

GENERAL INSTRUCTION FOR EARTHING:

1. Location of earthing conductors / risers shown in the earthing drawing may change to suit the site condition.
2. Two different risers of one structure/equipment shall be connected to different conductors of main earthmat.
3. Earthing conductor around the building shall be buried at a minimum distance of 1500 mm from the outer boundary of the building.
4. Minimum distance of 6000 mm shall be maintained between two treated (pipe) electrode.
5. For surge arrester, earthing lead from surge counter to main earthmat shall be shortest in length as practically as possible. Earthing lead from surge arrester shall not be passed through any pipe.
6. No welding is allowed in the over ground earthing leads/risers if the length is less than 6m .
7. All ground connections shall be made by electric arc welding. All welded joints shall be allowed to cool down gradually to atmospheric temperature before putting any load on it. Artificial cooling shall not be allowed.
8. All arc welding with MS ROD shall be done with low hydrogen content electrodes. the welds should be treated with red oxide primer and afterwards coated with two layers bitumen compound to prevent corrosion.
9. Wherever earthing conductor crosses cable trenches, underground service ducts, pipes, tunnels, railway tracks etc., it shall be laid minimum 300 mm below them and shall be circumvented in case it fouls with equipment/structure foundations.
10. Earthing conductor around the building shall be buried in earth at a minimum distance of 1500 mm from the outer boundary of the building.
11. Earthing conductors crossing the road shall be laid 300mm below road or at greater depth to suit the site conditions.
12. Earthing conductors embedded in the concrete shall have approximately 50mm concrete cover

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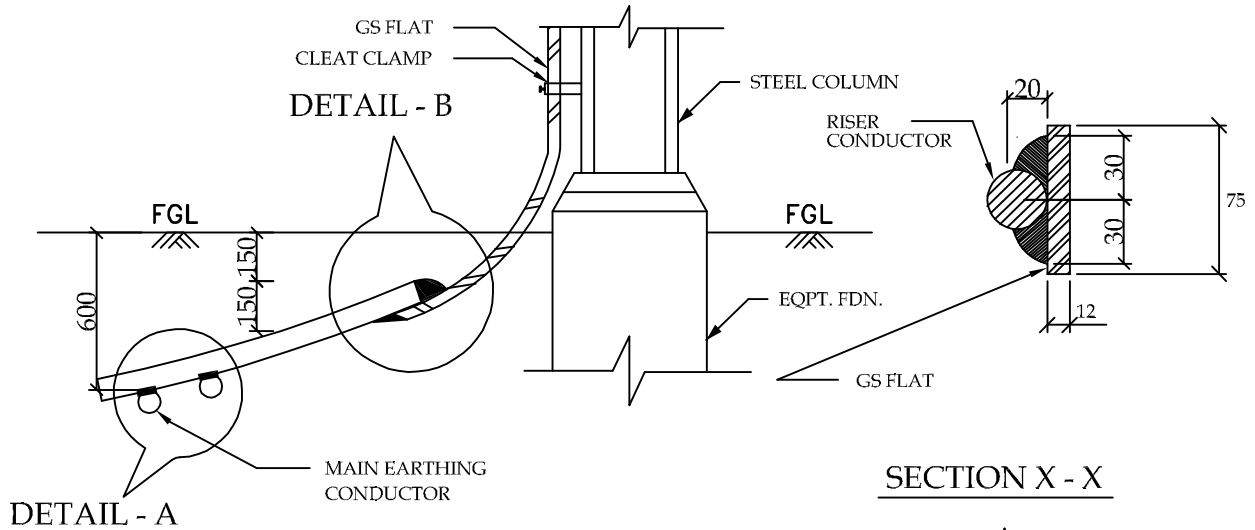
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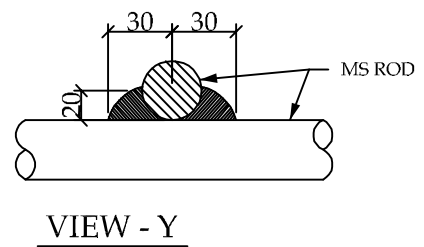
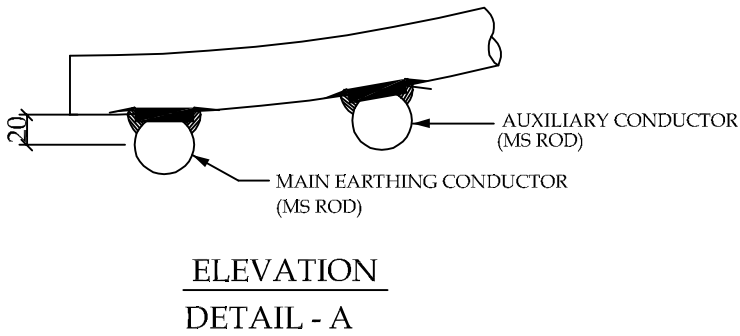
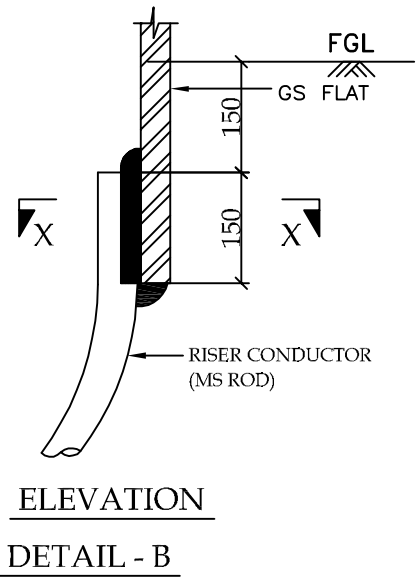
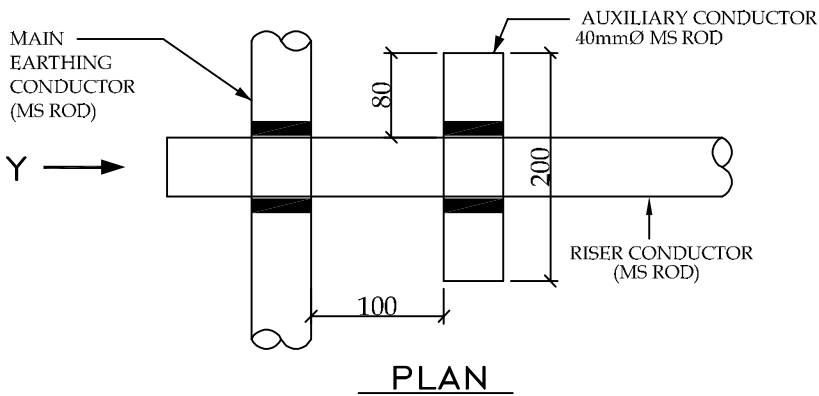
PROJECT :- TECHNICAL SPECIFICATION-
SWITCHYARD ERECTION

TITLE:- STANDARD EARTHING DETAILS

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TYPICAL DETAILS OF RISER



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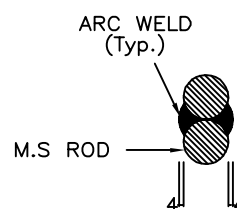
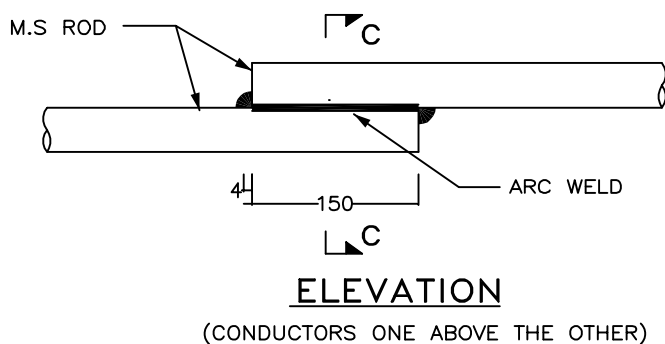
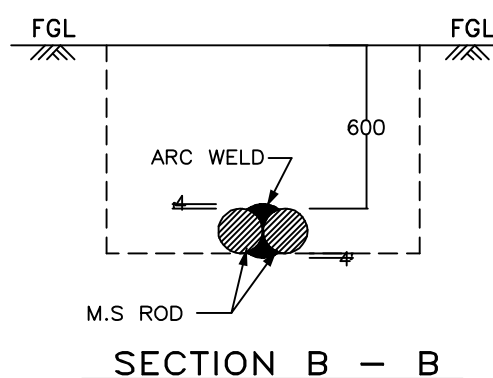
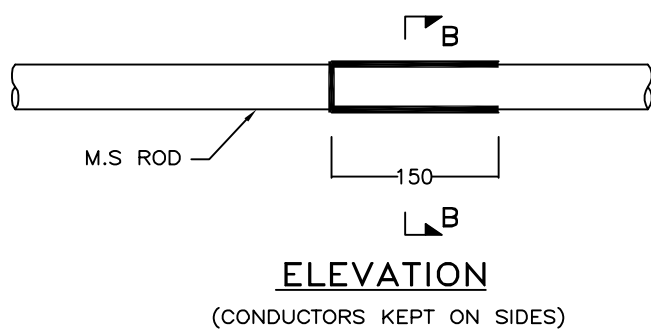
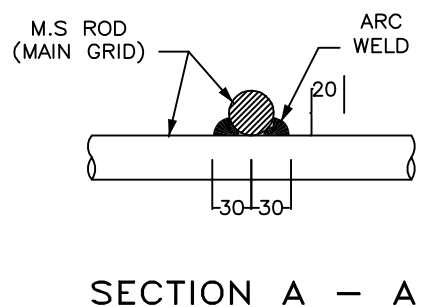
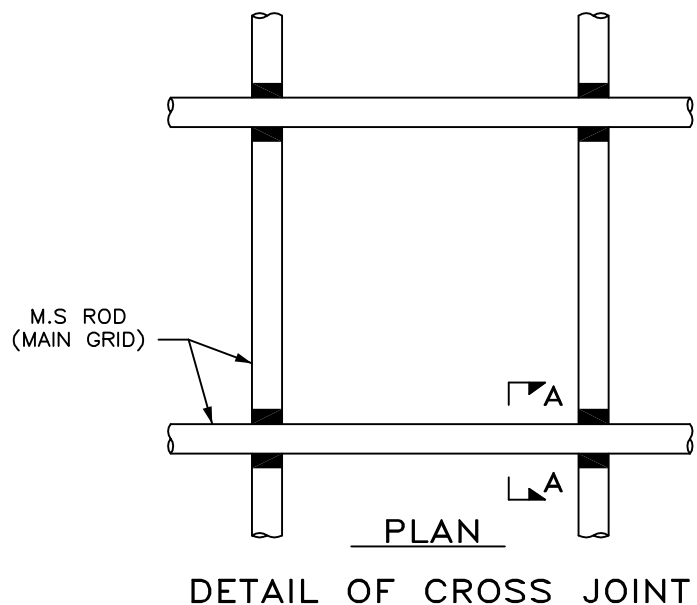
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SWITCHYARD ERECTION

