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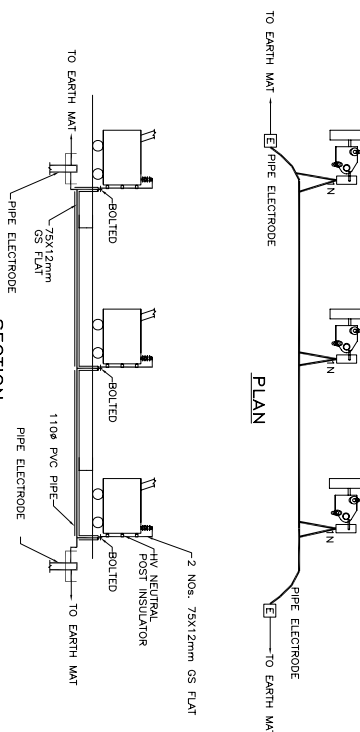
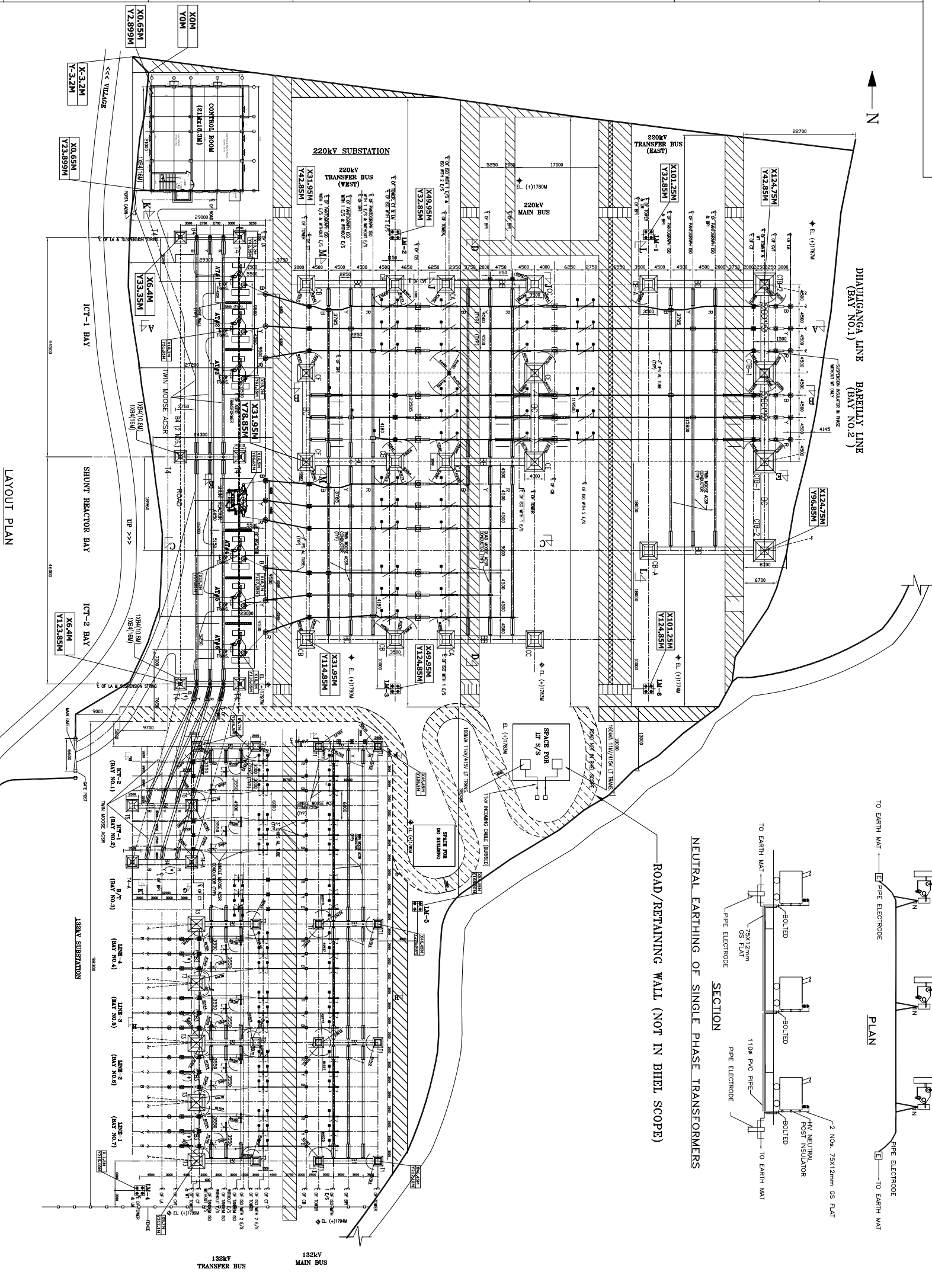
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COMPUTER DRG. PATH NAME :

REF. DRG. No.











SIGN. & DATE

INVENTORY No.











NEUTRAL EARTHING OF SINGLE PHASE TRANSFORMERS

-ROAD/RETAINING WALL (NOT IN BHEL SCOPE)





BILL OF QUANTITY -- 220KV			
S.R.	EQUIPMENT	SYMBOL	QTY. REMARKS
1	220KV TRANSFORMER WITH 220KV/11KV RATIO AND 1000 MVA (TYPE SUPPLIED BY POCL)		6 1 PHASE UNIT
2	220KV/11KV SHUNT REACTOR (TYPE SUPPLIED BY POCL)		1 3 PHASE UNIT
3	27.6 KV CIRCUIT BREAKER		6 3 PHASE UNIT
4	220KV/11KV SHUNT REACTOR (TYPE SUPPLIED BY POCL)		5 3 PHASE UNIT
5	220KV/11KV SHUNT REACTOR (TYPE SUPPLIED BY POCL)		6 3 PHASE UNIT
6	220KV/11KV SHUNT REACTOR (TYPE SUPPLIED BY POCL)		5 3 PHASE UNIT
7	220KV/11KV SHUNT REACTOR (TYPE SUPPLIED BY POCL)		1 3 PHASE UNIT
8	220KV/11KV SHUNT REACTOR (TYPE SUPPLIED BY POCL)		6 3 PHASE UNIT
9	220KV/11KV SHUNT REACTOR (TYPE SUPPLIED BY POCL)		1 3 PHASE UNIT
10	220KV/11KV SHUNT REACTOR (TYPE SUPPLIED BY POCL)		1 3 PHASE UNIT

BOQ OF QUANTITY (MAIN EQUIPMENT) :-

BILL OF QUANTITY – 132kV				
SER.	EQUIPMENT	SYMBOL	QTY	REMARKS
1	SVS CIRCUIT BREAKER 15kV / 1250A, 315kV, 1SEC		7	3 PHASE UNIT
2	ISOLATOR WITH ONE EARTH SWITCH 15kV, 1250A, 315kV, 1SEC (EACH TYPE)		6	3 PHASE UNIT
3	ISOLATOR WITH TWO EARTH SWITCHES 15kV, 1250A, 315kV, 1SEC (EACH TYPE)		8	3 PHASE UNIT
4	ISOLATOR WITH ONE EARTH SWITCH, CIRCUIS 15kV, 1250A, 315kV, 1SEC (EACH TYPE)		6	3 PHASE UNIT
5	ENERGY TRANSFORMER 15kV/660V, 660V/15kV, 15kV, WITH 100% EXTENDED CURRENT		7X3	1 PHASE UNIT
6	CAPACITOR VOLTAGE TRANSFORMER 15kV / 440V		3X3	1 PHASE UNIT
7	GRAPES LIGHTNING ARRESTER 15kV		6X2	1 PHASE UNIT
8	WAVE DAMP 15kV, 1500A		4X1	1 PHASE UNIT

