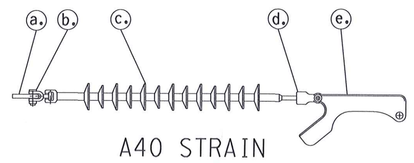
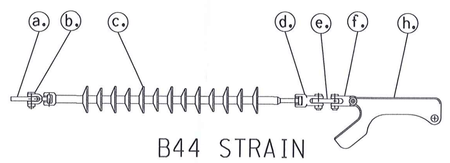
SCHEDULE 'A' 88kV BYPASS - GANTRY SECTION (FDR BAY 11 excl)				
CONDUCTOR AND HARDWARE SCHEDULE		Mk	SIZE	QTY
CONDUCTOR	STRINGER (FDR 11 G'TRY PORTAL TO G'TRY 5)	1	2x800mm²	806m
	STRINGER (G'TRY 5 TO Tx POLE)	2	1x400mm²	65m
	JUMPER/DROPPER (GANTRIES & TUBE SECTION)	1	2x800mm²	420m
	JUMPER (G'TRY 5 & Tx POLE)	2	1x400mm²	36m
	DAMPING CONDUCTOR		1x400mm²	130m
	EARTHWIRE - HARE (100/18)	16	14,16mm²	156m
CLAMPS AND HARDWARE TO DRG 0.54/412	DESCRIPTION		ITEM	QTY
	INSULATOR STRAIN ASS'Y (POLYMERIC)	3	B44	42
	INSULATOR SUSP'N ASS'Y (POLYMERIC)	4	E42	3
	INSULATOR STRAIN ASS'Y (POLYMERIC)	5	A40	6
	SPACER CLAMP (NON CURRENT)	6	S-2	216
	STRAIN CLAMP (PISTOL TYPE)	7	STA-30/40	84
	STRAIN CLAMP (PISTOL TYPE)	8	STA-20/30	6
	TEE CLAMP	9	TC-10	84
	TEE CLAMP	10	TC-3	6
	PALM CLAMP (T/OFF) 132kV ISOL 45°	11	YC-17	3
	PALM CLAMP (STP TYPE) 132kV ISOL 0°	12	STP-26/P	3
	CROSS CLAMP (K-TYPE) (EXISTING)	13	K-10	3
	P/ INSULATOR (C4-550 - 127/127)	14		15
	CLAMP (P-THRU TYPE) (Ø127 BASE)	15	P-38/127-150	15

SCHED 'E' 88kV BYPASS - GANTRY SECTION	G/TRY 5 TO Tx POLE	A40		
STRAIN INSULATOR ASSEMBLY SCHEDULE	6off ASSY'S			
DESCRIPTION	Mk	ITEM	QTY/ASS'Y	TOTAL
U-BOLT (M16) (0.54/644 Sh 1)	a.		1	6
CLEVIS BALL (BOLT TYPE)	b.	CB-120	1	6
POLYMERIC INSULATOR ASS'Y (88kV/7 DISC/999 LG/31mm/kV)	c.		1	6
SOCKET TONGUE	d.	ST-120/16	1	6
STRAIN CLAMP (PISTOL TYPE)	e.	STA-20/30	1	6



A40 STRAIN

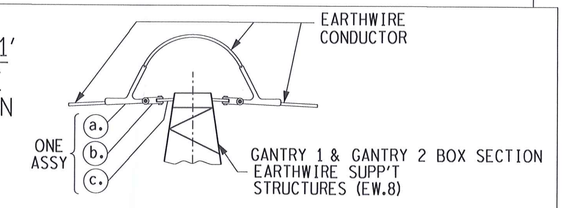
SCHED 'F' 88kV BYPASS - GANTRY SECTION	GANTRY's 1 - 5 42off ASSY's	B44		
STRAIN INSULATOR ASSEMBLY SCHEDULE				
DESCRIPTION	Mk	ITEM	QTY/ASS'Y	TOTAL
U-BOLT (M16) (0.54/644 Sh 1)	a.		1	42
CLEVIS BALL (BOLT TYPE)	b.	CB-120	1	42
POLYMERIC INSULATOR ASS'Y (88kV/7 DISC/999 LG/31mm/kV)	c.		1	42
SOCKET CLEVIS (BOLT TYPE)	d.	SC-120	1	42
YOKE PLATE	e.	YP-1	1	42
TWISTED CLEVIS TONGUE (BOLT TYPE)	f.	TCT120/38	2	84
STRAIN CLAMP (PISTOL TYPE)	h.	STA-30/40	2	84



B44 STRAIN

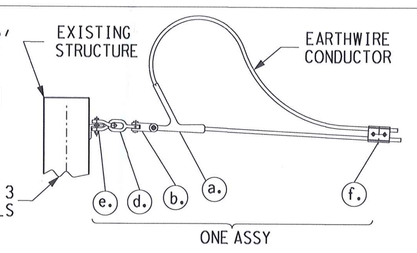
SCHEDULE 'C' 88kV BYPASS - GANTRY SECTION	GANTRY'S 1&2	G-1		
E/WIRE CONN ASS'Y SCHEDULE (THROUGH CONDUCTOR)	6off ASSY's			
DESCRIPTION	Mk	ITEM	QTY/ASS'Y	TOTAL
STRAIN CLAMP-PISTOL (3-BOLT STEEL)	a.	D-402	1	6
TWISTED CLEVIS TONGUE (BOLT TYPE)	b.	TCT120/38	1	6
U-BOLT (M16) (0.54/644 Sh 1)	c.		1	6

DETAIL 'G-1'
EARTHWIRE CONNECTION DETAIL



SCHED 'D' 88kV B'PASS-G'TRY SEC'N	FDR 11 & G'TRY 3	G-2		
E/WIRE CONN ASS'Y SCHEDULE (COND TERMINATION)	4off ASSY's			
DESCRIPTION	Mk	ITEM	QTY/ASS'Y	TOTAL
STRAIN CLAMP-PISTOL (3-BOLT STEEL)	a.	D-402	1	4
TWISTED CLEVIS TONGUE (BOLT TYPE)	b.	TCT120/38	1	4
TWISTED TONGUE OVAL EYE	d.	TTOE-120	1	4
TWISTED SHACKLE (BOLT TYPE)	e.	SHB/T-120	1	4
PG CLAMP (EXTRUDED)	f.	2PG/E-Bi	1	4