TITLE:- STANDARD EARTHING DETAILS

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DETAIL OF LAP JOINT

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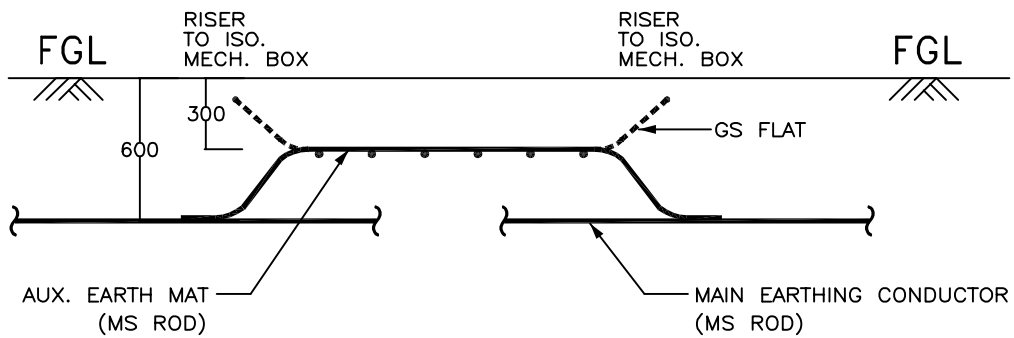
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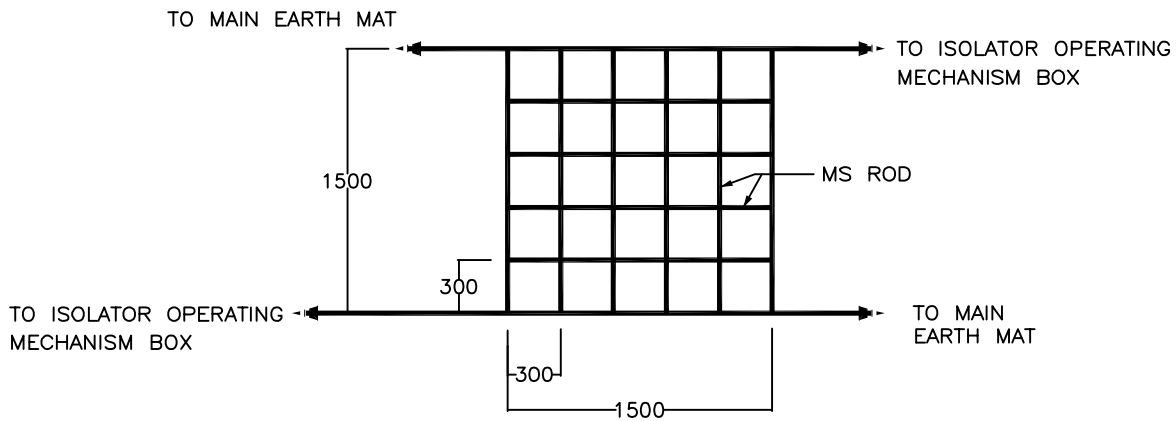
PROJECT :- TECHNICAL SPECIFICATION-
SWITCHYARD ERECTION

TITLE:- STANDARD EARTHING DETAILS

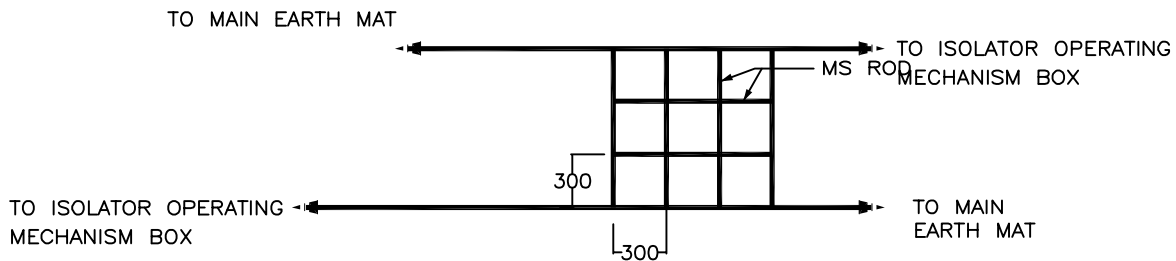
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ELEVATION



PLAN (For 220kV & above class isolators)



PLAN (For 132kV & below class isolators)

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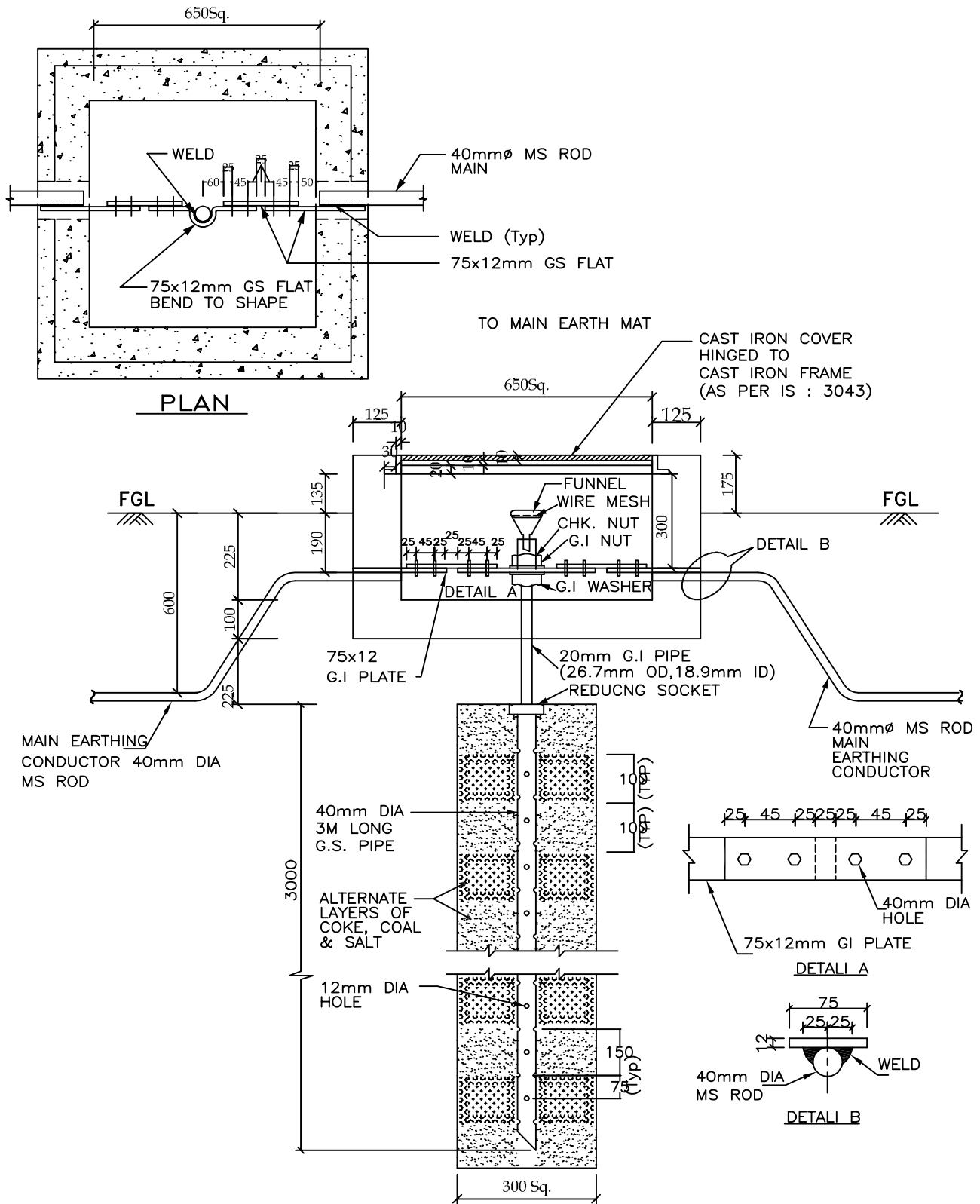
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SWITCHYARD ERECTION

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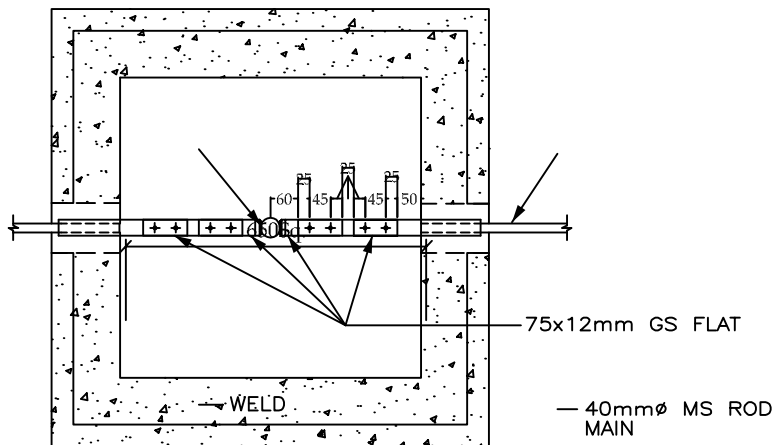