132kV SWITCHYARD

LEGEND :-

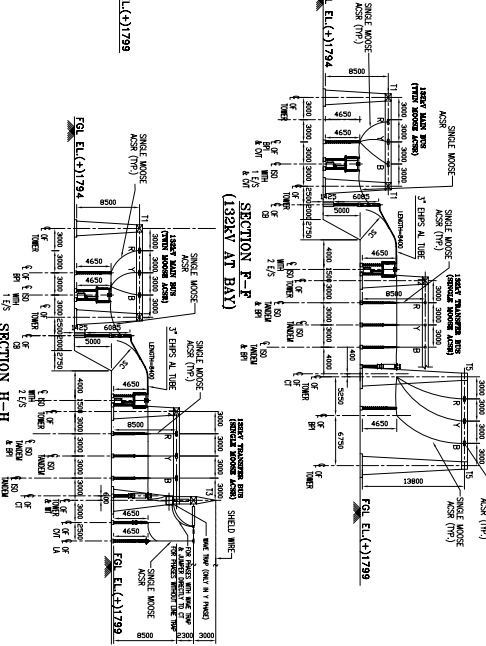
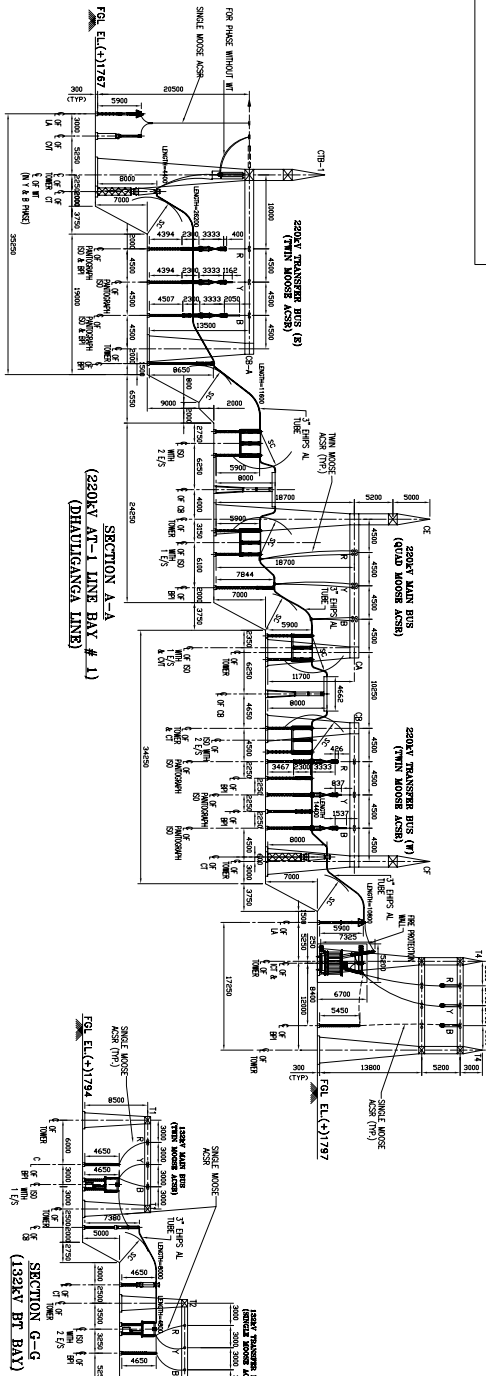
	TOWER WITH PEAK
	TOWER WITHOUT PEAK
	STRUNG INSULATOR
	BUS POST INSULATOR

REFERENCE DRAWINGS :-

- | | |
|---------------------|-------------------------------------|
| 1. TB-1-276-510-001 | SINGLE LINE DIAGRAM OF 220/132KV |
| 2. TB-0-276-316-002 | GENERAL ARRANGEMENT OF 220/132KV |
| 3. TB-1-276-316-004 | 220/132KV SUBSTATION LAYOUT SECTION |

[illegible]

400-916-622-1-BL ON DRAWING



NOTES:-

1. FOR NOTES, LEGEND & REFERENCE DRAWINGS REFER DWG. NO. TB-0-273-316-003 :

220 & 132KV SWITCHYARD LAYOUT (PLAN)