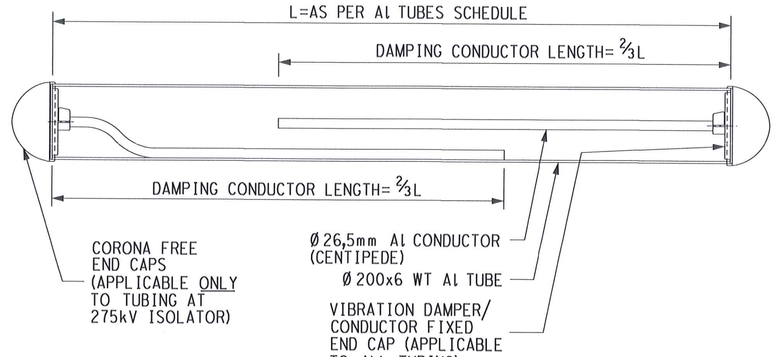
DETAIL 'G-2'
EARTHWIRE CONNECTION DETAIL



SCHEDULE 'B' 88kV BYPASS - TUBULAR BUSBAR SECTION			
CLAMPING SCHEDULE			
DESCRIPTION	Mk	ITEM	QTY
CORONA-FREE END CAPS	1	TBEC/CR-200	12
COUPLER SUPPORT CLAMP (FIXED)	2	TBFC-200/225	10
IN-LINE BUS CONDUCTOR TAP-OFF CLAMP 45°	3	TBTC-200/C2-38	9
TWISTED BUS CONDUCTOR TAP-OFF CLAMP 45°	4	TBTC-200/C2-38	3
PALM TAP-OFF CLAMP 0° (275kV ISOLATOR)	5	YC-16	6
POST INSULATOR (275kV/C10-1175-225/275)	6		12
COUPLER SUPPORT CLAMP (SLIDING)	7	TBSC-200/225	2
BUS CONDUCTOR TAP-OFF CLAMP 0°	8	TBCT-200/C2-38	6
POST INSULATOR (132kV/C10-550-225/225)	9		9
VIBRATION DAMPER/CONDUCTOR FIXING END CAP	10	TBEC/C-200	18
ALUMINIUM TUBING (SEE SCHEDULE 'L')	11		
SPACER CLAMP (NON CURRENT)	12	S-2	56
COUPLER SUPPORT CLAMP (FIXED)	13	TBFC-200/127	3
COUPLER SUPPORT CLAMP (SLIDING)	14	TBSC-200/127	6

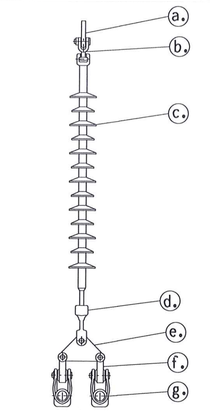
SCHEDULE 'L' 88kV BYPASS - BUSBAR TUBE SECTION				
DAMPING CONDUCTOR & TUBING SCHEDULE				
ITEM	TUBE LENGTH/mm	QTY	DAMPING CONDUCTOR (mm/ITEM)	QTY/m
1	5000	3off	6667	20,001
2	4500	1off	6000	6,000
3	8000	1off	10667	10,667
4	11600	1off	15467	15,467
5	18100	1off	24133	24,133
6	19600	1off	26133	26,133
7	20600	1off	27467	27,467
			DAMPING CONDUCTOR TOTAL=	130m ROUNDED VALUE

NOTES:
1. Al TUBING TO BE Ø200x6WT.
2. DAMPING CONDUCTOR TO BE 1xCENTIPEDE (1x400mm²)
3. TUBE LENGTHS GIVEN AS PER DESIGN LENGTHS.
4. TUBE SUPPLIED IN 25m LENGTHS (MAX).

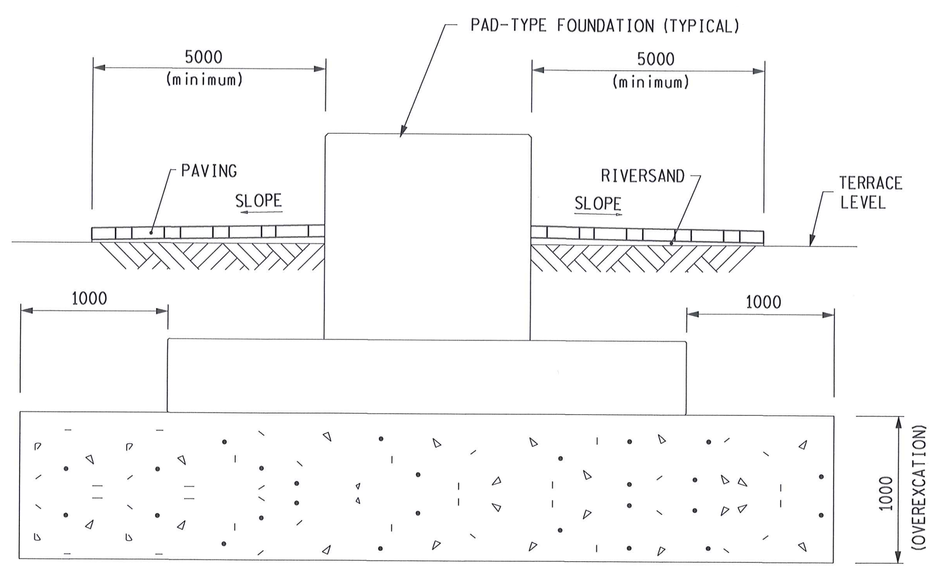


DAMPING CONDUCTOR & TUBE REQUIREMENTS
(AS PER SCHEDULE 'L')

SCHED 'C' 88kV BYPASS - GANTRY SECTION	88kV FDR BAY 11	E42		
SUSPENSION INSULATOR ASSEMBLY SCHEDULE	3off ASSY'S			
DESCRIPTION	Mk	ITEM	QTY/ASS'Y	TOTAL
U-BOLT (M16) (0.54/644 Sh 1)	a.		1	3
CLEVIS BALL (BOLT TYPE)	b.	CB-120	1	3
POLYMERIC INSULATOR ASS'Y (88kV/7 DISC/999 LG/31mm/kV)	c.		1	3
SOCKET CLEVIS (BOLT TYPE)	d.	SC-120	1	3
YOKE PLATE	e.	YP-1	1	3
TWISTED CLEVIS TONGUE (BOLT TYPE)	f.	TCT120/38	2	6
SUSPENSION CLAMP (CRADLE TYPE)	g.	SPA-30/40	2	6



E42 SUSPENSION ASSEMBLY
(SEE GENERAL NOTE 17)