PROJECT :- TECHNICAL SPECIFICATION-
SWITCHYARD ERECTION

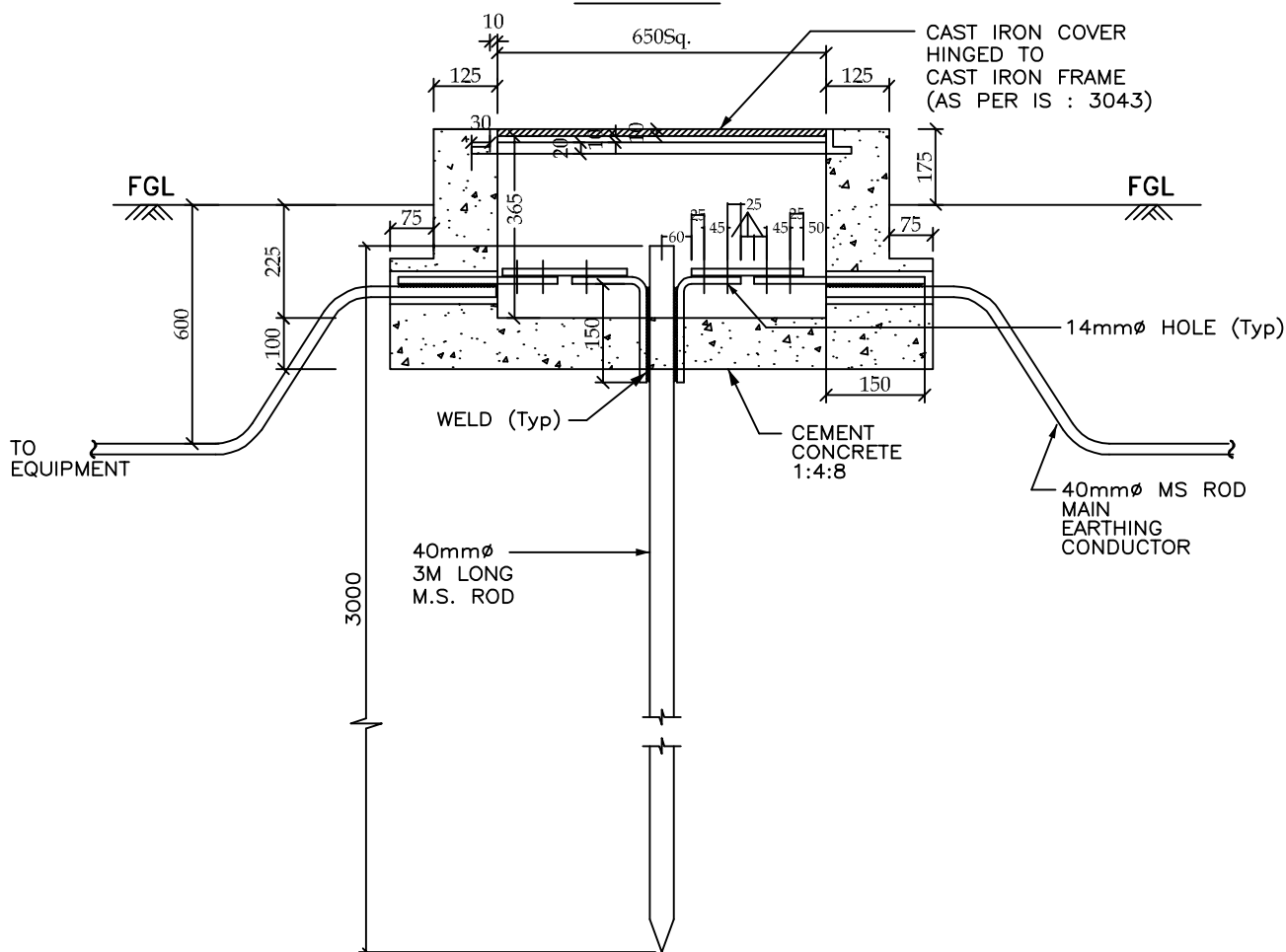
TITLE:- STANDARD EARTHING DETAILS

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ROD ELECTRODE WITH TEST LINK FOR LM, TOWER WITH PEAK, CVT, LA



PLAN



ELEVATION

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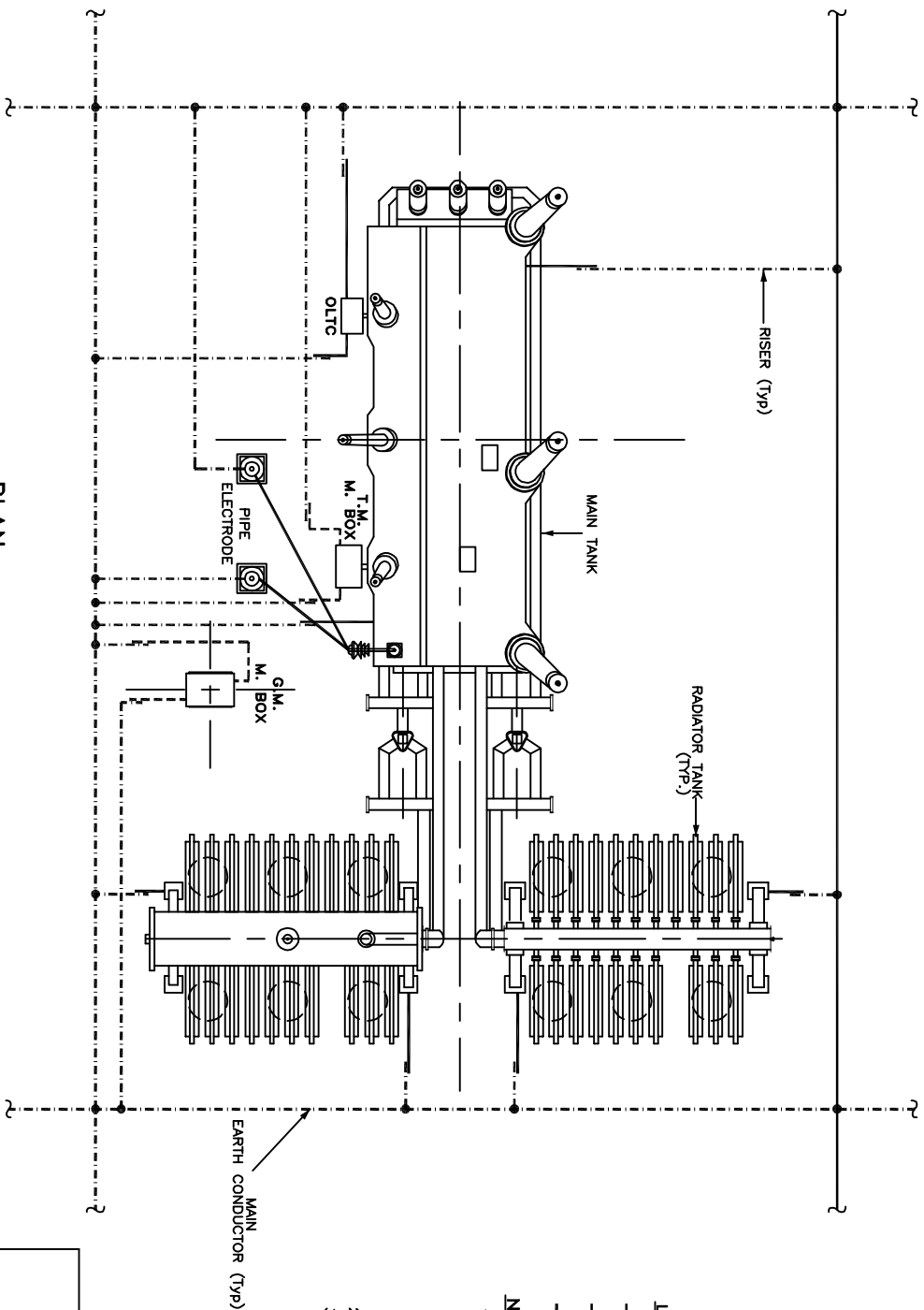


PROJECT :- TECHNICAL SPECIFICATION-
SWITCHYARD ERECTION

TITLE:- STANDARD EARTHING DETAILS

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EARTHING OF TRANSFORMER / REACTOR



PLAN

LEGEND

- 40mm ϕ MS ROD
- 75 x 12 mm GS FLAT
- 50 x 6 mm GS FLAT

NOTES :-

1. No. OF RISERS :-
 MAIN TANK - 2 Nos.
 RADIATOR TANK - 4 Nos.
 O.L.T.C - 2 Nos. (CT only)
 M. BOX - 2 Nos./M. BOX
 NEUTRAL EARTH ELECTRODE - 2 Nos.
2. No. OF PIPE ELECTRODE REQUIRED = 2 Nos.
3. PYLON SUPPORTS SHALL BE EARTHED TO THE MAIN EARTHING CONDUCTOR BY GS FLAT.

RELEASED FOR CONTRUCTION

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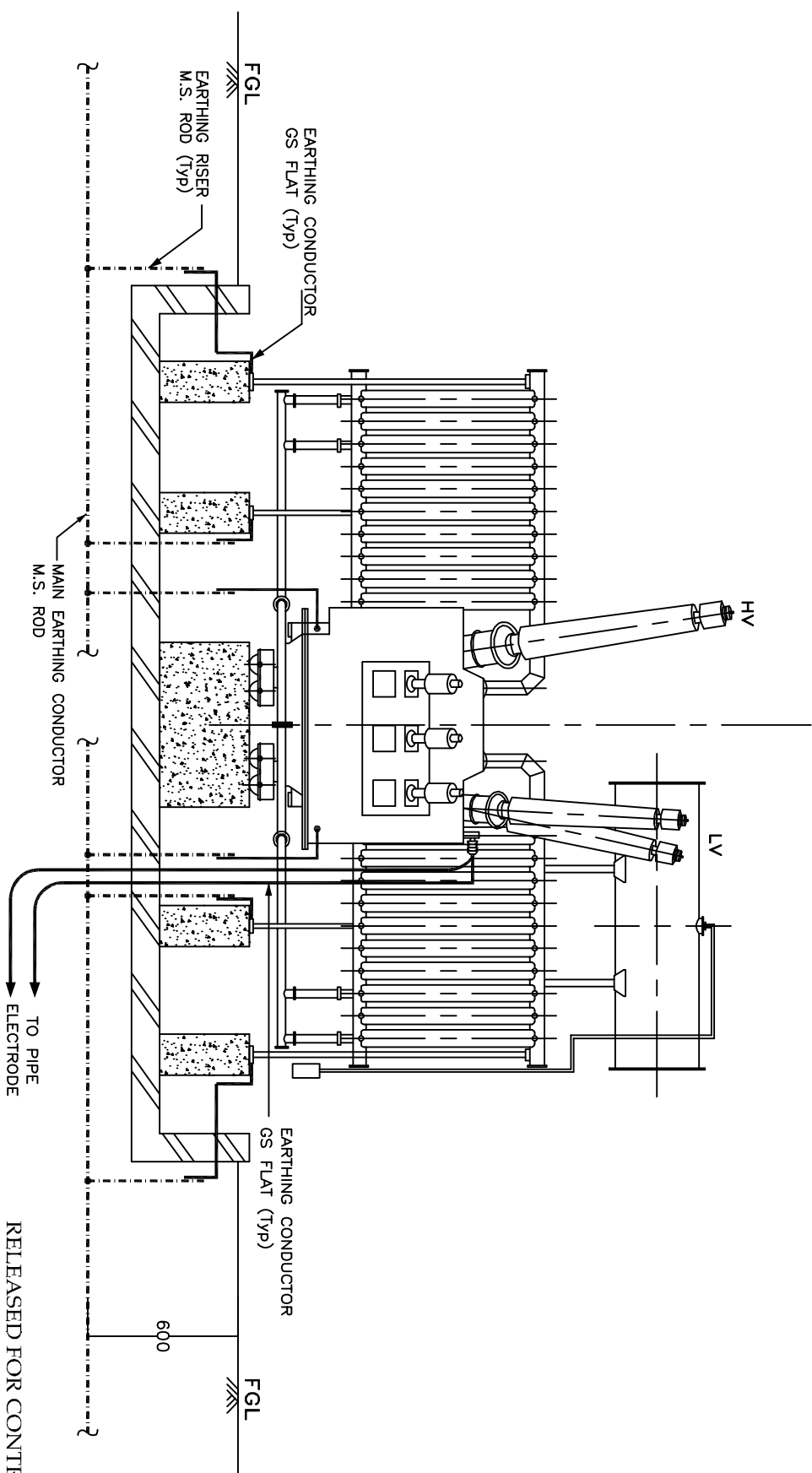


PROJECT :- TECHNICAL SPECIFICATION-
 SWITCHYARD ERECTION

TITLE:- STANDARD EARTHING DETAILS

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			C/ENG/STD/EARTHINGS/09
			SHEET # 7