2. THE FOLLOWING MINIMUM CLEARANCES ARE ADOPTED AS PER SPECIFICATION:

220KV

132KV

a. PHASE TO PHASE CLEARANCE (PP) 2350mm 1500mm

b. PHASE TO EARTH CLEARANCE (PE) 2350mm 1500mm

c. SECTION CLEARANCE (SC) 5000mm 4150mm

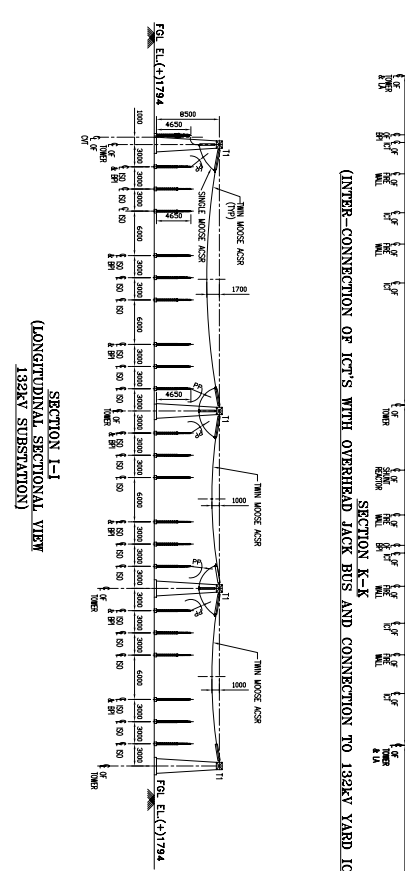
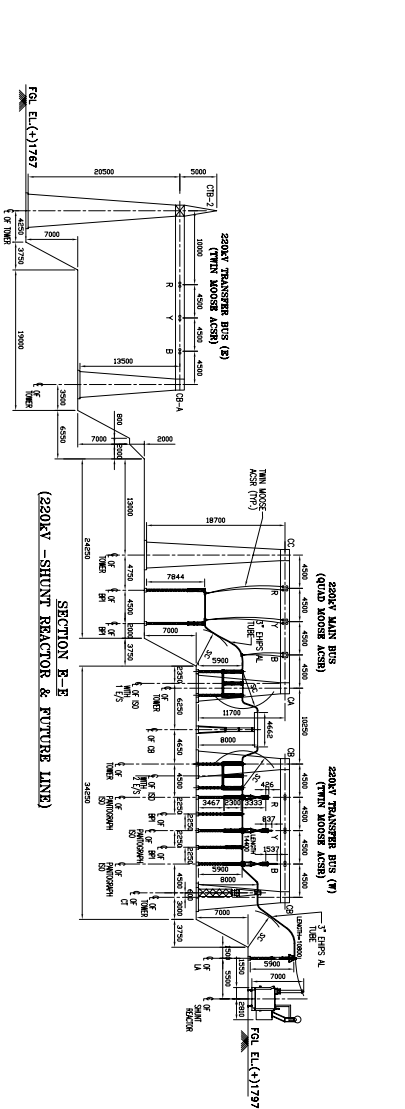
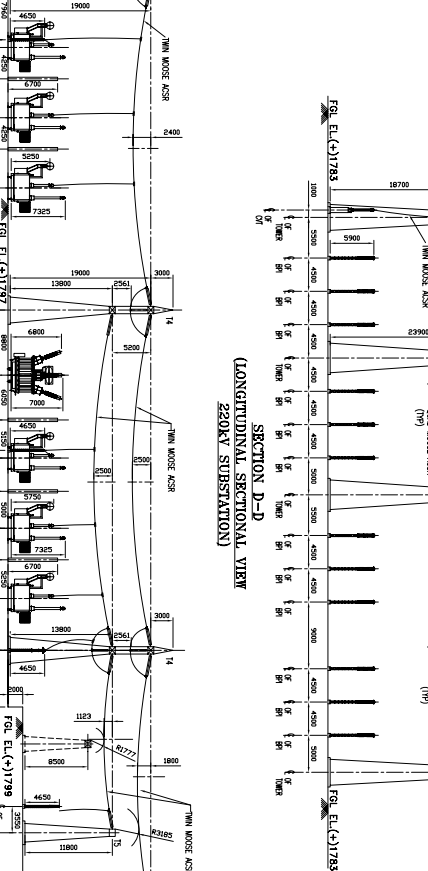
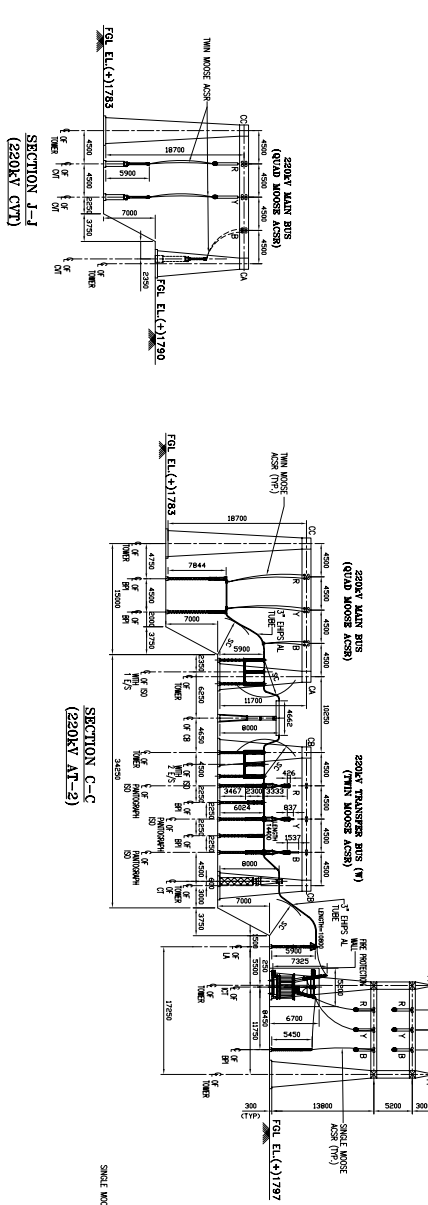
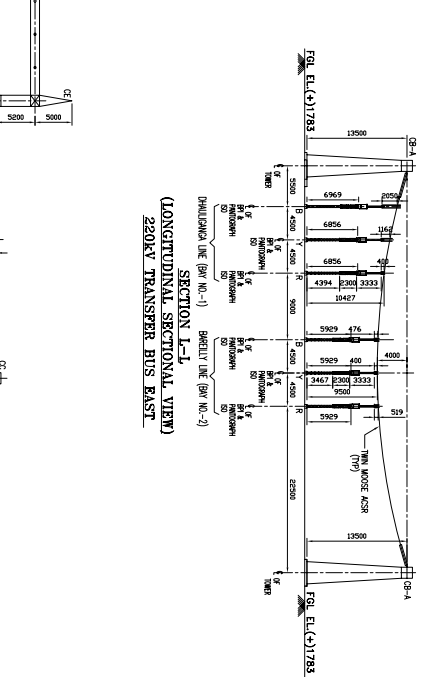
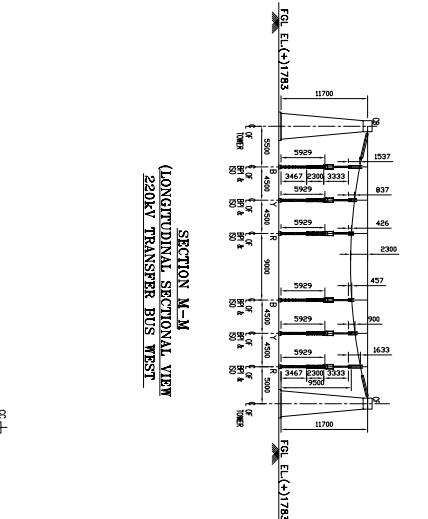
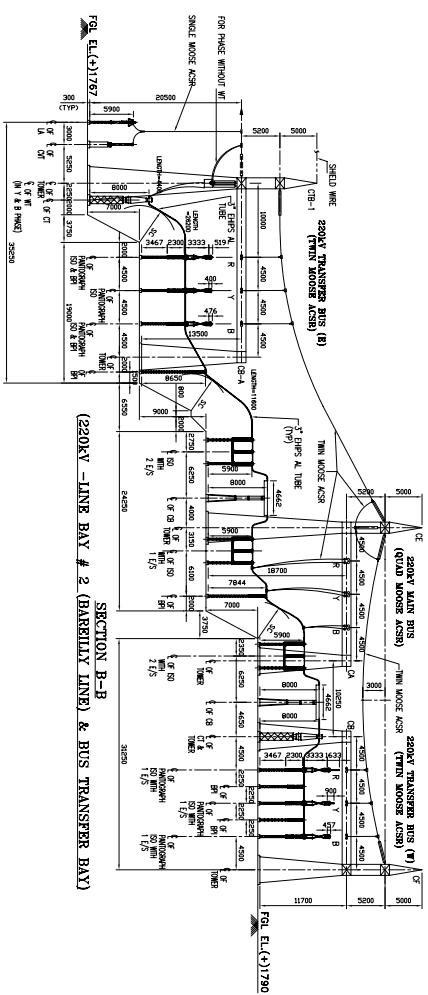
d. GROUND CLEARANCE 2750mm 2750mm

(INSULATOR SAFETY CLEARANCE)

REFERENCE DRAWING :-

1. TB-2-273-510-001 : SINGLE LINE DIAGRAM OF 220 & 132KV SYSTEM

2. TB-0-273-316-003 : 220 & 132KV SUBSTATION LAYOUT (PLAN)



INVENTORY No.		SIGN. & DATE		REF. DRG. No.		COMPUTER DRG. PATH NAME :	
A		B		C		D	
E		F		G		H	
I		J		K		L	
M		N		O		P	
Q		R		S		T	
U		V		W		X	
Y		Z		AA		AB	
AC		AD		AE		AF	
AG		AH		AI		AJ	
AK		AL		AM		AN	
AO		AP		AQ		AR	
AS		AT		AU		AV	
AW		AX		AY		AZ	
BA		BB		BC		BD	
BE		BF		BG		BH	
BI		BJ		BK		BL	
BM		BN		BO		BP	
BQ		BR		BS		BT	
BU		BV		BW		BX	
BY		BZ		CA		CB	
CC		CD		CE		CF	
CG		CH		CI		CJ	
CK		CL		CM		CN	
CO		CP		CQ		CR	
CS		CT		CU		CV	
CW		CX		CY		CZ	
DA		DB		DC		DD	
DE		DF		DG		DH	
DI		DJ		DK		DL	
DM		DN		DO		DP	
DQ		DR		DS		DT	
DU		DV		DW		DX	
DY		DZ		EA		EB	
EC		ED		EE		EF	
EG		EH		EI		EJ	
EK		EL		EM		EN	
EO		EP		EQ		ER	
ES		ET		EU		EV	
EW		EX		EY		EZ	
FA		FB		FC		FD	
FE		FF		FG		FH	
FI		FJ		FK		FL	
FM		FN		FO		FP	
FQ		FR		FS		FT	
FU		FV		FW		FX	
FY		FZ		GA		GB	
GC		GD		GE		GF	
GG		GH		GI		GJ	
GK		GL		GM		GN	
GO		GP		GQ		GR	
GS		GT		GU		GV	
GW		GX		GY		GZ	
HA		HB		HC		HD	
HE		HF		HG		HH	
HI		HJ		HK		HL	
HM		HN		HO		HP	
HQ		HR		HS		HT	
HU		HV		HW		HX	
HY		HZ		IA		IB	
IC		ID		IE		IF	
IG		IH		II		IJ	
IK		IL		IM		IN	
IO		IP		IQ		IR	
IS		IT		IU		IV	
IW		IX		IY		IZ	
JA		JB		JC		JD	
JE		JF		JG		JH	
JI		JJ		JK		JL	
JM		JN		JO		JP	
JQ		JR		JS		JT	
JU		JV		JW		JX	
JY		JZ		KA		KB	
KC		KD		KE		KF	
KG		KH		KI		KJ	
KK		KL		KM		KN	
KO		KP		KQ		KR	
KS		KT		KU		KV	
KW		KX		KY		KZ	
LA		LB		LC		LD	
LE		LF		LG		LH	
LI		LJ		LK		LL	
LM		LN		LO		LP	
LQ		LR		LS		LT	
LU		LV		LW		LX	
LY		LZ		MA		MB	
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MG		MH		MI		MJ	
MK		ML		MM		MN	
MO		MP		MQ		MR	
MS		MT		MU		MV	
MW		MX		MY		MZ	
NA		NB		NC		ND	
NE		NF		NG		NH	
NI		NJ		NK		NL	
NM		NN		NO		NP	
NQ		NR		NS		NT	
NU		NV		NW		NX	
NY		NZ		OA		OB	
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REV.	DATE	ALTERED BY	CHK	ZONE	REV.	DATE	ALTERED BY	CHK	ZONE	REV.	DATE	ALTERED BY	CHK	ZONE	REV.	DATE	ALTERED BY	CHK	ZONE	REV.	DATE	ALTERED BY	CHK	ZONE
01	15.06.08	DESIGNED	CHK		01	15.06.08	DESIGNED	CHK		01	15.06.08	DESIGNED	CHK		01	15.06.08	DESIGNED	CHK		01	15.06.08	DESIGNED	CHK	