FOUNDATION DETAIL NOTES

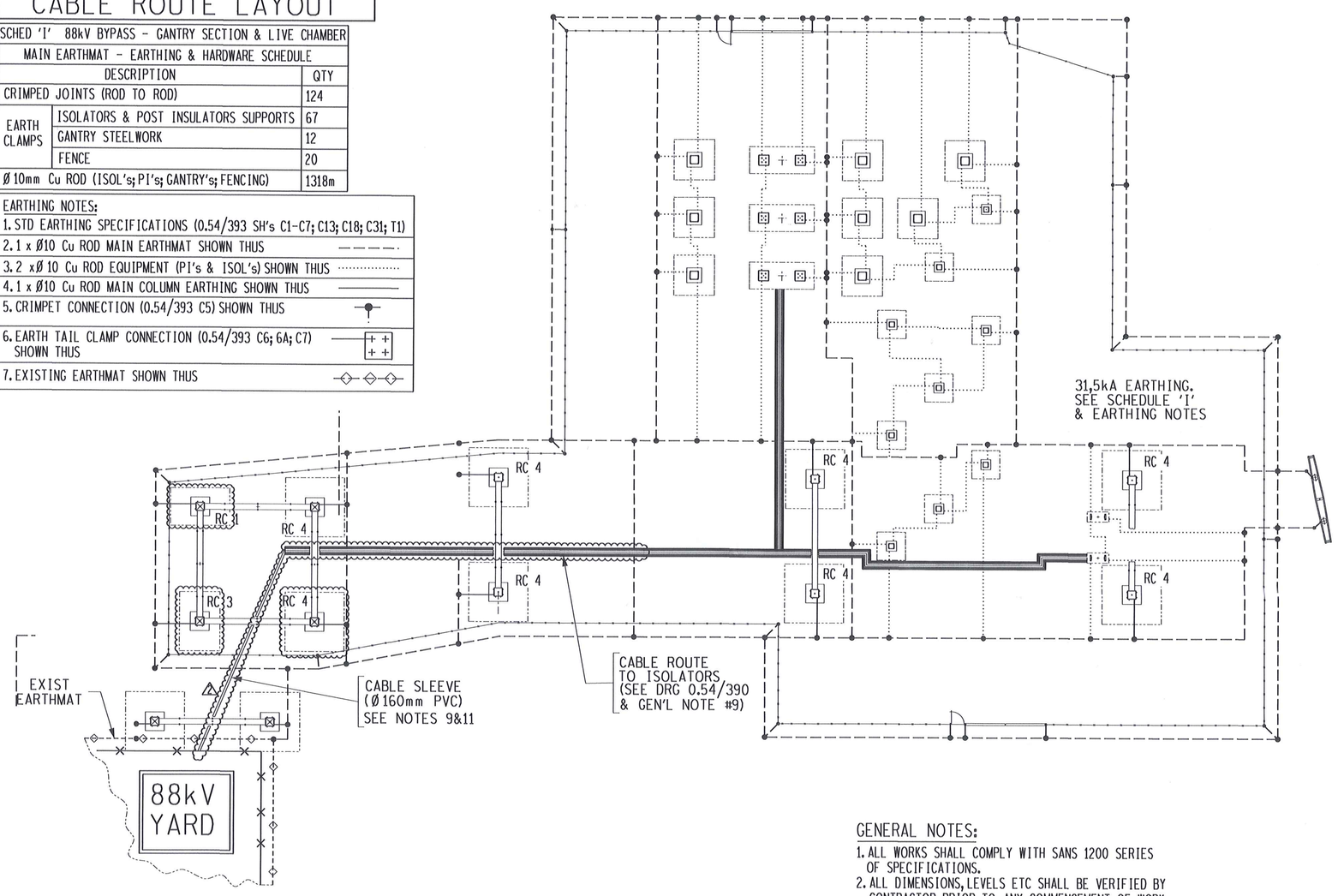
DUE TO DOLOMITIC CONDITIONS PLEASE REFER TO FOUNDATION SCHEDULE AND GENERAL NOTES(3; 12&13)

SCHEDULE 'M'	DETAIL 'A' - 275kV DROPPER CONNECTION		
SPECIAL CLAMP SCHEDULE			
SPACER CLAMPING ARRG'T - SECTION X-X			QTY
CLAMP	UT-Tee Type Clamp	UT-3	12off
CONDUCTOR	CENTIPEDE	400mm²	3,5m
DROPPER CLAMPING ARRG'T - SECTION Y-Y			QTY
CLAMP	STP-Type Palm Clamp 0° (STP-38)		6off
	COMPRESSION 'T' CLAMP (made as a special) BASED ON ABB CATALOGUE No 052903-00		6off
	SPACER CLAMP (NON CURRENT)(S-2)		3off

88kV BYPASS EARTHMAT & CABLE ROUTE LAYOUT

SCHED 'I' 88kV BYPASS - GANTRY SECTION & LIVE CHAMBER		
MAIN EARTHMAT - EARTHING & HARDWARE SCHEDULE		
DESCRIPTION		QTY
CRIMPED JOINTS (ROD TO ROD)		124
EARTH CLAMPS	ISOLATORS & POST INSULATORS SUPPORTS	67
	GANTRY STEELWORK	12
	FENCE	20
Ø 10mm Cu ROD (ISOL'S; PI's; GANTRY's; FENCING)		1318m

EARTHING NOTES:
1. STD EARTHING SPECIFICATIONS (0.54/393 SH's C1-C7; C13; C18; C31; T1)
2. 1 x Ø10 Cu ROD MAIN EARTHMAT SHOWN THUS
3. 2 x Ø 10 Cu ROD EQUIPMENT (PI's & ISOL's) SHOWN THUS
4. 1 x Ø10 Cu ROD MAIN COLUMN EARTHING SHOWN THUS
5. CRIMPET CONNECTION (0.54/393 C5) SHOWN THUS
6. EARTH TAIL CLAMP CONNECTION (0.54/393 C6; 6A; C7) SHOWN THUS
7. EXISTING EARTHMAT SHOWN THUS



GENERAL NOTES:
1. ALL WORKS SHALL COMPLY WITH SANS 1200 SERIES OF SPECIFICATIONS.
2. ALL DIMENSIONS, LEVELS ETC SHALL BE VERIFIED BY CONTRACTOR PRIOR TO ANY COMMENCEMENT OF WORK.
3. POSITIONS OF GANTRY COL'S/SUPP'T STWK MAY BE VARIED TO SUITE SITE CONDITIONS. THESE ARE TO BE VERIFIED WITH THE PROJECT MANAGER & DESIGNER PRIOR TO ANY CHANGE.
4. ALL STRUCTURAL USE OF STEEL TO CONFORM TO SANS 10162. GRADE OF STEEL TO BE SANS 1431 GRADE 300WA.
5. STWK & FASTENERS TO BE HD GALV'D TO SANS 121.
6. ALL STWK TO BE FABRICATED, ERECTED AND LEVELLED TO TOLERANCE OF ±1,5mm.
7. ALL BOLTS SECURING LABELS TO VARIOUS STRUCTURES TO BE SUPPLIED BY STWK CONTRACTOR.
8. ALL BOLTS AND NUTS TO BE GRADE 4,8.
9. PVC PIPE (Ø160mm X 16m LG) TO BE USED AS CABLE SLEEVE FOR CROSSING SAND ROAD.
10. CABLES(2xBVX7ECV) TO BE USED FOR MOTORIZED ISOLATORS.
11. PVC PIPE TO BE LAID @ 600mm DEPTH. TO COMPACT WELL IN MAX LAYERS OF 150mm.
12. DUE TO DOLOMITIC CONDITIONS 88kV LIVE CHAMBER TO NOT BE YARDSTONED. TO BE PAVED ACCORDING TO NOTE #3 ON FDN SCHEDULES.
13. DOLOMITIC CONDITIONS SHALL BE FACTORED INTO WHEN THE EARTHMAT IS PLANNED AND LAID.
14. LIVE CHAMBER SAFTEY FENCE TO BE CONSTRUCTED AS PER STD DRG 0.54/4963 Sht's 1-4. (Sht's 1&2 CURRENTLY UNDER REVISION. CONTACT DESIGNER FIRST IN THIS REGARD).
15. EXISTING SAND ROAD TO BE RE-DIVERTED TO ACCOMODATE GANTRY POSITIONS.
16. ALL QUANTITIES SPECIFIED IN SCHEDULES TO HAVE CONSOLIDATED AMOUNTS AS PER PRO FORMAS GENERATED.
17. E42 SUSPENSION ASSY's USED IN FDR BAY 11 ONLY. SCHEDULE 'C' & DETAIL SHOWN HERE FOR REF PURPOSES ONLY. FDR BAY 11 (0.18/17320 Sh45)