EARTHING OF TRANSFORMER / REACTOR



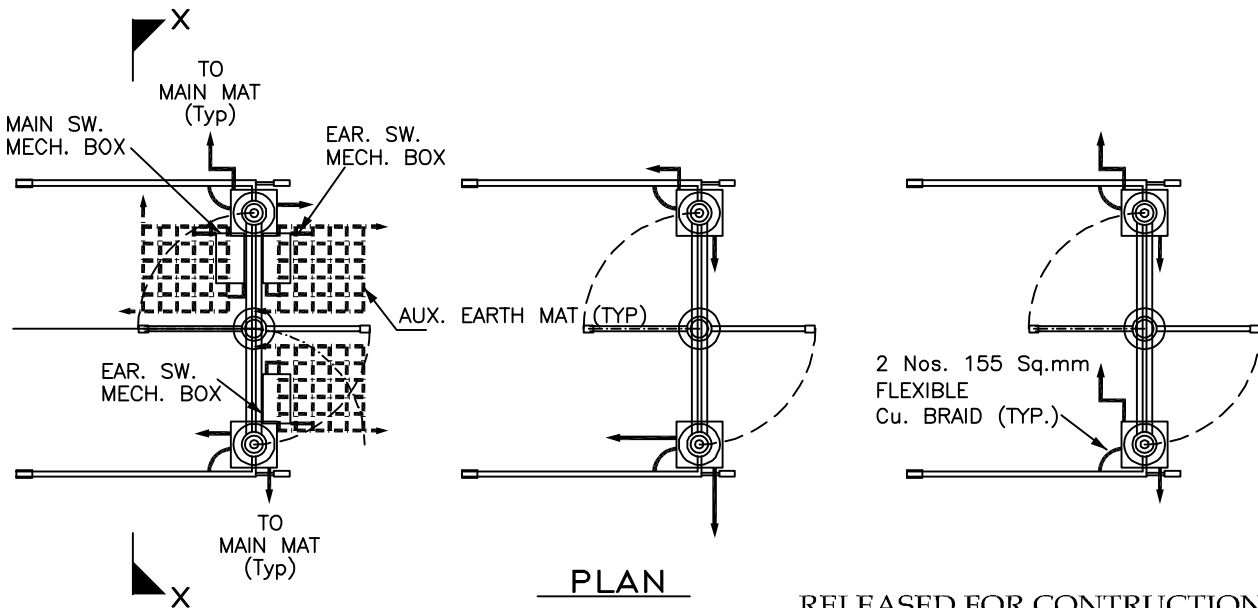
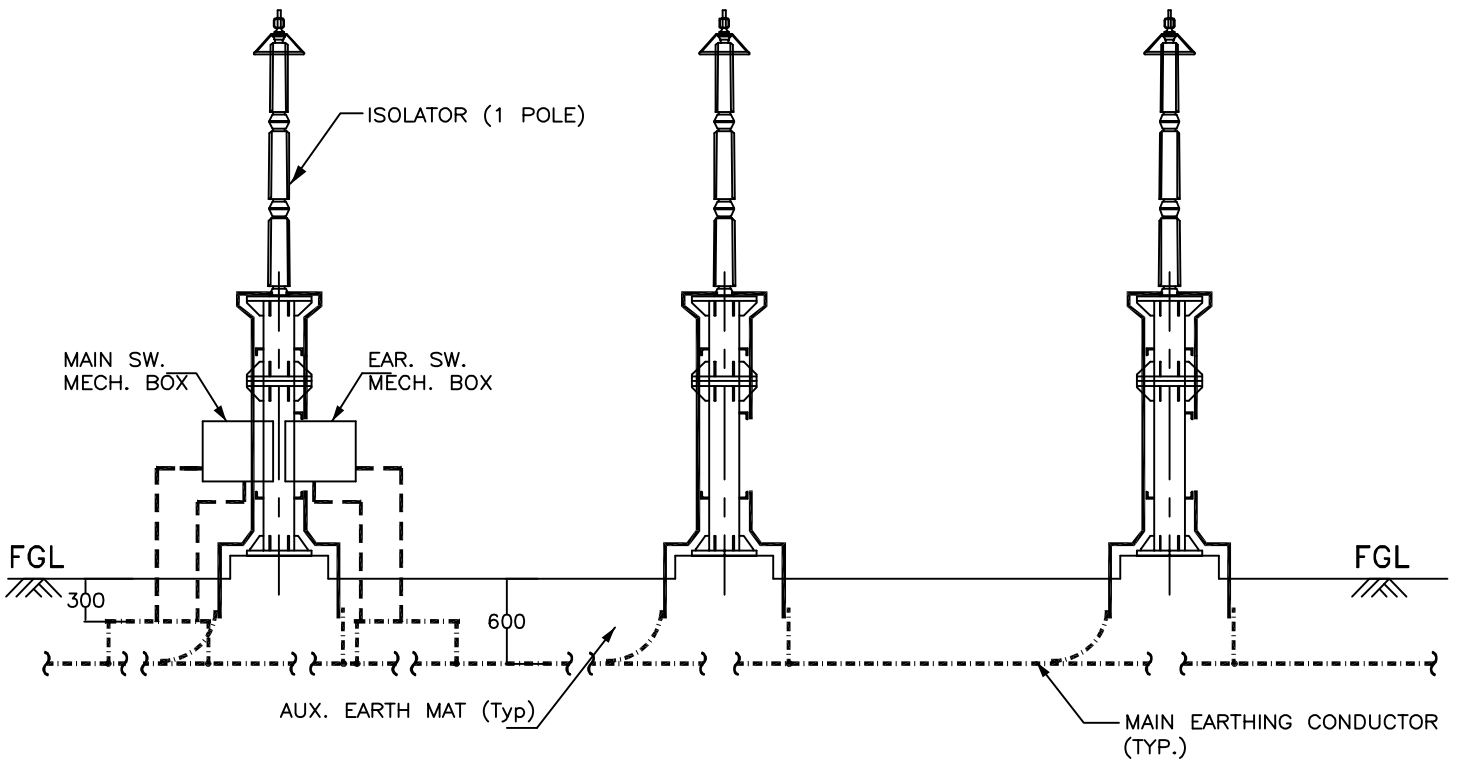
LEGEND

- 40mm ϕ MS ROD
- 75 x 12 mm GS FLAT
- - - 50 x 6 mm GS FLAT

END VIEW

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PROJECT :- TECHNICAL SPECIFICATION- SWITCHYARD ERECTION			
TITLE:- STANDARD EARTHING DETAILS			
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<small>CKD BY</small>	<small>PRPD BY</small>	<small>Date</small>	<small>C/ENG/STD/EARTHINGS/09</small>
			<small>SHEET # 8</small>

EARTHING OF ISOLATOR



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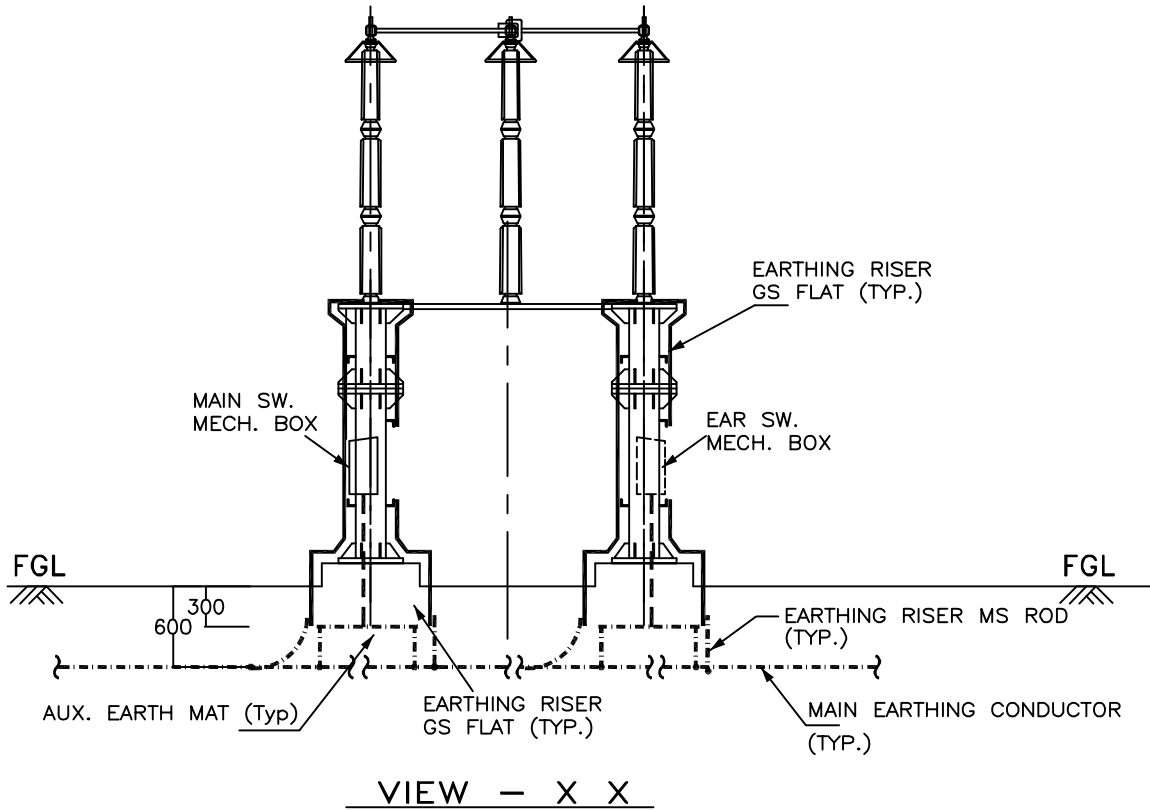


**PROJECT :- TECHNICAL SPECIFICATION-
SWITCHYARD ERECTION**

TITLE:- STANDARD EARTHING DETAILS

<i>KKParhar</i>	<i>KKParhar</i>	Dec-2013	Drawing No.:
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EARTHING OF ISOLATOR (1 PH)



LEGEND

— · — · — · —	40mm ϕ MS ROD
—————	75 x 12 mm GS FLAT
- - - - -	50 x 6 mm GS FLAT

NOTES :-

1. No. OF RISERS FOR ISOLATOR = 4 Nos. / PHASE.
2. No. OF RISERS FOR MAIN MECH. BOX = 2 Nos.
3. No. OF RISERS FOR EARTH SW. MECH. BOX = 2 Nos. / BOX.
4. No. OF AUXILIARY EARTH MAT = 1 Nos. FOR EACH MB
5. CLEAT CLAMP SHALL BE PROVIDED AT 1000mm INTERVAL.
6. NO. OF AUX. EARTH MAT IS INDICATIVE ONLY. IT SHALL BE EXECUTED AS PER ACTUAL NUMBER/POSITION OF EARTH SWITCHES.

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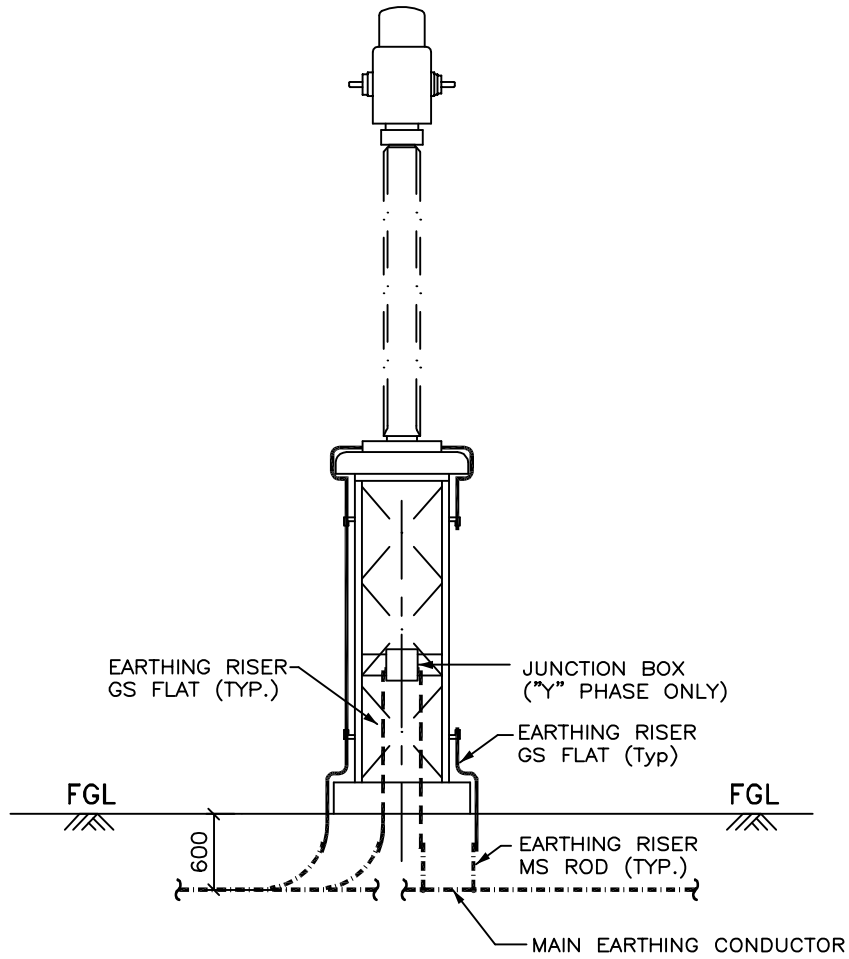


PROJECT :- TECHNICAL SPECIFICATION-
SWITCHYARD ERECTION

TITLE:- STANDARD EARTHING DETAILS

<i>KK Parshar</i>	<i>KK Parshar</i>	Dec-2013	Drawing No.:
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EARTHING OF CURRENT TRANSFORMER (1 PH)



