 sheet 15
10.	Steel Gantry Structure 12.5mitres high	09111
11.	132kV Surge Diverters Galvanized Steel Structure	09108


TABLE 2: STRUCTURES FOR 66kV EQUIPMENT

Item No.	Item Description	Drawing SK No
1.	66kV Bus Bar; 7600mm high	09110
2.	66kV Voltage Transformer; 3000mm high	09821 sheet 3C
3.	66kV Current Transformer; 2700mm high	08409 sheet 3C
4.	66kV Surge Diverters; 2400mm high	09107
5.	66kV Post Insulator; 4500mm high	9114
6.	66kV Air Break Switch/Isolator; 4500mm high	9114

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TABLE 3: STRUCTURES FOR 33kV EQUIPMENT

Item No.	Item Description	Drawing SK No
1.	33kV Voltage Transformer Structure, 3.5m high	07840 sheet 8
2.	33kV Air break Switch Structure, 4.38m high	09774 sheet 19
3.	33kV Current Transformer Structure, 2.4m high	09774 sheet 18/2
4.	33kV Voltage Transformer Structure, 2.4m high	09774 sheet 18/2
5.	33kV Bus Bars; 7000mm high	08675 sheet 8
6.	33kV Gantries; 4870mm high	08786/3
7.	33kV Voltage Transformer/Isolator 4870mm high	08786/3
8.	33kV Current Transformer	09210
9.	33kV Isolators; 4870mm high	08796/1
10.	33kV Neutral Current Transformer	08257 sheet 5
11.	33kV Bus Bars galvanized Steel Structure; 25 feet High	06779 sheet 2
12.	33kV Isolator Structure 6300mm High.	09774 sheet 20
13.	33kV Post Insulator Steel Structure 6000mm High	09769 sheet 3.
14.	33kV Surge Diverters galvanized Steel Structure 6000mm high	09769 sheet 3
15.	VWVE/Switch Galvanized Steel Structure 6300mm high	09774 sheet 20

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
TABLE 4: STRUCTURES FOR 11KV EQUIPMENT

Item No.	Item Description	Drawing SK No
1.	11kV Neutral Link; 4500mm high	08257/5
2.	11kV Heat Shrink Structure/Double Seating ends	07750/9A
3.	11kV Local Transformer; 2100mm high	08675/7
4.	11kV Bus Bar galvanized Steel Structure 23 feet high	06779 sheet 2
5.	11kV Post Insulator/surge diverter galvanized steel structure 5000mm high	09769 sheet 3
6.	11kV Switch/KFE galvanized Steel Structure 6000mm high	09769 sheet 3

TABLE 5: STRUCTURES FOR OTHER SUBSTATION EQUIPMENT


Item No.	Item Description	Drawing SK No
1.	Lightning Mast; 16760mm high	09774 sheet 9
2.	Working/Security Lights	09774 sheet 9
3.	Steel Galvanized Security Lighting Pole	09774 sheet 9A

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steel structures, which upon examination, test or use fail to meet any of the requirements in the specification.

6 MARKING, LABELLING AND PACKING

- 6.1 Each assembly and package of items associated with this specification shall be suitably marked with KPLC drawing number and item description.
- 6.2 Where an item includes a number of components to form a complete assembly, all component parts shall be included in one composite package which shall be firmly strapped or bound together. The composite packages shall contain an additional 5% of the bolts, nuts and washers needed for erection of the packed structure. Each package shall contain an erection/ installation drawing and instructions in a sealed weather proof envelope (all in English Language).
- 6.3 All galvanized parts shall be protected from injury to the zinc coating due to abrasion during periods of transit, storage and erection.

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