ADDITIONAL INFORMATION

65013

NAME OF CUSTOMER/PROJECT

POWER GRID CORPORATION OF INDIA LIMITED

220/132KV PITHORAGARH SUBSTATION (NEW) ASSAM

WITH SYSTEM TRANSFORMER IN THE STATION

DISTRIBUTION OF PHASES

SCALE

1:500

TITLE

REACTION KEY DIAGRAM
220/132KV SUBSTATION
PLAN LAYOUT

DATE

01.07.02

LEGEND :-

TOWER WITH PEAK

TOWER WITHOUT PEAK

GROUND INSULATOR

BUS POST INSULATOR

REFERENCE DRAWINGS :-

1. TB-1-276-510-001

SINGLE LINE DIAGRAM OF 220/132KV

2. TB-0-276-316-002

GENERAL ARRANGEMENT OF 220/132KV

3. TB-1-276-316-003

220/132KV SUBSTATION LAYOUT PLAN

4. TB-1-276-316-004

220/132KV SUBSTATION LAYOUT SECTION

220KV SWITCHYARD

S.R.	EQUIPMENT	SYMBOL	QTY	REMARKS
1	37.5 MVA 220/132KV 1-PM AUTO TRANSFORMER TO BE SUPPLIED BY MCL		6	1 PHASE UNIT
2	BUS REACTOR SHUNTED FROM DHULIGANGA BY BHEL		1	3 PHASE UNIT
3	37.5 MVA 220KV 3PHASE 1SEC		6	3 PHASE UNIT
4	ISOLATOR WITH ONE EARTH SWITCH 220KV 1600A 48MM 1SEC DB TYPE		5	3 PHASE UNIT
5	ISOLATOR WITH TWO EARTH SWITCHES 220KV 1600A 48MM 1SEC DB TYPE		6	3 PHASE UNIT
6	ISOLATOR WITHOUT EARTH SWITCH 220KV 1600A 48MM 1SEC DB TYPE		5	3 PHASE UNIT
7	ISOLATOR WITH EARTH SWITCH 220KV 1600A 48MM 1SEC DB TYPE		1	3 PHASE UNIT
8	CIRCUIT TRANSFORMER 220KV 1600A 48MM 1SEC DB TYPE		6	3 PHASE UNIT
9	CAPACITIVE VOLTAGE TRANSFORMER WITH 1000 EXTENDED CURRENT 220KV 4400V		3	3 PHASE UNIT
10	WAVE TRAP 220KV 1600A		2	2 PHASE UNIT

132KV SWITCHYARD

S.R.	EQUIPMENT	SYMBOL	QTY	REMARKS
1	37.5 MVA 132KV 1SEC		7	3 PHASE UNIT
2	ISOLATOR WITH ONE EARTH SWITCH 132KV 1600A 315MM 1SEC DB TYPE		6	3 PHASE UNIT
3	ISOLATOR WITH TWO EARTH SWITCHES 132KV 1600A 315MM 1SEC DB TYPE		8	3 PHASE UNIT
4	ISOLATOR WITHOUT EARTH SWITCH 132KV 1600A 315MM 1SEC DB TYPE		6	3 PHASE UNIT
5	CIRCUIT TRANSFORMER 132KV 1600A 315MM 1SEC DB TYPE		7	3 PHASE UNIT
6	CAPACITIVE VOLTAGE TRANSFORMER WITH 1000 EXTENDED CURRENT 132KV 4400V		3	3 PHASE UNIT
7	WAVE TRAP 132KV 1600A		6	3 PHASE UNIT

SECTION B-B
(220KV -LINE BAY # 2 (BAREILLY LINE) & BUS TRANSFER BAY)

SECTION L-L
(LONGITUDINAL SECTIONAL VIEW)
220KV TRANSFER BUS EAST

(220KV AT-1 LINE BAY # 1
(DHAULIGANGA LINE)

E/S SECTION H-H
(132KV LINE BAY)

SECTION E-E
(220kV - SHUNT REACTOR & FUTURE LINE)

SECTION I-I
(LONGITUDINAL SECTIONAL VIEW
132KV SUBSTATION)

ADDITIONAL INFORMATION	65013	POWER GRID CORPORATION OF INDIA LIMITED 220/13KV PHILFARGHAT (NM) SUBSTATION ASSOCIATED WITH SYSTEM STRENGTHENING SCHEME IN UTHAMANVELL	NAME	SSN	NAME	SSN
W.O. No.						
STATUS OF DRAWING						
POSTERIZATION OF PRINTS						

REFERENCE DRAWING :-

1. TB-2-273-510-001	: SINGLE LINE DIAGRAM OF 220 & 132KV SYSTEM
2. TB-0-273-316-003	: 220 & 132KV SUBSTATION LAYOUT (PLAN)

SECTIONAL LAYOUT

NAME OF CUSTOMER/PROJECT		POWER GRID CORPORATION OF INDIA LIMITED																																	
		WITH SYSTEM STRENGTHENING SCHEME IN HYDRABAD.																																	
NAME OF SUPPLIER		BHARAT HEAVY ELECTRICALS LTD																																	
		TRANSMISSION PROJECTS DIVISION																																	
SPIN	SCALE	GAND CODE		GAND CODE																															
1:500	1:500																																		
EJECTION KEY DIAGRAM 220/132KV SUBSTATION SECTIONAL LAYOUT		<table border="1"> <thead> <tr> <th>BRIDGE</th> <th>DATE</th> <th>SCALE</th> <th>DATE</th> <th>SCALE</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>ORIGINAL</td> <td>05-01-80</td> <td>1:500</td> <td>05-01-80</td> <td>1:500</td> <td>05-01-80</td> </tr> <tr> <td>CHECKED</td> <td>04-01-80</td> <td>3/675</td> <td>05-01-80</td> <td>1:111.16</td> <td></td> </tr> <tr> <td>APPROVED</td> <td>04-01-80</td> <td>0.111.16</td> <td>0.111.16</td> <td></td> <td></td> </tr> </tbody> </table>										BRIDGE	DATE	SCALE	DATE	SCALE	DATE	ORIGINAL	05-01-80	1:500	05-01-80	1:500	05-01-80	CHECKED	04-01-80	3/675	05-01-80	1:111.16		APPROVED	04-01-80	0.111.16	0.111.16		
BRIDGE	DATE	SCALE	DATE	SCALE	DATE																														
ORIGINAL	05-01-80	1:500	05-01-80	1:500	05-01-80																														
CHECKED	04-01-80	3/675	05-01-80	1:111.16																															
APPROVED	04-01-80	0.111.16	0.111.16																																
DRAWING NO. TH-0-216-006 (CONSISTENT WITH THE PROVISIONS Laid IN THE ORDER IN RESPECT OF THE CONTRACT)		DRAWING NO. TH-0-216-006 (CONSISTENT WITH THE PROVISIONS Laid IN THE ORDER IN RESPECT OF THE CONTRACT)																																	
SHEET NO. 01 OF 02																																			

[illegible]

BILL OF QUANTITY 220KV

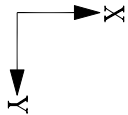
[illegible][illegible]