SCHEDULE 'K' 88kV BYPASS - BUSBAR TUBE & ISOLATORS SECTION									
SUPPORT STEELWORK AND FOUNDATION SCHEDULE									
DESCRIPTION	QTY	SUPP'T (STWK DRG)	QTY	SUPP'T CAP (STWK DRG)	QTY	FDN (DRG)	QTY	REMARKS
6m SUPP'T (DTL's 'B'-'E')	8	0.54/5573	8	0.54/306	4	0.54/4726	8	TUBE/PI SUPP'TS 275kV ISOLATOR
				0.54/8424	4			
3m SUPP'T (DTL 'F')	9	0.54/8423	9	0.54/8423	9	0.54/4319	9	TUBE/PI SUPP'TS 88kV DROPPERS
ISOLATOR SUPP'T	1	0.54/7664 #	1	N/A	-	0.54/7514 △	1 SET	275kV ISOLATOR
ISOLATOR SUPP'T	1	0.54/7683 #	1	N/A	-	0.54/7513 △	1 SET	132kV ISOLATOR

SPECIAL NOTES:
ISOLATOR SUPP'T STRUCTURES TO BE SUPPLIED & ERECTED BY TNC SUPPLIER.
△ ISOLATOR FOUNDATIONS TO BE ESKOM'S SCOPE OF RESPONSIBILITY.

NOTES:
1. OVER-EXCAVATE TO 1,0m BELOW FOUNDING LEVEL AND SPOIL.
2. IMPORT G6 MATERIAL AND COMPACT IN LAYERS OF 150mm TO 95% Mod. AASHTO AT OMC ±2%
3. PAVE THE SURFACE ABOVE THE FDN's TO PREVENT WATER PONDING AND PENETRATION INTO THE FDN SOILS.
   - SHAPE NATURAL GROUND TO FALL AWAY FROM THE PLINTH.
   - COMPACT IN-SITU WELL TO 90% Mod. AASHTO.
   - PLACE 20mm RIVERSAND.
   - PLACE 80mm CLASS 25 TYPE SA CONCRETE INTERLOCKING PAVING BLOCKS IN HERRINGBONE PATTERN.
   - SWEEP SAND/CEMENT MIXTURE IN ALL JOINTS TO SEAL PAVING.
4. STRICT COMPLIANCE SHALL BE MADE THE STDS AS SET OUT IN THE RESPECTIVE 0.54 DRG's CITED.

SCHEDULE 'J' 88kV BYPASS - GANTRY SECTION							
GANTRY STEELWORK AND FOUNDATION SCHEDULE							
GANTRY No	COL & BEAM ARRG'T	COL & BEAM DTL'S	BEAM TYPE/HEIGHT/LOADING	COLUMN	FDN DRG	FDN TYPE
1	0.54/330 Rev3	0.54/331 Rev3	STRAIN(88/28/2) /9,284m/9kN	2xTYPE 88/H	0.54/5612 Rev1	2x RC4
2 BOX SEC'N	0.54/330 Rev3	0.54/331 Rev3	2x STRAIN(88/28/2) /9,284m/9kN 2x STRAIN(88/28/2) /6,706m/9kN	4xTYPE 88/H	0.54/5612 Rev1	1x RC1 1x RC3 2x RC4
3	0.54/330 Rev3	0.54/331 Rev3	STRAIN(88/28/2) @ 6,706m/9kN	2xTYPE 88/H	0.54/5612 Rev1	2x RC4
4	0.54/330 Rev3	0.54/331 Rev3	STRAIN(88/28/2) @ 6,706m/9kN	2xTYPE 88/H	0.54/5612 Rev1	2x RC4
5	0.54/330 Rev3	0.54/331 Rev3	STRAIN(88/28/2) @ 6,706m/9kN	2xTYPE 88/H	0.54/5612 Rev1	2x RC4

NOTES:
1. OVER-EXCAVATE TO 1,0m BELOW FOUNDING LEVEL AND SPOIL.
2. IMPORT G6 MATERIAL AND COMPACT IN LAYERS OF 150mm TO 95% Mod. AASHTO AT OMC ±2%
3. PAVE THE SURFACE ABOVE THE FDN's TO PREVENT WATER PONDING AND PENETRATION INTO THE FDN SOILS.
   - SHAPE NATURAL GROUND TO FALL AWAY FROM THE PLINTH.
   - COMPACT IN-SITU WELL TO 90% Mod. AASHTO.
   - PLACE 20mm RIVERSAND.
   - PLACE 80mm CLASS 25 TYPE SA CONCRETE INTERLOCKING PAVING BLOCKS IN HERRINGBONE PATTERN.
   - SWEEP SAND/CEMENT MIXTURE IN ALL JOINTS TO SEAL PAVING.
4. STRICT COMPLIANCE SHALL BE MADE TO THE STDS AS SET OUT IN THE RESPECTIVE 0.54 DRG's CITED.
5. COLUMNS FOR GANTRIES 1 & 2 ONLY, TO HAVE (EW.8) EARTHWIRE SUPPORTS.