ELEVATION

LEGEND

- · — · — · — 40mm ϕ MS ROD
- 75 x 12 mm GS FLAT
- 50 x 6 mm GS FLAT

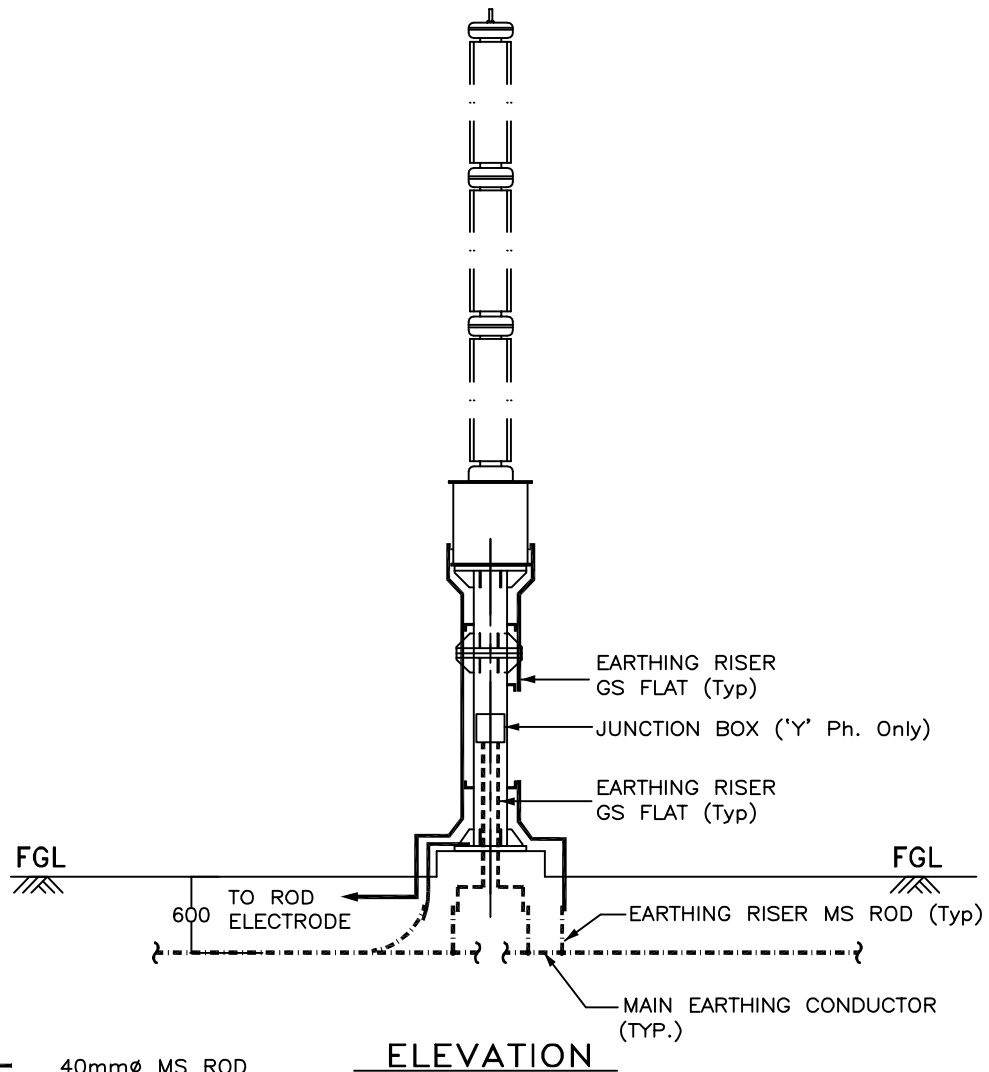
NOTES :-

1. No. OF RISERS = 2 Nos. / PHASE.
2. No. OF RISERS FOR JUN. BOX = 2 Nos.
3. CLEAT CLAMP SHALL BE PROVIDED AT 1000mm INTERVAL.

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PROJECT :- TECHNICAL SPECIFICATION- SWITCHYARD ERECTION			
TITLE:- STANDARD EARTHING DETAILS			
<i>SK Parshar</i> CKD BY	<i>SK Parshar</i> PRPD BY	Dec-2013 Date	Drawing No.: C/ENG/STD/EARTHINGS/09 SHEET # 12

EARTHING OF CAPACITIVE VOLTAGE TRANSFORMER (1 PH)




LEGEND

- · — · — · — 40mm ϕ MS ROD
- 75 x 12 mm GS FLAT
- 50 x 6 mm GS FLAT

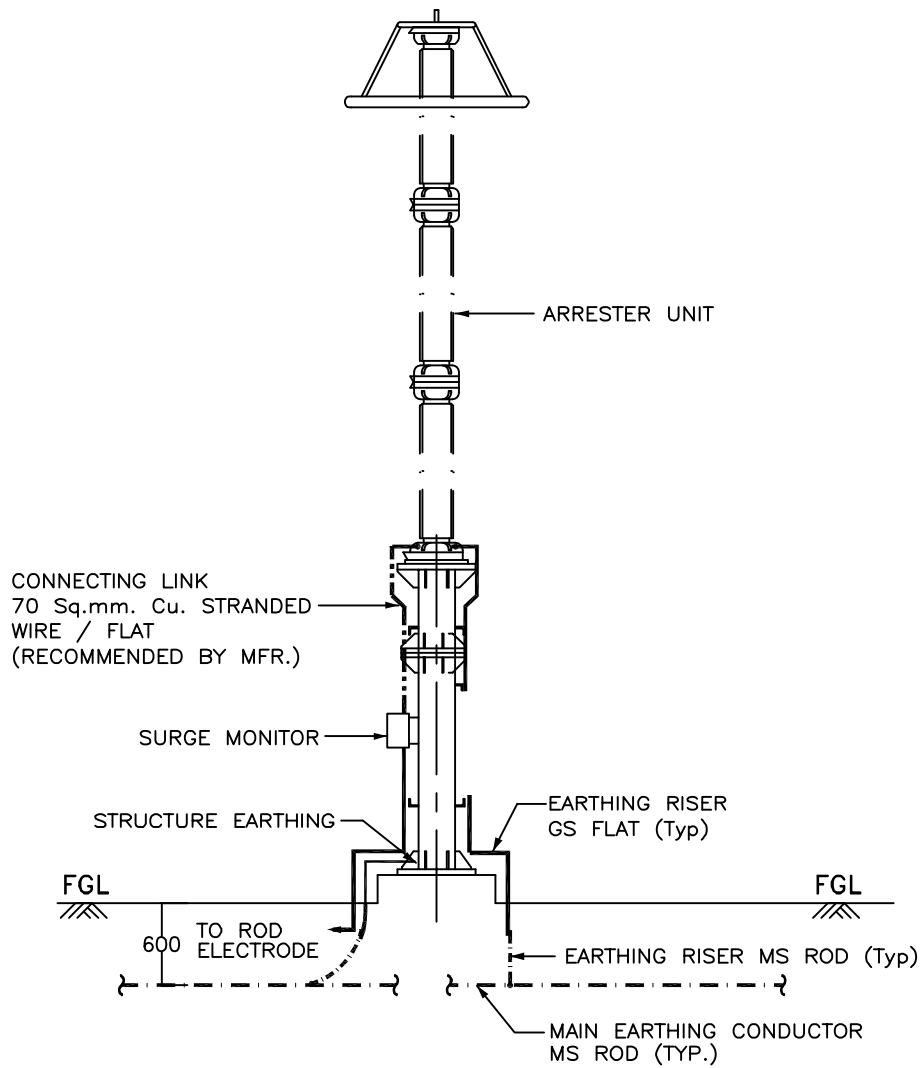
NOTES :-

1. No. OF RISERS = 3 Nos. / PHASE.
2. No. OF RISERS FOR J. BOX = 2 Nos.
3. No. OF ROD ELECTRODE REQUIRED = 1 No. / PHASE.
4. CLEAT CLAMP SHALL BE PROVIDED AT 1000mm INTERVAL.

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<p>PROJECT :- TECHNICAL SPECIFICATION- SWITCHYARD ERECTION</p>			
<p>TITLE:- STANDARD EARTHING DETAILS</p>			
<i>SK Parshar</i>	<i>SK Parshar</i>	Dec-2013	Drawing No.:
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EARTHING OF SURGE ARRESTER (1PH)



ELEVATION


LEGEND

- · — · — · — 40mm ϕ MS ROD
- 75 x 12 mm GS FLAT

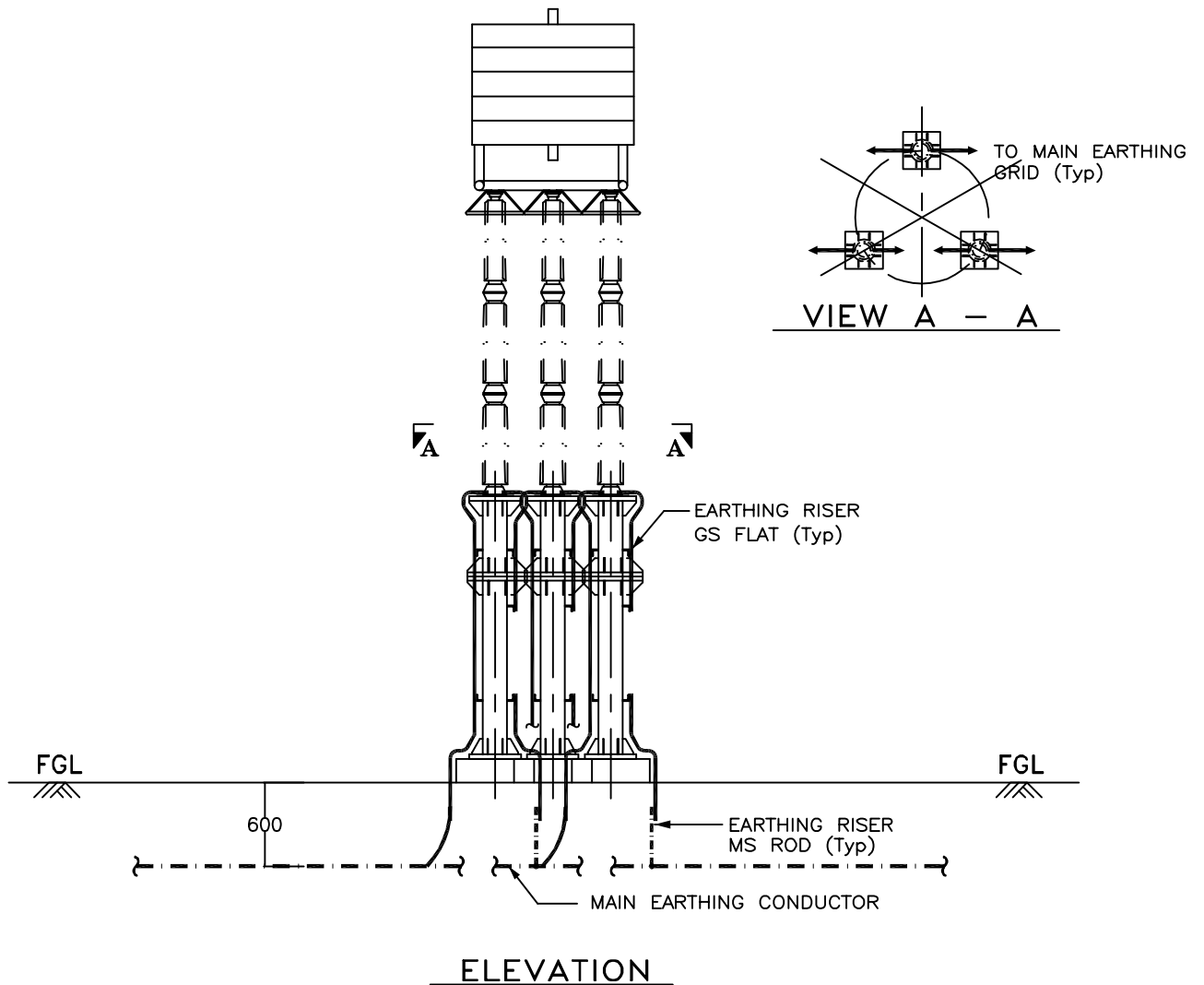
NOTES :-

- 1 . No. OF RISERS = 3 Nos. / PHASE.
- 2 . No. OF ROD ELECTRODE REQUIRED = 1 No. / PHASE.
- 3 . CLEAT CLAMP SHALL BE PROVIDED AT 1000mm INTERVAL.