BILL OF QUANTITY 132kv

[illegible][illegible]

DRAUGHTING LINE
(BAY NO.1)

BATTERY LINE
(BAY NO.2)



NOTES :-

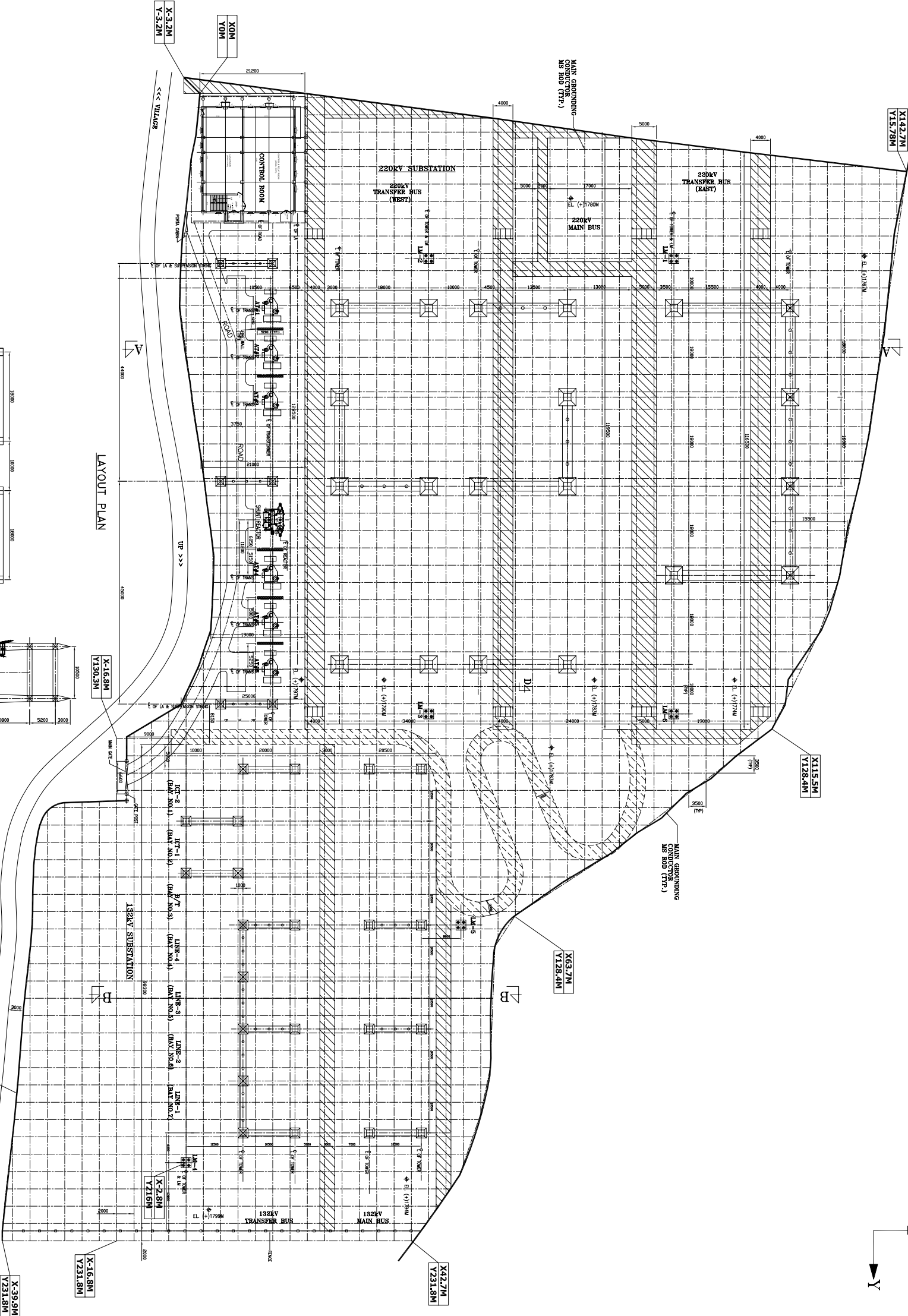
1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2. THE EARTHING SYSTEM INSTALLATION WORK SHALL CONFORM TO THE REQUIREMENTS OF THE FOLLOWING STANDARDS/CODES:-
 - a. IS:3043
 - b. IEEE Std. 80
3. GROUNDING MAT (40M M.S. ROD) TO BE EAIRED GENERALLY AT A DEPTH OF 0.6 M BELOW FINISH GROUND LEVEL. A MINIMUM GROUND COVERAGE OF 300mm SHALL BE PROVIDED BETWEEN THE GROUND MAT CONDUCTOR AND THE BOTTOM OF TRENCHES, UNDERGROUND PIPES ETC. THE GROUND MAT CONDUCTOR SHALL BE RE-ROUTED IN CASE IT FOLDS WITH EQUIPMENT FOUNDATIONS.
4. ALL EQUIPMENT AND/OR MAIN CONDUCTORS AT A DEPTH OF 300mm FROM FINISHED GRADE LEVEL SHALL BE PROVIDED BELOW THE OPERATING HANDLE OF EACH ISOLATOR MAIN OPERATING BOX AND EARTH SWITCH OPERATING BOX. THE GND SHALL ALSO BE CONNECTED TO THE MAIN GROUND GND.
5. TREATED EARTH PIT CONSISTING OF 40MM DN PIPE ELECTRODE WITH DISCONNECTING LINK FACILITY FOR TESTING PURPOSES SHALL BE USED FOR TRANSFORMER / RECTOR GROUNDING. TRANSFORMER & RECTOR NEUTRAL SHALL BE EARTHED THROUGH TWO ELECTRODES. THESE ELECTRODES SHALL ALSO BE CONNECTED TO MAIN GROUND MAT.
6. DOWN CONDUCTOR OF LIGHTNING MAST AND TOWERS WITH PEAK SHALL BE CONNECTED TO MAIN GROUND MAT THROUGH TWO ELECTRODES. THESE ELECTRODES SHALL BE CONNECTED TO EACH OTHER THROUGH TWO SHORT EARTH LEADS ALL OTHER ACCESSORIES ASSOCIATED WITH THE EQUIPMENT SHALL BE EARTHED AS PER IEC 60078-4-276-509-051)
7. RISER FROM THE EARTHING MAT TO THE EQUIPMENT/STRUCTURE SHALL BE MADE BY TWO SHORT EARTH LEADS ALL OTHER ACCESSORIES ASSOCIATED WITH THE EQUIPMENT SHALL BE EARTHED AS PER IEC 60078-4-276-509-051)
8. ALL GROUND MAT CONNECTION BELOW GROUND LEVEL SHALL BE DONE BY WELDING. THE CONTACT SURFACES SHALL BE THOROUGHLY CLEANED TO PROVIDE GOOD ELECTRICAL CONTACT. FOR ROOF PROTECTION, WELLS SHOULD BE TREATED WITH TWO COATS OF PREVENT CORROSION. CONCRETE SHALL BE COVERED BY BRICKEN CONCRETE TO PREVENT CORROSION.
9. ALL INDOOR AND OUTDOOR ELECTRICAL EQUIPMENT AND ASSOCIATED NON CURRENT CARRYING METAL WORKS, SUPPORTING STRUCTURE, FENCE, RAILS, SYSTEM NEUTRALS SHALL BE EARTHED BASED ON EQUIPMENT GROUNDING NOTES & DETAILS (DMS (TB-4-276-509-051))
10. AS PER SIZE SYSTEM SHALL RUN ON TOP TER ALL ALONG THE CABLE TRENCH INTERVAL OF 30m AND ALSO AT BOTH ENDS.
11. EARTHING CONDUCTOR ALONG BOUNDARY WALL SHALL BE EARTHED AT REGULAR INTERVAL POSSIBLE TO THE BOUNDARY WALL. FENCE GATE SHALL BE EARTHED AT REGULAR INTERVAL NOT EXCEEDING 100m. FENCE GATE SHALL BE SEPARATELY EARTHED WITH FLEXIBLE CONNECTION TO PERMIT MOVEMENT.
12. REFER TO SEPARATE DWG. FOR GROUNDING LAYOUT OF LT MRO.
13. EARTHING CONDUCTOR CROSSING ROAD SHALL BE LAID 300 mm BELOW ROAD OR GREATER DEPTH.
14. EARTHING CONDUCTOR EMBEDDED IN THE CONCRETE SHALL HAVE APPROX. 50 mm COVER.
15. ALL THE EQUIPMENT AND GENTRY STRUCTURES ARE TO BE CONNECTED TO THE MAIN GROUNDING CONDUCTOR 40M ROD AT TWO POINTS DIAGONALLY OPPOSITE WEATHER THEY ARE SHOWN OR NOT.