FINAL DESIGN FOR CONSTRUCTION
ORIGINAL DWG #: 0.18/17324 SHT 4 REV 1
CONCEPT DWG #: N/A
DETAIL DWG #: N/A

REV	REVISION DESCRIPTION	DRAWN	CHKD	AUTH	DATE	REFERENCE DRAWINGS
2	OUTSTANDING COLUMNS & TRENCH INDICATED WITH A CLOUD.					
1	DRG REV'D TO 'FOR CONSTRUCTION' STATUS.	JEB	CT	D DELLY	15/08/2014	17324 Sh3 LAYOUT & DETAILS
0	FIRST ISSUE					17324 Sh2 KEY PLAN

APPROVED BY: D DELLY — DATE 02/06/2014
CHECKED BY: S BUCHNER — DATE 02/06/2014
DRAWN BY: JE BUCHLER — DATE 29/05/2014
SCALE N T S

Eskom
ESKOM HOLDINGS LIMITED
REG No 2002/015527/06

ESSELEN
88kV NATIONAL EPP BYPASS
DETAILS; SCHEDULES AND NOTES

©

SHEET NUMBER	REVISION
0.18/17324	4 / 2

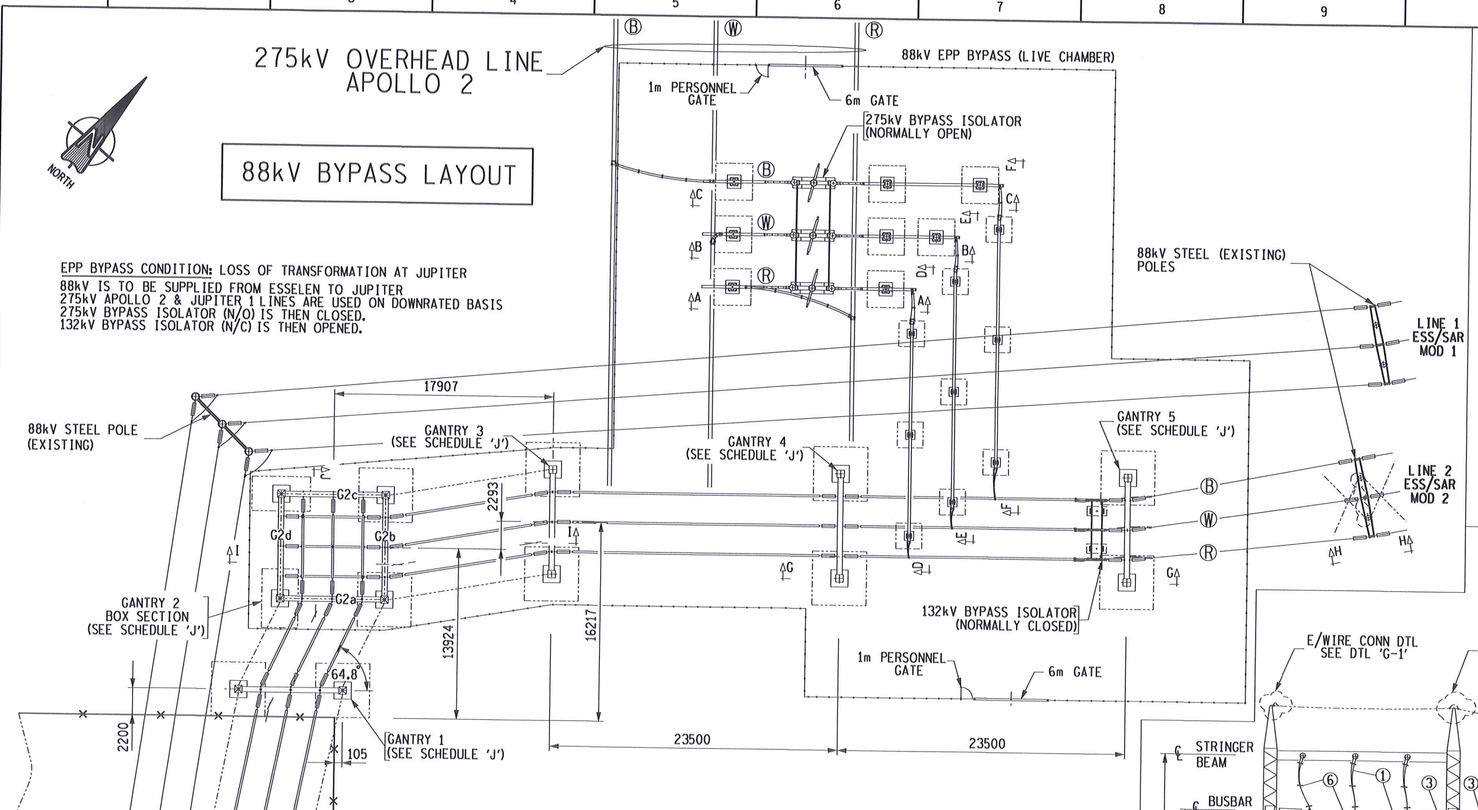
SIZE GROOTTE A1L

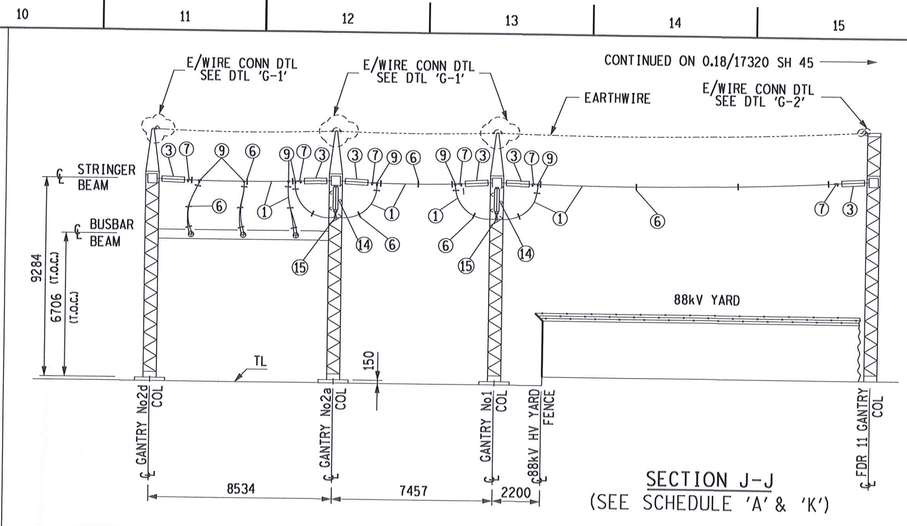
275kV OVERHEAD LINE APOLLO 2

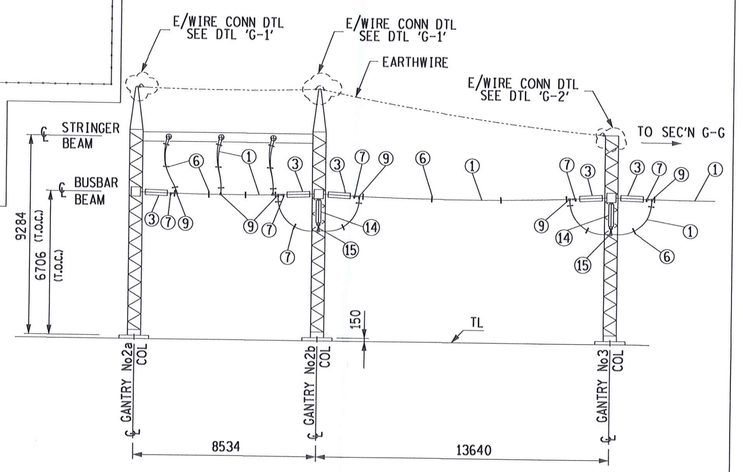
88kV BYPASS LAYOUT

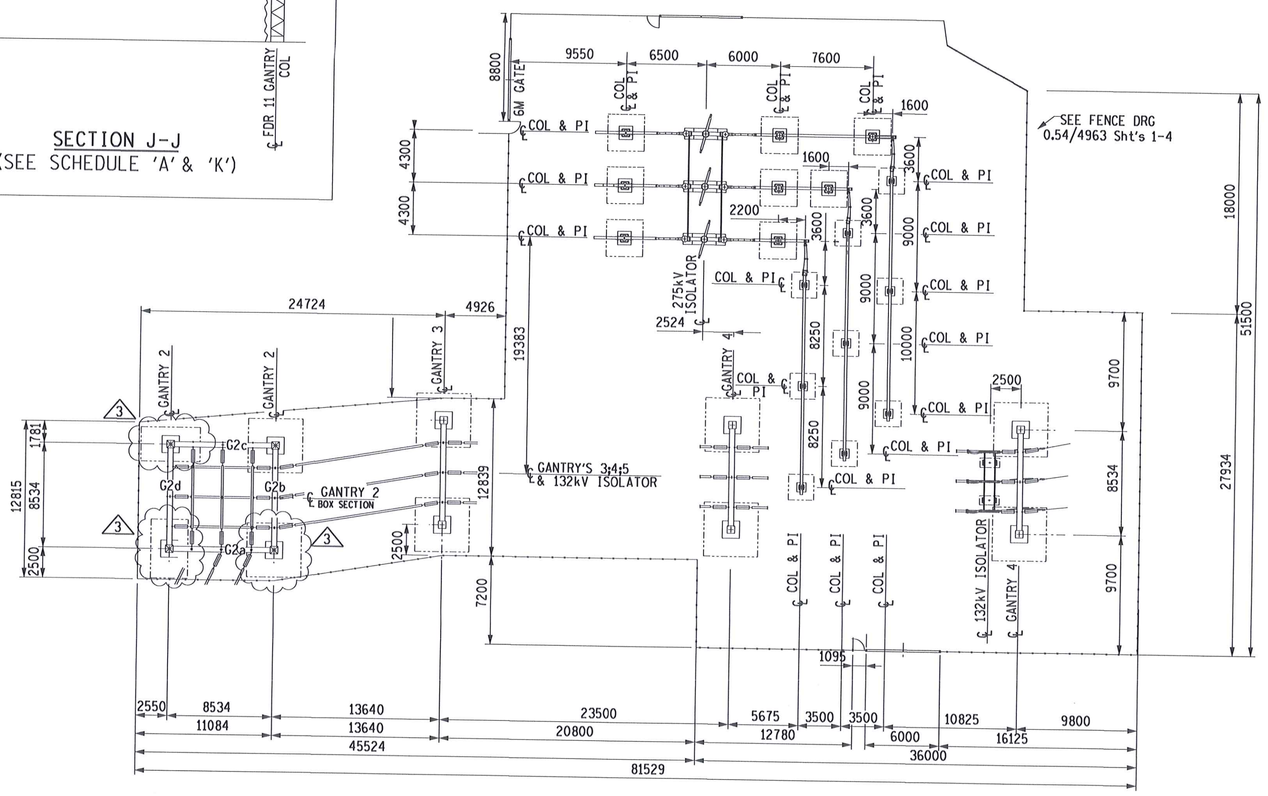
FINAL DESIGN FOR CONSTRUCTION
ORIGINAL DWG #: 0.18/17324 SHT 3 Rev 3
CONCEPT DWG #: N/A
DETAIL DWG #: N/A

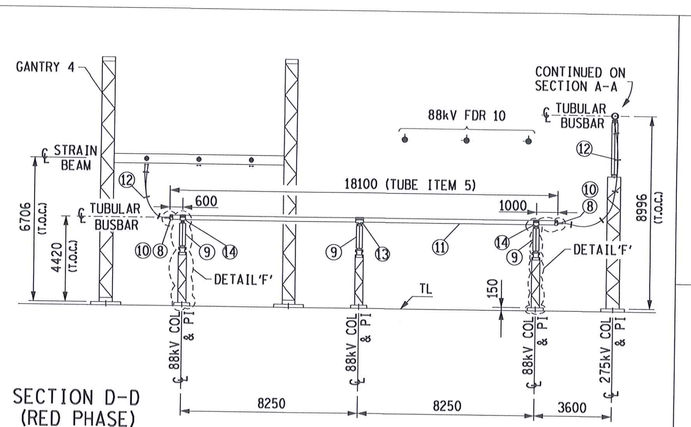
EPP BYPASS CONDITION: LOSS OF TRANSFORMATION AT JUPITER
88kV IS TO BE SUPPLIED FROM ESSELEN TO JUPITER
275kV APOLLO 2 & JUPITER 1 LINES ARE USED ON DOWNRATED BASIS
275kV BYPASS ISOLATOR (N/O) IS THEN CLOSED.
132kV BYPASS ISOLATOR (N/C) IS THEN OPENED.