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EARTHING OF WAVE TRAP (1PH)




LEGEND

- · — · — · — 40mm ϕ MS ROD
- 75 x 12 mm GS FLAT

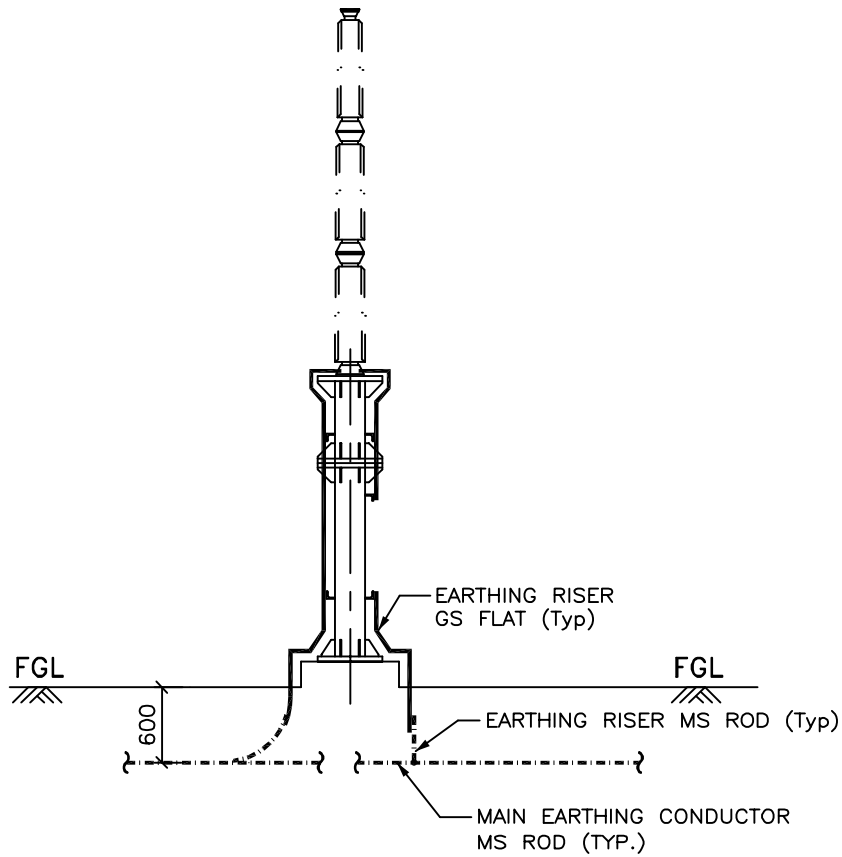
NOTE :-

1. No. OF RISERS = 6 Nos. / PHASE.
2. CLEAT CLAMP SHALL BE PROVIDED AT 1000mm INTERVAL.

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EARTHING OF POST INSULATOR (1PH)



ELEVATION

LEGEND

- 40mm ϕ MS ROD
 75 x 12 mm GS FLAT

NOTES :-

1. No. OF RISERS = 2 Nos. / PHASE.
2. CLEAT CLAMP SHALL BE PROVIDED AT 1000mm INTERVAL.

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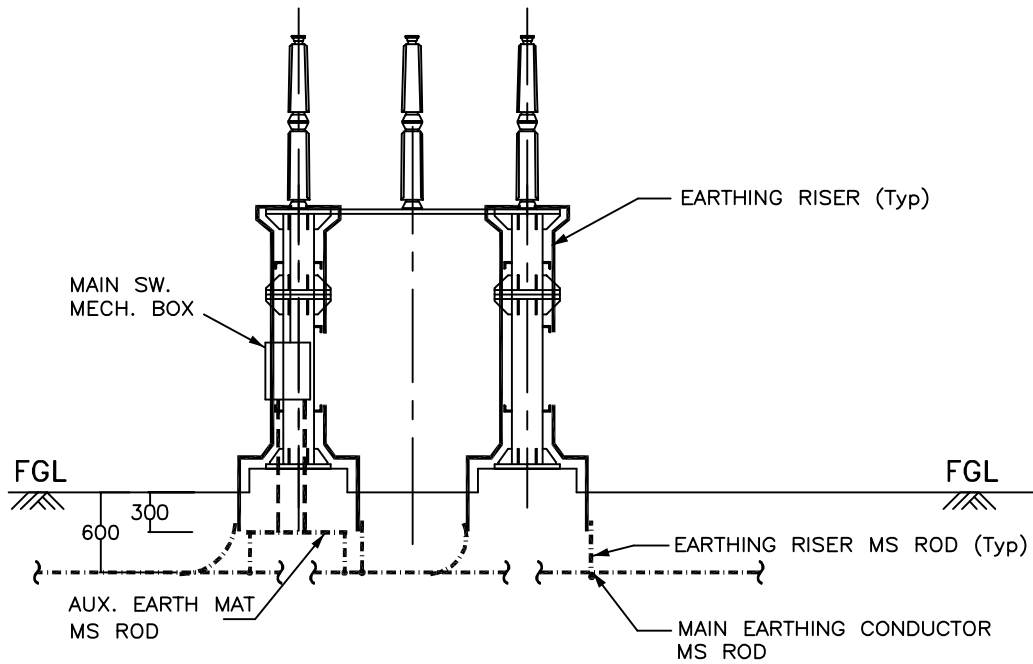


PROJECT :- TECHNICAL SPECIFICATION-
SWITCHYARD ERECTION

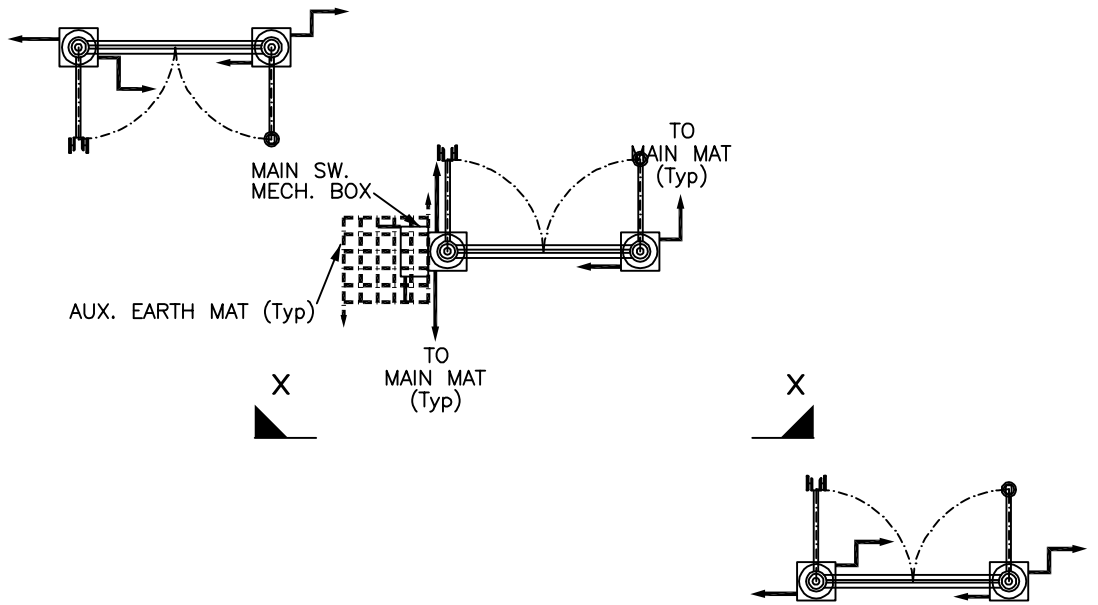
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TANDEM ISOLATOR



VIEW - X X



PLAN

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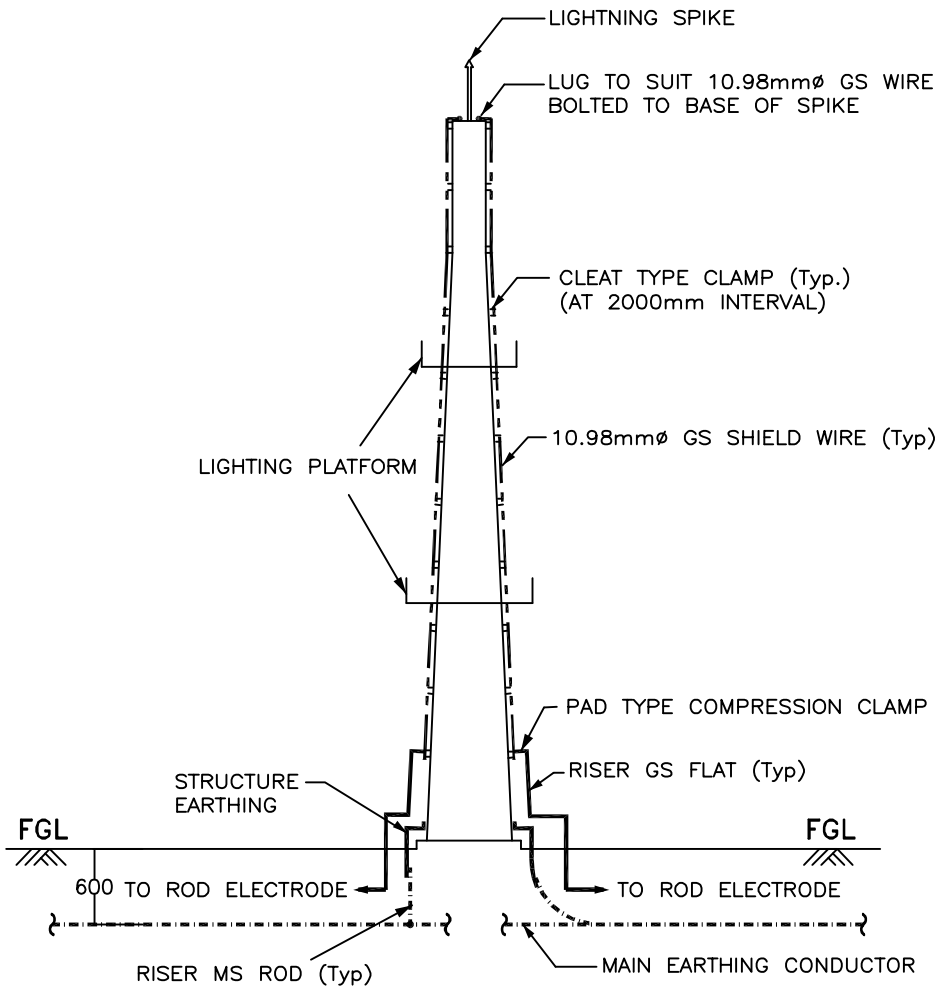