REFERENCE DRAWINGS :-

1. TB-0-276-516-002 : GENERAL ARRANGEMENT FOR 220/132KV SUBSTATION
2. TB-0-276-516-003 : LAYOUT PLAN FOR 220 & 132KV SUBSTATION

LEGEND:-

SYMBOL	DESCRIPTION
	MAIN GROUNDING CONDUCTOR (40M MS ROD) BELOW FINISHED GRADE LEVEL



LAYOUT PLAN

SECTION A-A
(220KV)

SECTION B-B
(132KV)

FIG. EL.(+1)787
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)788
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)787
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)788
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)787
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)788
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)787
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)788
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)787
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)788
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)787
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)788
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)787
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)788
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)787
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)788
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)787
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)788
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)787
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)788
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)787
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)788
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)787
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)788
MAIN GROUNDING
CONDUCTOR
MS ROD (TTP)

FIG. EL.(+1)787
MAIN GROUNDING
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VILLAGE

SYMBOL	DESCRIPTION
————	MAIN GROUND GRID CONDUCTOR (400 M.S ROD) BELOW FINISHED GRADE LEVEL
————	SUB GROUND GRID CONDUCTOR (400 M.S ROD) BELOW FINISHED GRADE LEVEL
⊙	GROUND ROD ELECTRODE 400 mm 3.0M LONG AT THE PERIPHERY
————	50X6 M.S. FLAT
————	50X6 G.S. FLAT

REVISED AS PER PGCL COMMENTS DATED
7.04.07.

भारत भारती
BHARAT
BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION PROJECTS DIVISION

DRAWN	NAME	SIGN.	NAME	SIGN.	DATE
	KK				27.12.06
CHECKED	CPK				
APPROVED	SKB				

1. EARTHING CONDUCTOR AROUND THE BUILDING TO BE LAID 1500MM MINIMUM FROM THE BUILDING.
2. IN BATTERY ROOM 50X6 MS FLAT TO BE BURIED IN THE FLOOR BEFORE FLOOR FINISHING IS DONE.
3. WHEREVER EARTH CONDUCTOR CROSSES DOOR IT SHOULD BE TAKEN OVER THE DOOR OR IT SHALL BE BURIED IN THE FLOOR AND SHALL HAVE A CONCRETE COVER OF 50MM APPROXIMATELY.
4. EARTH STRIP TO BE RUN ON WALL 300 MM ABOVE THE FFL.
5. WHEREVER EARTHING CONDUCTOR ENTER THE BUILDING IT SHOULD BE TAKEN DIRECTLY THROUGH THE WALL WITHOUT SLEEVE.
6. 50X6 M.S. STRIP TO BE RUN ON THE CABLE RACKS/BURIED AND 50X6 G.S. FLAT ON THE WALL OF CONTROL BUILDING WHEREVER IT RUNS.

1. TB-0-276-316-003 : LAYOUT PLAN FOR 220/132kV SUBSTATION
2. TB-4-276-509-002 : EQUIPMENT EARTHING DETAILS

पावर ग्रिड कारपोरेशन ऑफ इंडिया लिमिटेड

(भारत सरकार का उद्यम)

POWER GRID CORPORATION OF INDIA LIMITED

(Government of India Enterprise)



पावरग्रिड

पता: पावरग्रिड लिमिटेड, एन.डी. 2, सेक्टर-28, लोधी रोड, नई दिल्ली-110003, भारत
मुख्यालय: पावरग्रिड लिमिटेड, एन.डी. 2, सेक्टर-28, लोधी रोड, नई दिल्ली-110003, भारत
मुख्यालय: पावरग्रिड लिमिटेड, एन.डी. 2, सेक्टर-28, लोधी रोड, नई दिल्ली-110003, भारत
मुख्यालय: पावरग्रिड लिमिटेड, एन.डी. 2, सेक्टर-28, लोधी रोड, नई दिल्ली-110003, भारत

संख्या: PGC/ENGG/NI/UTS/PITHORA

C/ENGG/NI/UTS/PITHORA

Date: 23rd Oct, 2009

M/s Bharat Heavy Electrical Limited,
Transmission Business Group,
Integrated Office Complex,
Lodhi Road,
New Delhi- 110003

X
27.10.09

KIND ATTN : MR. DAVINDER SINGH, AGM (TBEM)

SUB: 220/132 kV Pithoragarh Substation (Pkg-B) associated with System strengthening scheme in Uttaranchal .

LOA NO. C-13302-S919A-3/LOA-I/1898 & LOA-II/1899 dated 03.01.2006

Please find enclosed the following drg/doc of the subject package.

S.NO	DRAWING/DOCUMENT TITLE	DRAWING/DOCUMENT NO.	REMARKS
1	PANEL ARRANGEMENT FOR 220 & 132 KV C&R PANELS	C/ENGG/PITH/CRP/01 REV 0	RELEASED FOR CONSTRUCTION

Thanking you.

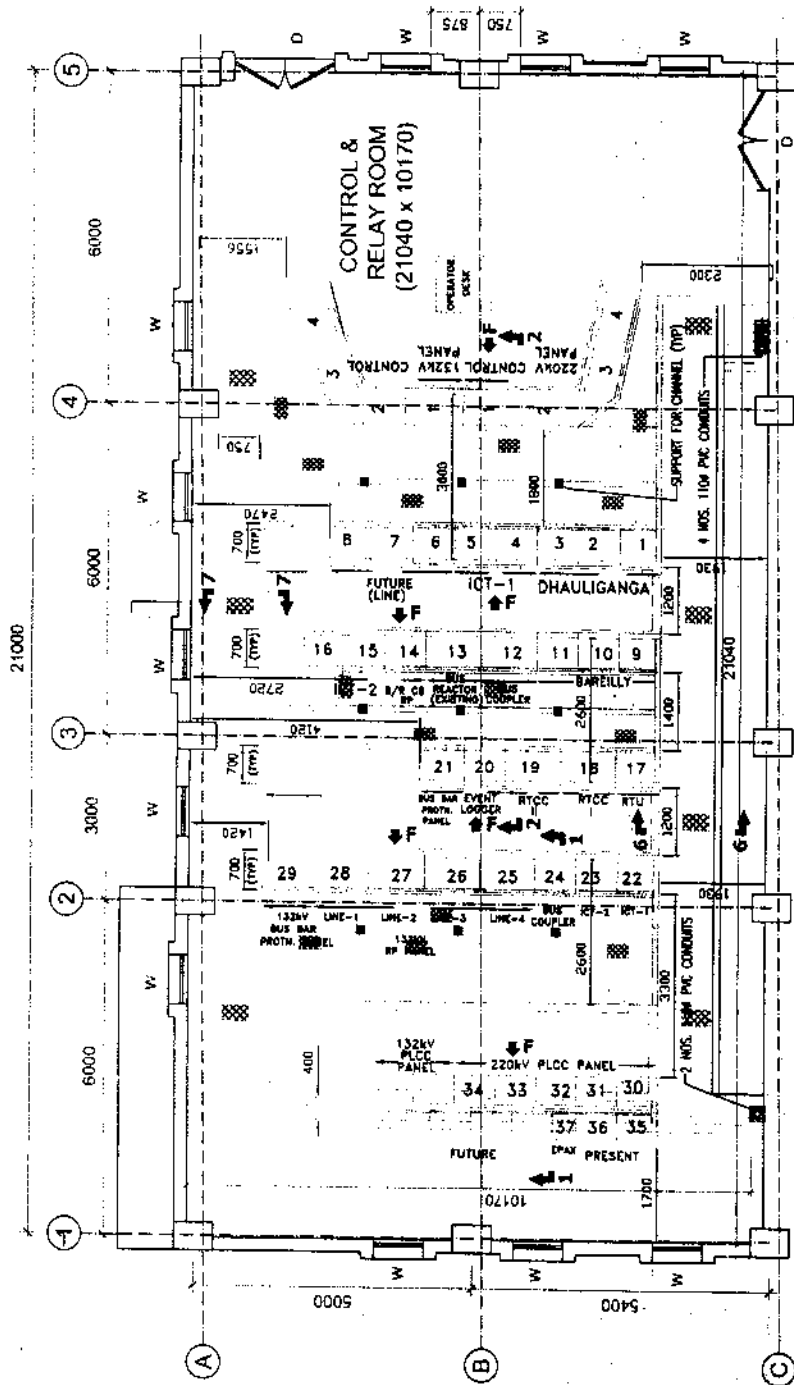
Yours faithfully

M.M.GOSWAMI
23/10/09

(M.M.GOSWAMI)
AGM (ENGG-S/S)