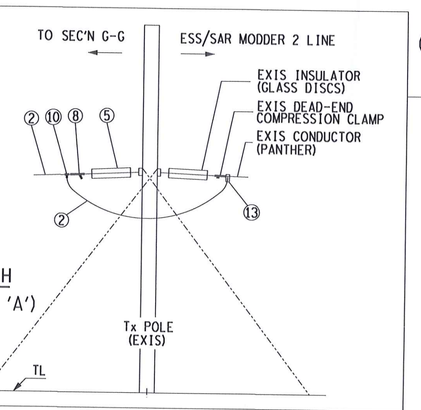


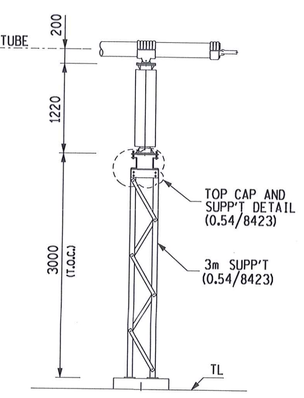


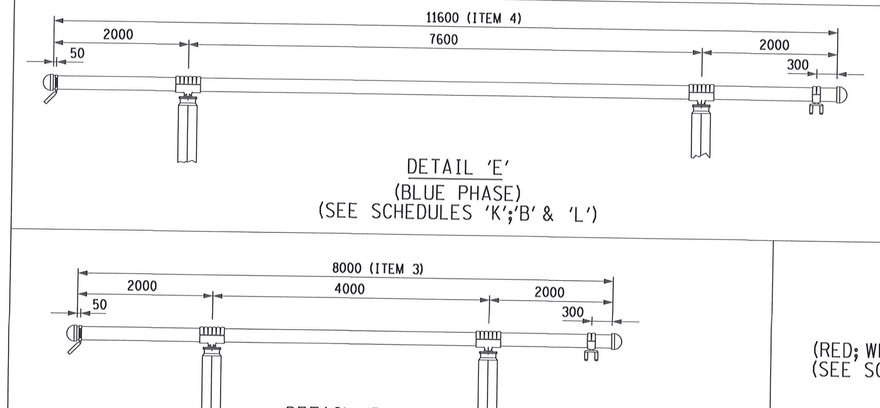


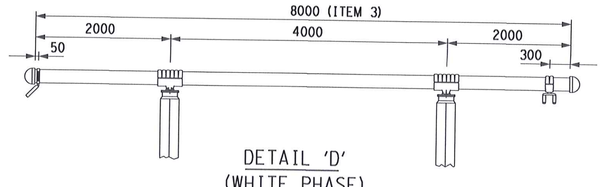


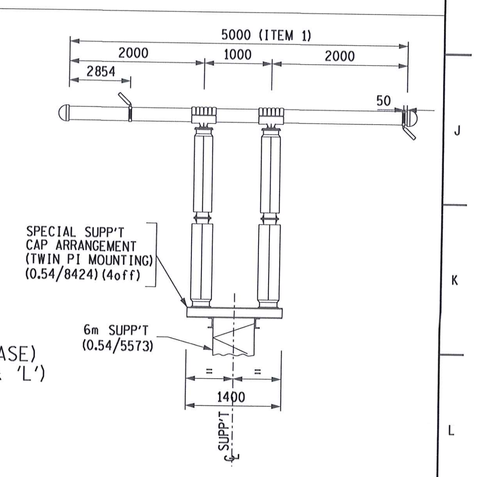


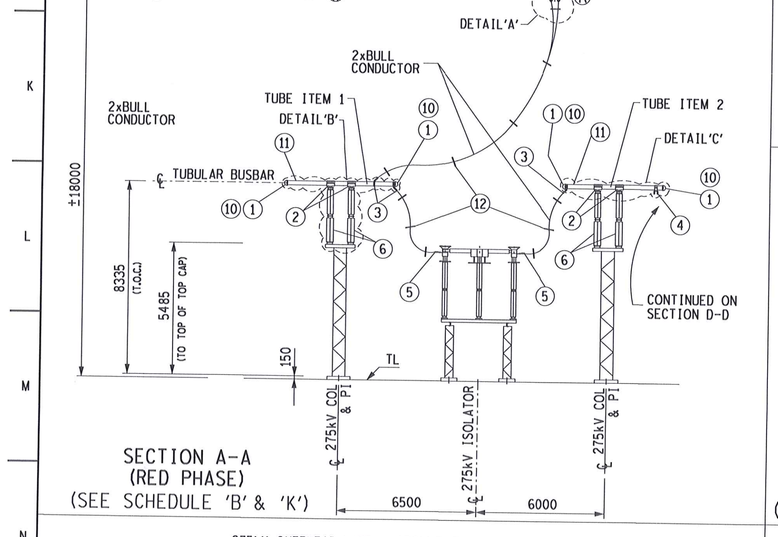


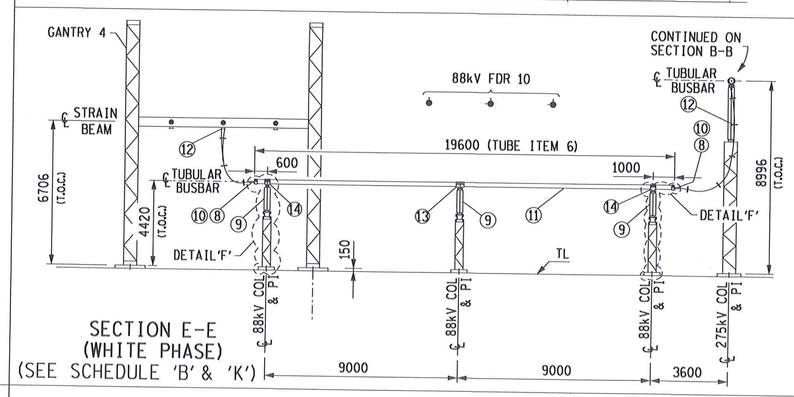


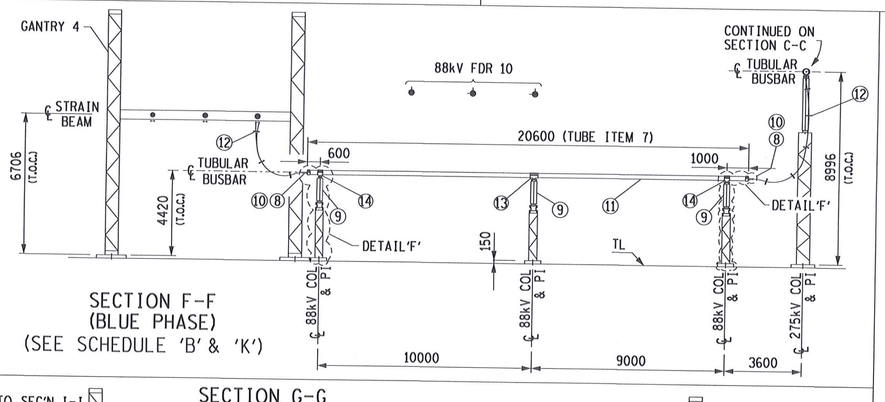


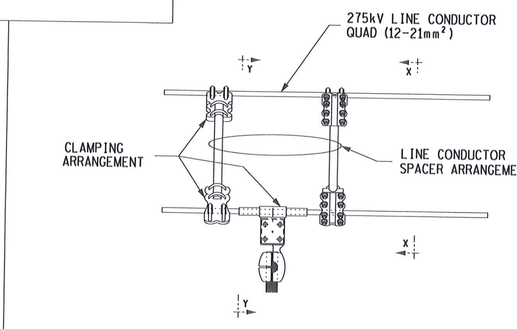


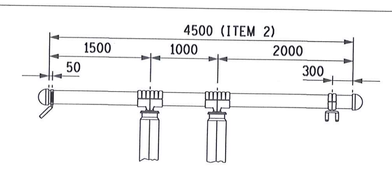


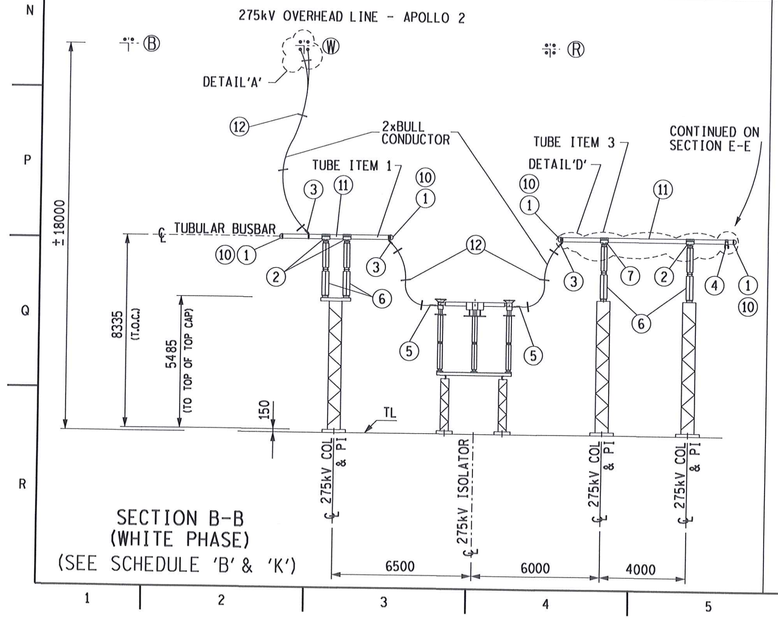


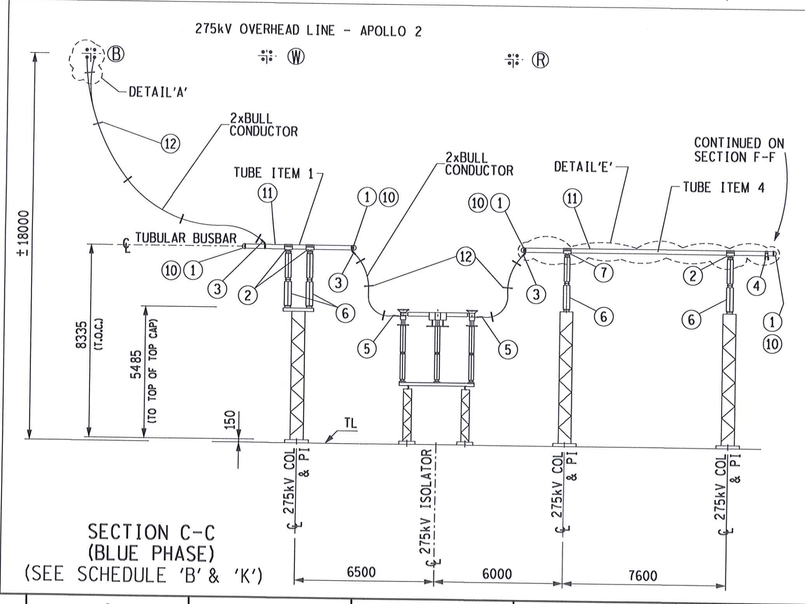


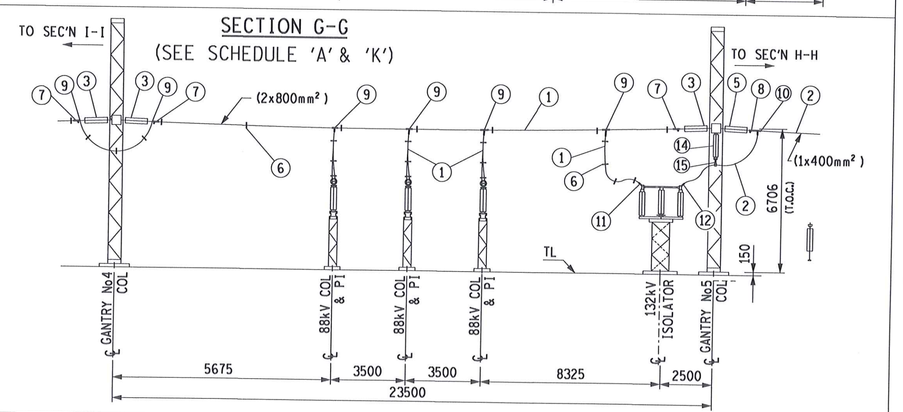


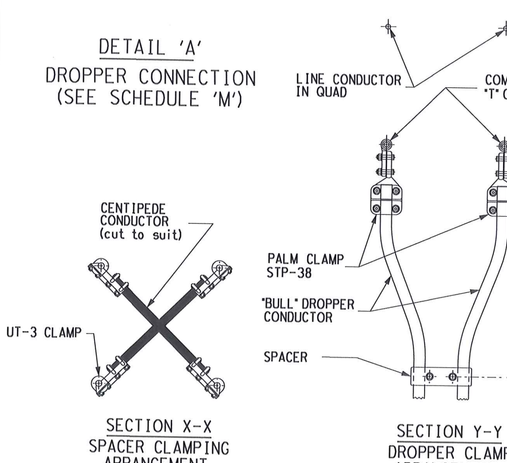












REV	REVISION DESCRIPTION	DRAWN	CHKD	AUTH	DATE
3	THE FENCE & GATE THAT WAS INDICATED TO BE TEMPORARILY REMOVED IN REVISION 2 WILL NO LONGER BE REMOVED. THE OUTSTANDING COLUMN FOUNDATIONS TO BE CAST ARE INDICATED WITH A CLOUD.				16/12/2015