PROJECT :- TECHNICAL SPECIFICATION-
SWITCHYARD ERECTION

TITLE:- STANDARD EARTHING DETAILS

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EARTHING OF LIGHTNING MAST



NOTES :-

1. No. OF RISERS = 4 Nos.
2. No. OF ROD ELECTRODE REQUIRED = 2 Nos.
3. No. OF PAD TYPE CLAMP = 2 Nos.

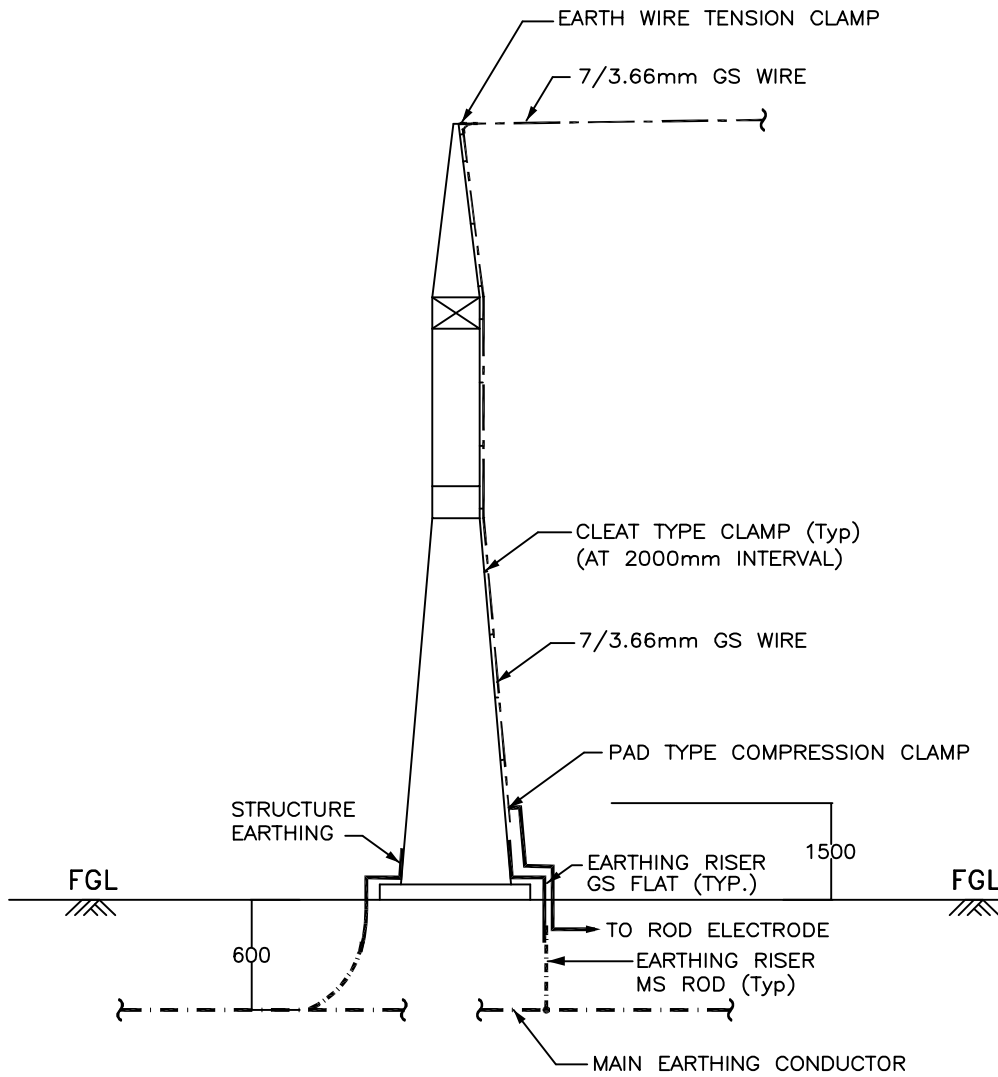
LEGEND

- 40mm ϕ MS ROD
- 75 x 12 mm GS FLAT

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TITLE:- STANDARD EARTHING DETAILS			
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EARTHING OF TOWER WITH PEAK



ELEVATION

LEGEND

- 40mm ϕ MS ROD
- 75 x 12 mm GS FLAT

NOTES :-

1. No. OF RISERS = 3 Nos.
2. No. OF ROD ELECTRODE REQUIRED = 1 No.
3. No. OF PAD TYPE CLAMP = 1 No.

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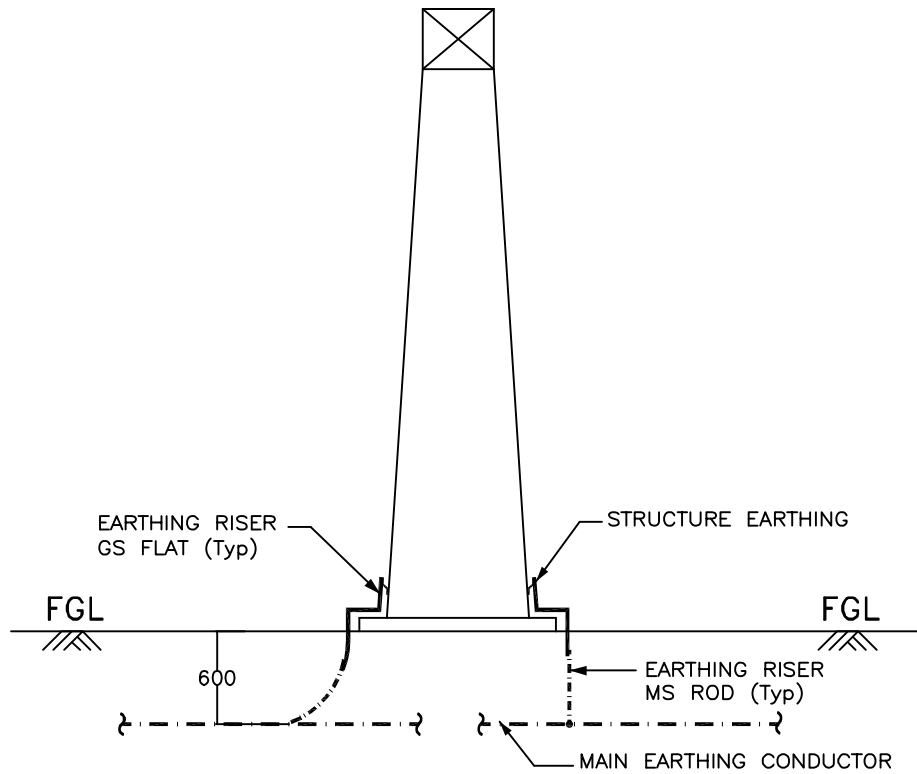


PROJECT :- TECHNICAL SPECIFICATION-
SWITCHYARD ERECTION

TITLE:- STANDARD EARTHING DETAILS

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EARTHING OF TOWER WITHOUT PEAK



ELEVATION

LEGEND

- 40mm ϕ MS ROD
- 75 x 12 mm GS FLAT

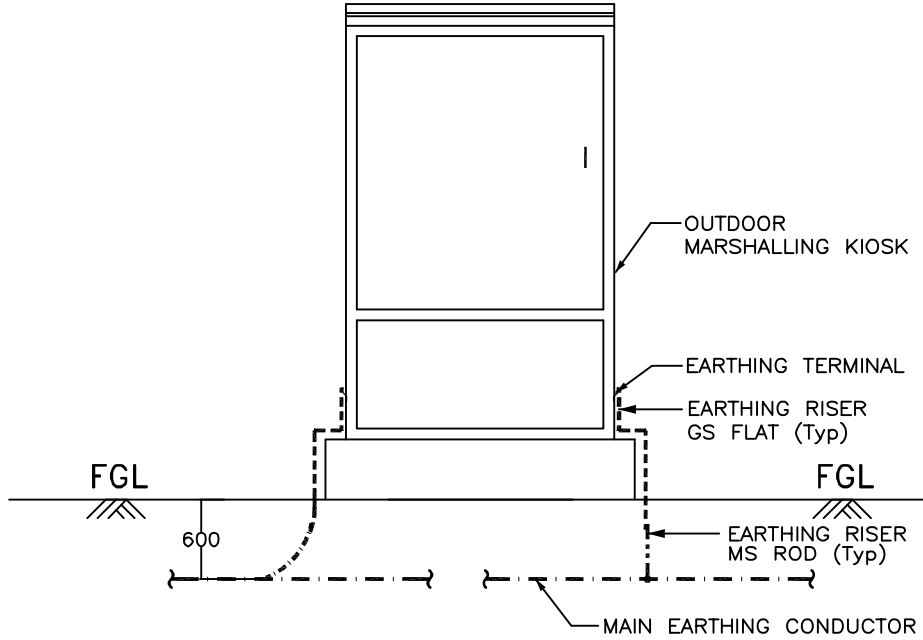
NOTES :-

1. No. OF RISERS = 2 Nos.

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EARTHING OF BAY MARSHALLING BOX



ELEVATION


LEGEND

- · — · — · — 40mm ϕ MS ROD
- 75 x 12 mm GS FLAT
- 50 x 6 mm GS FLAT

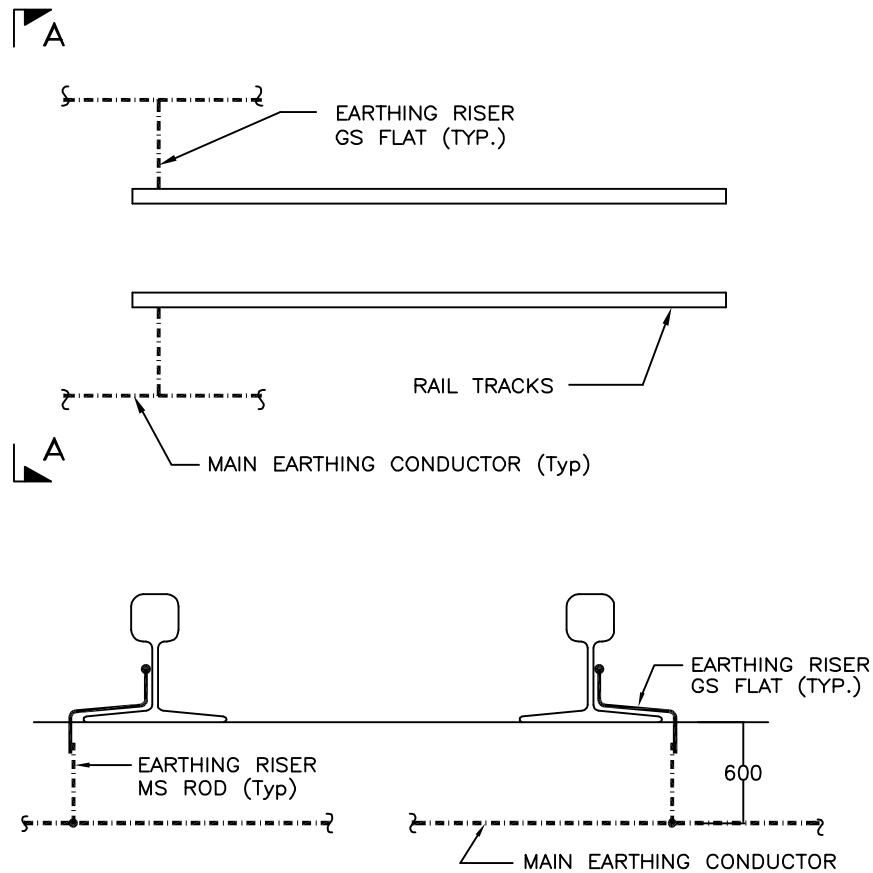
NOTE :-

1. No. OF RISERS = 2 Nos.

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EARTHING OF RAIL TRACK



LEGEND

- · — · — · — 40mm ϕ MS ROD
- 75 x 12 mm GS FLAT

NOTES :-

1. EACH RAIL SHALL BE EARTHED AT 30M INTERVAL AND ALSO AT BOTH ENDS.

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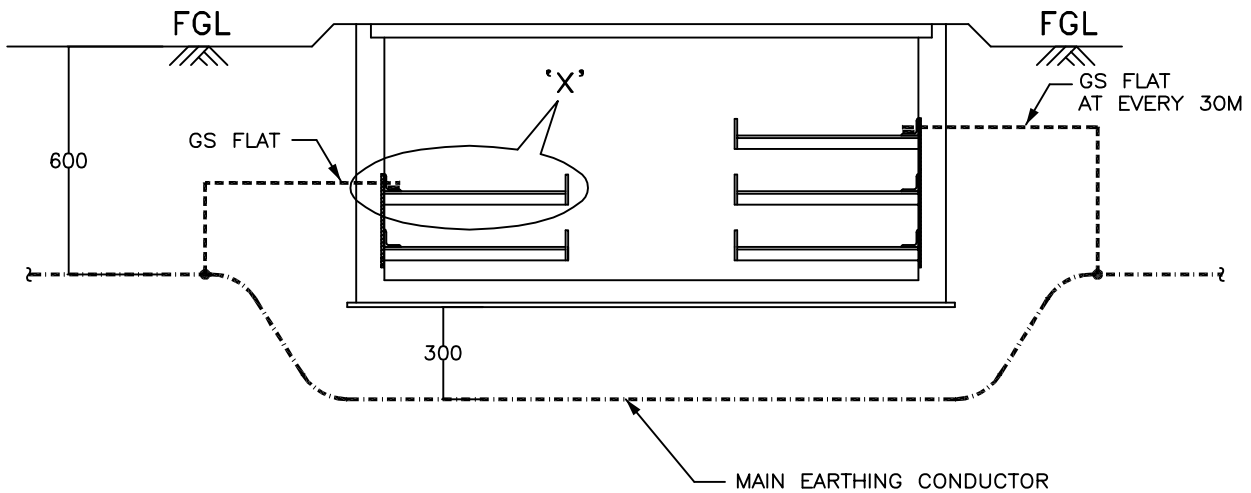