CC:-1>DGM(ENGG), Powergrid-NRI,Katwaria Sarai,Attn:Sh S.K.NAGPAL

2>Sh. H.C.Bist, Manager, Powergrid, 220/132 kV Substation, Mostmanu,Chandak
.PITHORAGARH-262301.(Uttaranchal).



PAN. NO.	FEDER DESCRIPTION	PAN. DESG.	DMC. NO. GA/SCH	PANEL DIMENSIONS (WxDxH)
1	220KV DHHAULIGANGA LINE MAIN-1 PROTIN. RELAY PANEL	28P1A		750x700x237
2	220KV DHHAULIGANGA LINE MAIN-2 PROTIN. RELAY PANEL	28P1B		750x700x237
3	220KV DHHAULIGANGA LINE CB RELAY PANEL	28P1C		750x700x237
4	220KV SIDE OF ICT-1 PROTECTION PANEL	28P2A		750x700x237
5	220KV SIDE OF ICT-1 PROTECTION PANEL	28P2B		750x700x237
9	220KV BAREILLY LINE MAIN-1 PROTIN. RELAY PANEL	28P3A		750x700x237
10	220KV BAREILLY LINE MAIN-2 PROTIN. RELAY PANEL	28P3B		750x700x237
11	220KV BAREILLY LINE CB RELAY PANEL	28P3C		750x700x237
12	220KV BUS COUPLER PROTECTION PANEL	28P4		1000x700x237
13	220KV BUS REACTOR PROTECTION PANEL (EXISTING PANEL)	28P5		1000x700x237
14	220KV BUS REACTOR CB RELAY PANEL	28P6		1000x700x237
15	220KV SIDE OF ICT-2 PROTECTION PANEL	28P7A		750x700x237
16	220KV SIDE OF ICT-2 PROTECTION PANEL	28P7B		750x700x237
17	RTU			800x700x237
18	RTCC-1			
19	RTCC-4			
20	EVENT LOGGER			
21	220KV BUSBAR PROTECTION PANEL	28BP		750x700x237
22	132KV RELAY/PROTECTION PANELS			
23	132KV SIDE OF ICT-1 PROTECTION PANEL	18P1		750x700x237
24	132KV SIDE OF ICT-2 PROTECTION PANEL	18P2		750x700x237
25	132KV BUS COUPLER PROTECTION PANEL	18P3		750x700x237
26	132KV UPPOL LINE-4 PROTECTION PANEL	18P4		1000x700x237
27	132KV UPPOL LINE-3 PROTECTION PANEL	18P5		1000x700x237
28	132KV UPPOL LINE-2 PROTECTION PANEL	18P6		1000x700x237
29	132KV UPPOL LINE-1 PROTECTION PANEL	18P7		1000x700x237
30	132KV BUSBAR PROTECTION PANEL	18BP		800x700x237

PAN. NO.	FEDER DESCRIPTION	PANEL REF.	DMC. NO. GA/SCH	PANEL DIMENSIONS (WxDxH)
1	220KV DHHAULIGANGA LINE (BAY-201) & 220KV SIDE OF ICT-1 (BAY-202) CONTROL PANEL	2CP12		1050x 700x237mm
2	220KV BAREILLY LINE (BAY-203) & 220KV BUS COUPLER (BAY-204) CONTROL PANEL	2CP34		1050x 700x237mm
3	220KV BUS REACTOR (BAY-205) & FUTURE (BAY-206) CONTROL PANEL	2CP56		1050x 700x237mm
4	220KV SIDE OF ICT-2 (BAY-207) CONTROL PANEL	2CP7		750x 700x237mm
1	132KV SIDE OF ICT-1 CONTROL PANEL & 132KV SIDE OF ICT-2 CONTROL PANEL	1CP12		1050x 700x237mm
2	132KV BUS COUPLER CONTROL PANEL	1CP3		750x 700x237mm
3	132KV UPPOL LINE-4 & UPPOL LINE-3 CONTROL PANEL	1CP45		1000x 700x237mm
4	132KV UPPOL LINE-2 & UPPOL LINE-1 CONTROL PANEL	1CP67		1000x 700x237mm

PAN. NO.	FEDER DESCRIPTION	PAN. DESG.	DMC. NO. GA/SCH	PANEL DIMENSIONS (WxDxH)
30	220KV PLOC PANELS			7X 750x 505 x175mm
37	220KV UPPOL LINE-4 & UPPOL LINE-3 PROTECTION PANEL			1X 4.5x 505 x185mm

RELEASED FOR CONSTRUCTION

POWER GRID CORPORATION
OF INDIA LIMITED
(A GOVT. OF INDIA ENTERPRISE)