2	THE CLOSURE FENCE & GATE TO BE TEMPORARILY REMOVED & RE-INSTALLED WHEN THE TEMPORARY BY-PASS IS REMOVED. THE BUSBAR SUPPORTS IN SECTIONS 'A-A' & 'B-B' HAVE BEEN REVISED TO ENSURE STATIONARY ELECTRICAL CLEARANCES TO THE 275kV APOLLO 1 & 2 LINES.	PDM	FM	DD	02/10/2018
1	DRG REVD TO 'FOR CONSTRUCTION' STATUS.	JEB	CT	D DELLY	15/08/2014
0	FIRST ISSUE				

17324 SH1	SCHEDULES AND NOTES
17324 SH2	88kV YARD KEY PLAN
0.18/	REFERENCE DRAWINGS

APPROVED BY: D DELLY — DATE: 02/06/2014
CHECKED BY: S BUCHNER — DATE: 02/06/2014
DRAWN BY: JE BUCHNER — DATE: 29/05/2014
SCALE: NTS

Eskom — Eskom Holdings SOC Ltd Reg No.2002/015527/30

ESSELEN
88kV NATIONAL EPP BYPASS
LAYOUT & DETAILS

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SHEET NUMBER: 0.18/17324 — 3
REVISION: 3

SIZE: A0L — GROOTTE