PROJECT

220/132KV PITHORAGARH SUBSTATION (NPI) ASSOCIATED
WITH SYSTEM STRENGTHENING SCHEME IN UTTARANCHAL

TITLE

PANEL ARRANGEMENT FOR 220
& 132KV C & R PANELS

DRAWING NO. C/ENGG/PTR/099/01

REV

R-0

SDC
(ENGG-S/S)
8/11/2004

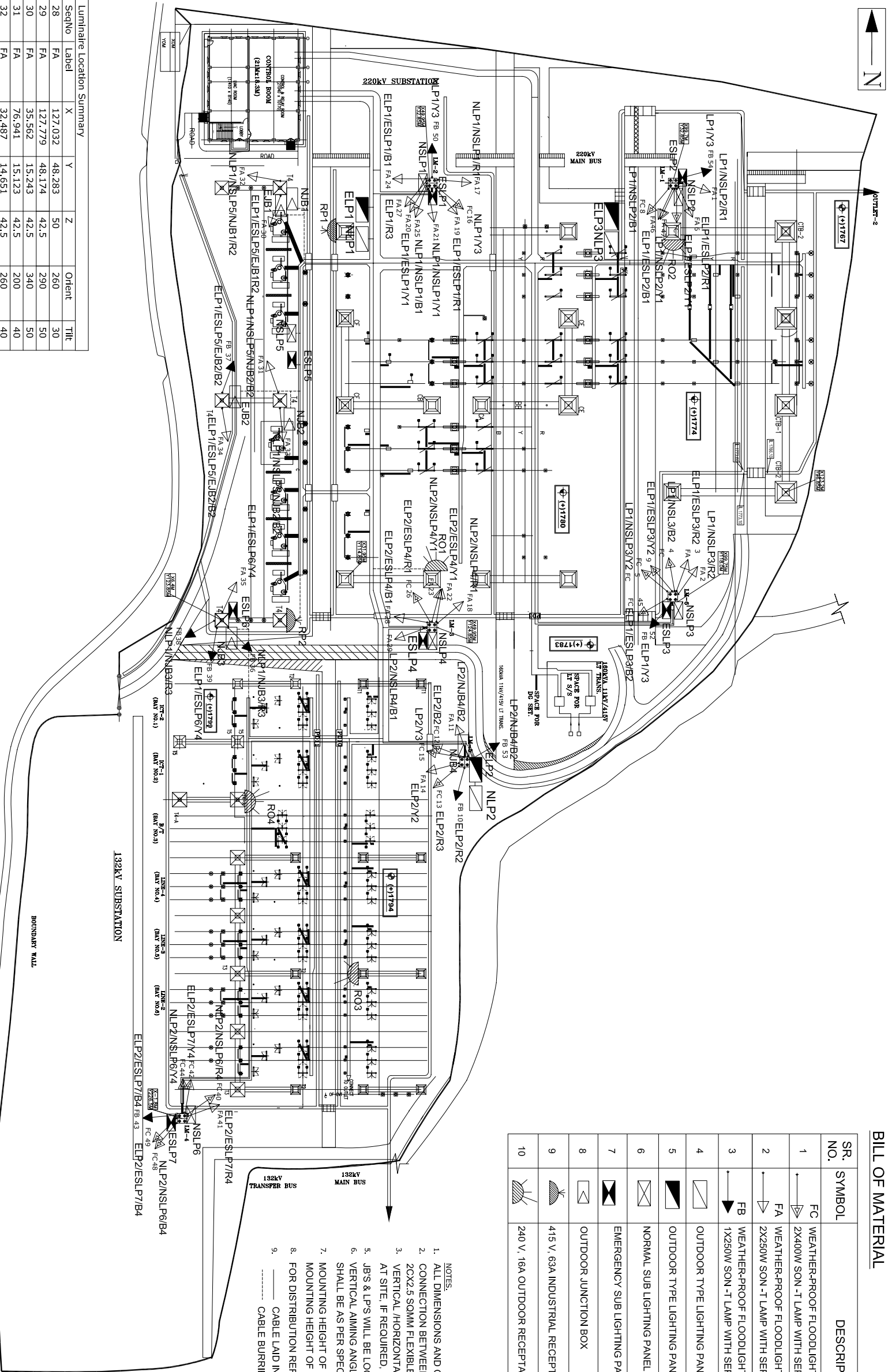
CDR
(ENGG-S/S)
27/01/2004

AO
(ENGG-S/S)
27/01/2004

BILL OF MATERIAL

SR. NO.	SYMBOL	DESCRIPTION	MAKE & TYPE EQ. TO	QTY.
1	FC	WEATHER-PROOF FLOODLIGHT LUMINAIRE SUITABLE FOR 2X400W SON -T LAMP WITH SEPARATE C.A. C.G. BOX	CROMPTON FHD1424	16Nos.
2	FA	WEATHER-PROOF FLOODLIGHT LUMINAIRE SUITABLE FOR 2X250W SON -T LAMP WITH SEPARATE C.A. C.G. BOX	CROMPTON FHD1424	27 Nos.
3	FB	WEATHER-PROOF FLOODLIGHT LUMINAIRE SUITABLE FOR 1X250W SON -T LAMP WITH SEPARATE C.A. C.G. BOX	CROMPTON FAD1314	10 Nos.
4		OUTDOOR TYPE LIGHTING PANEL. (ACP-2) (AC NORMAL)	MIKA ENGINEERS	03 Nos.
5		OUTDOOR TYPE LIGHTING PANEL. (ACP-2) (AC EMERGENCY)	MIKA ENGINEERS	03 Nos.
6		NORMAL SUB LIGHTING PANEL (OUTDOOR TYPE)	MIKA ENGINEERS	06 Nos.
7		EMERGENCY SUB LIGHTING PANEL (OUTDOOR TYPE)	MIKA ENGINEERS	07 Nos.
8		OUTDOOR JUNCTION BOX	MIKA ENGINEERS	6 Nos.
9		415 V, 63A INDUSTRIAL RECEPTACLE(TYPE RP)	MIKA ENGINEERS	02Nos.
10		240 V, 16A OUTDOOR RECEPTACLE(TYPE RO)	MIKA ENGINEERS	04Nos.

- NOTES.
- ALL DIMENSIONS AND CO-ORDINATES ARE IN METRES.
 - CONNECTION BETWEEN JUNCTION BOX & LUMINAIRE SHALL BE CARRIED OUT USING 2CX2.5 SOMM FLEXIBLE CU CABLE.
 - VERTICAL /HORIZONTAL AIMING ANGLES FOR LUMINAIRES CAN BE CHANGED AT SITE, IF REQUIRED, TO SUIT SITE CONDITION.
 - JBS & LPS WILL BE LOCATED NEAR LM/GANTRY INSIDE SWITCHYARD FENCE.
 - VERTICAL AIMING ANGLE AND MOUNTING HEIGHT FOR LUMINAIRES SHALL BE AS PER SPECIFIED IN LUMINAIRE SUMMARY TABLE.
 - MOUNTING HEIGHT OF TE LUMINAIRE ON LM = 25 MTRS + THE ELEVATION HEIGHT OF THAT AREA
 - MOUNTING HEIGHT OF THE LUMINAIRE ON GANTRIES = 12.5 + THE ELEVATION HEIGHT OF THAT AREA
 - FOR DISTRIBUTION REFER DRAWING NO. ME/BHEL/PITHO/33/03-02.
 - CABLE LAID IN READY TRENCHES
 - CABLE BURIED IN PVC PREES BELOW GROUND



Luminaire Location Summary				
SeqNo	Label	X	Y	Z
28	FA	127.032	48.283	50
29	FA	127.779	48.174	42.5
30	FA	35.562	15.243	42.5
31	FA	76.941	15.123	42.5
32	FA	32.487	14.651	42.5
34	FA	80.429	3.214	42.5
35	FA	122.917	3.241	42.5
36	FB	126.335	2.79	42.5
37	FB	76.63	2.512	42.5
38	FB	123.954	1.485	42.5
39	FB	125.668	1.233	42.5
40	FC	222.341	-2.177	56
41	FA	222.494	-2.448	56
42	FC	222.146	-2.762	56
43	FB	222.582	-3.116	56
44	FC	222.146	-3.151	56
45	FC	127.621	100.281	32
46	FA	33.023	99.915	32
47	FA	33.023	99.915	32
18	FA	126.403	101.014	32
9	FC	126.302	99.668	32
5	FC	127	101	32
33	FA	80.406	14.596	42.5
49	FC	222.107	-3.509	56
50	FB	31.343	49.409	50
48	FC	223.576	-2.856	56
52	FB	128.325	100.704	32
53	FB	171.327	54.264	56
54	FB	31.947	101.535	32

Luminaire Location Summary				
SeqNo	Label	X	Y	Z
1	FA	32.737	101.394	32
2	FA	127.165	101.399	32
3	FA	126.247	101.313	32
6	FA	33	100	32
7	FC	33.278	99.933	32
8	FC	31.891	99.698	32
10	FB	171.485	53.945	56
11	FA	170.769	53.706	56
12	FC	170.334	53.53	56
13	FC	171.503	53.336	56
14	FA	171.373	53.303	56
15	FC	170.529	53.141	56
16	FC	33.181	50.255	50
17	FA	32.707	49.87	50
20	FA	31.941	49.692	50
21	FA	33.368	49.645	50
22	FA	126	50	50
23	FA	126.115	49.503	50
24	FA	31.854	48.432	50
25	FA	33.381	48.421	50
26	FC	126.291	48.73	50
27	FA	33	48	50

REV.	DESCRIPTION	DATE	SIGN.
01	Revised as per PGCL comments dtd 30.07.09	18.09.09	

CUSTOMER.
PROJECT.

POWER GRID CORPORATION OF INDIA
230/132KV SUBSTATION AT PITHORAGARH

BHEL SP. NO.

TB-276-316-031 REV NO 01

CONTRACTOR.

BHEL

BHARAT HEAVY ELECTRICALS LIMITED

DELHI

BHEL PO NO.

4588439 DTD 06.01.09

SCALE
NTS

SWITCHYARD LIGHTING LAYOUT FOR
220/33 KV S/S AT PITHORAGARH.

DRAWN
P.K.U

DRAWING NO.

CHECKED
T.J.S.

SUB-CONTRACTOR

APPROVED
P.K.U

MIKA ENGINEERS, MUMBAI