PROJECT :- TECHNICAL SPECIFICATION-
SWITCHYARD ERECTION

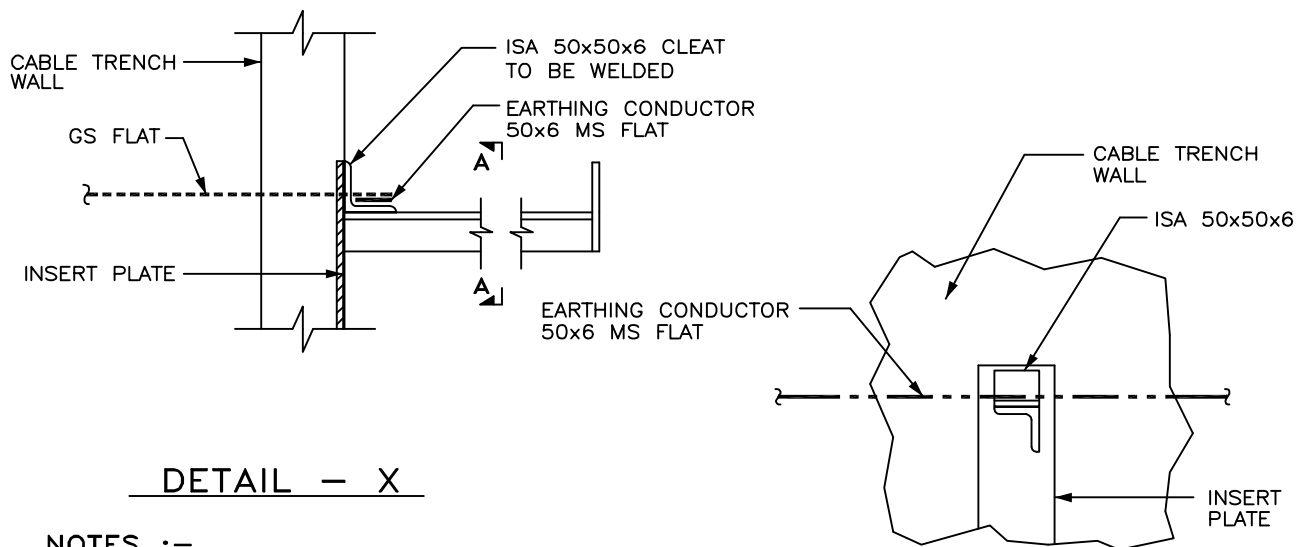
TITLE:- STANDARD EARTHING DETAILS

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EARTHING OF CABLE TRENCH



TYPICAL CROSS SECTION OF CABLE TRENCH



DETAIL - X

SECTION A - A

NOTES :-

1. MS FLAT SHALL RUN ON TOP TIER ALL ALONG THE CABLE TRENCHES & WELDED TO EACH OF THE RACKS.
2. MS FLAT SHALL BE EARTHED AT 30M INTERVAL AND ALSO AT BOTH ENDS.

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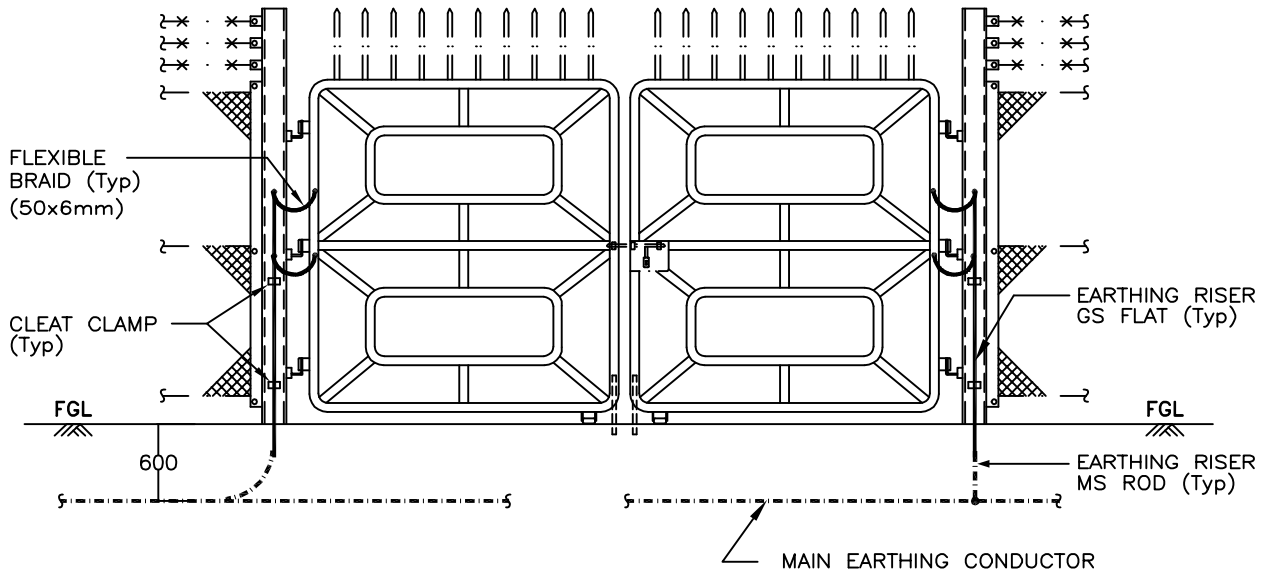


PROJECT :- TECHNICAL SPECIFICATION-
SWITCHYARD ERECTION

TITLE:- STANDARD EARTHING DETAILS

<i>KKParshar</i>	<i>KKParshar</i>	Dec-2013	Drawing No.: C/ENG/STD/EARTHINGS/09 SHEET # 23
CKD BY	PRPD BY	Date	

EARTHING OF GATES



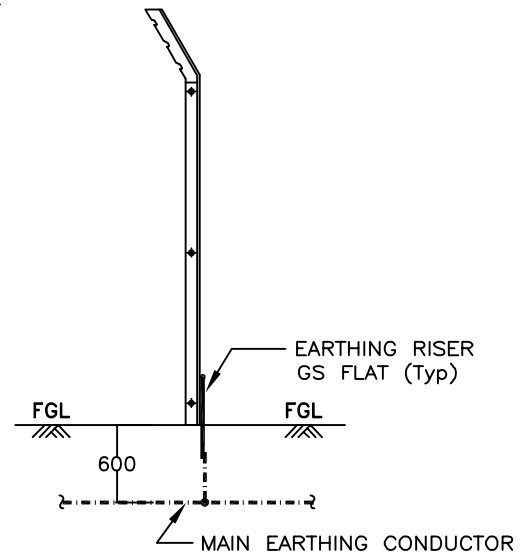
MAIN GATE

LEGEND

	40mm ϕ MS ROD
	75 x 12 mm GS FLAT
	50 x 6 mm MS FLAT

NOTES :-

	FENCE POST	MAIN GATE
1 . No. OF RISERS REQUIRED	1	2
2 . No. OF FLEXIBLE BRAID	-	4
3. ALL GATES & EVERY ALTERNATE FENCE SHALL BE CONNECTED TO EARTHING GRID.		



FENCE POST (ALTERNATE FENCE POST)

RELEASED FOR CONTRUCTION

POWER GRID CORPORATION
OF INDIA LIMITED
(A Government of India Enterprise)

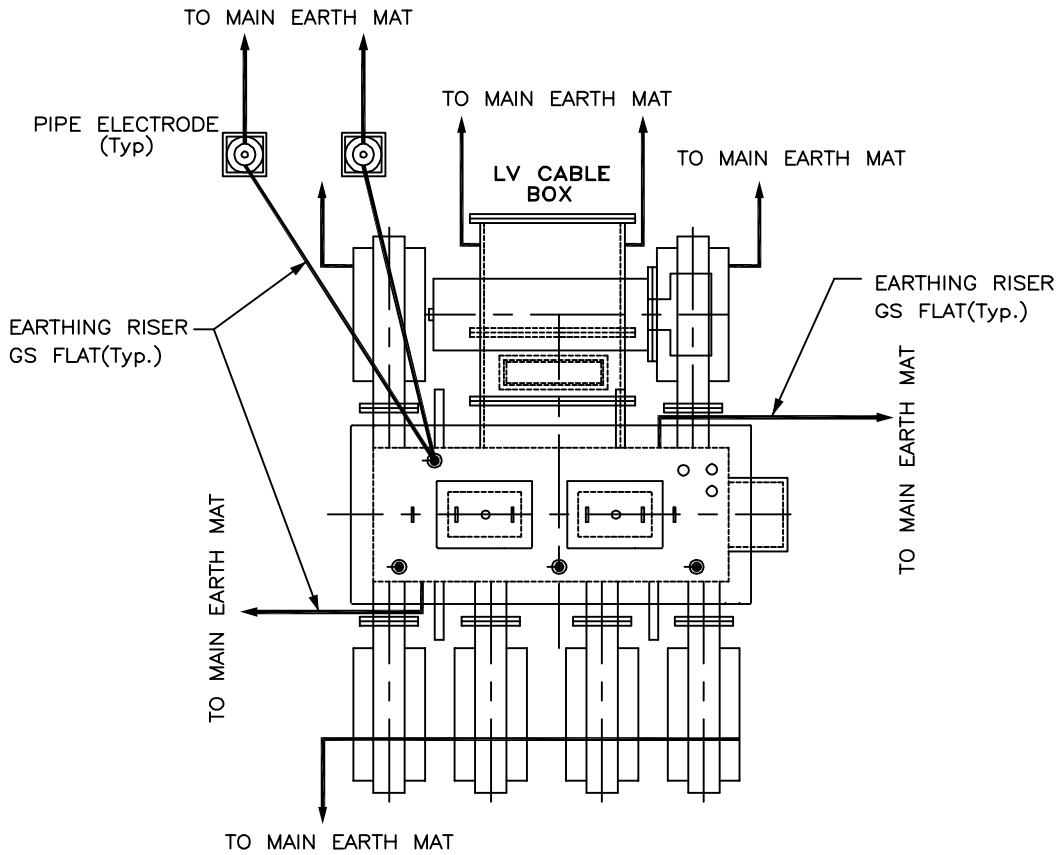


PROJECT :- TECHNICAL SPECIFICATION-
SWITCHYARD ERECTION

TITLE:- STANDARD EARTHING DETAILS

<i>KK Parhar</i>	<i>KK Parhar</i>	Dec-2013	Drawing No.:
CKD BY	PRPD BY	Date	C/ENG/STD/EARTHINGS/09 SHEET # 24

EARTHING OF LT TRANSFORMER



PLAN

LEGEND

— · — · — · —	40mm ϕ MS ROD
—————	75 x 12 mm GS FLAT
- - - - -	50 x 6 mm GS FLAT

NOTES :-

1. No. OF RISERS FOR MAIN TANK & T.M. MAR. BOX = 4 Nos.
2. No. OF RISERS FOR LV CABLE BOX & RADIATOR = 4 Nos.
3. No. OF RISERS FOR PIPE ELECTRODE = 2 Nos.
4. No. OF PIPE ELECTRODES REQUIRED = 2 Nos.

RELEASED FOR CONTRUCTION

POWER GRID CORPORATION
OF INDIA LIMITED
(A Government of India Enterprise)

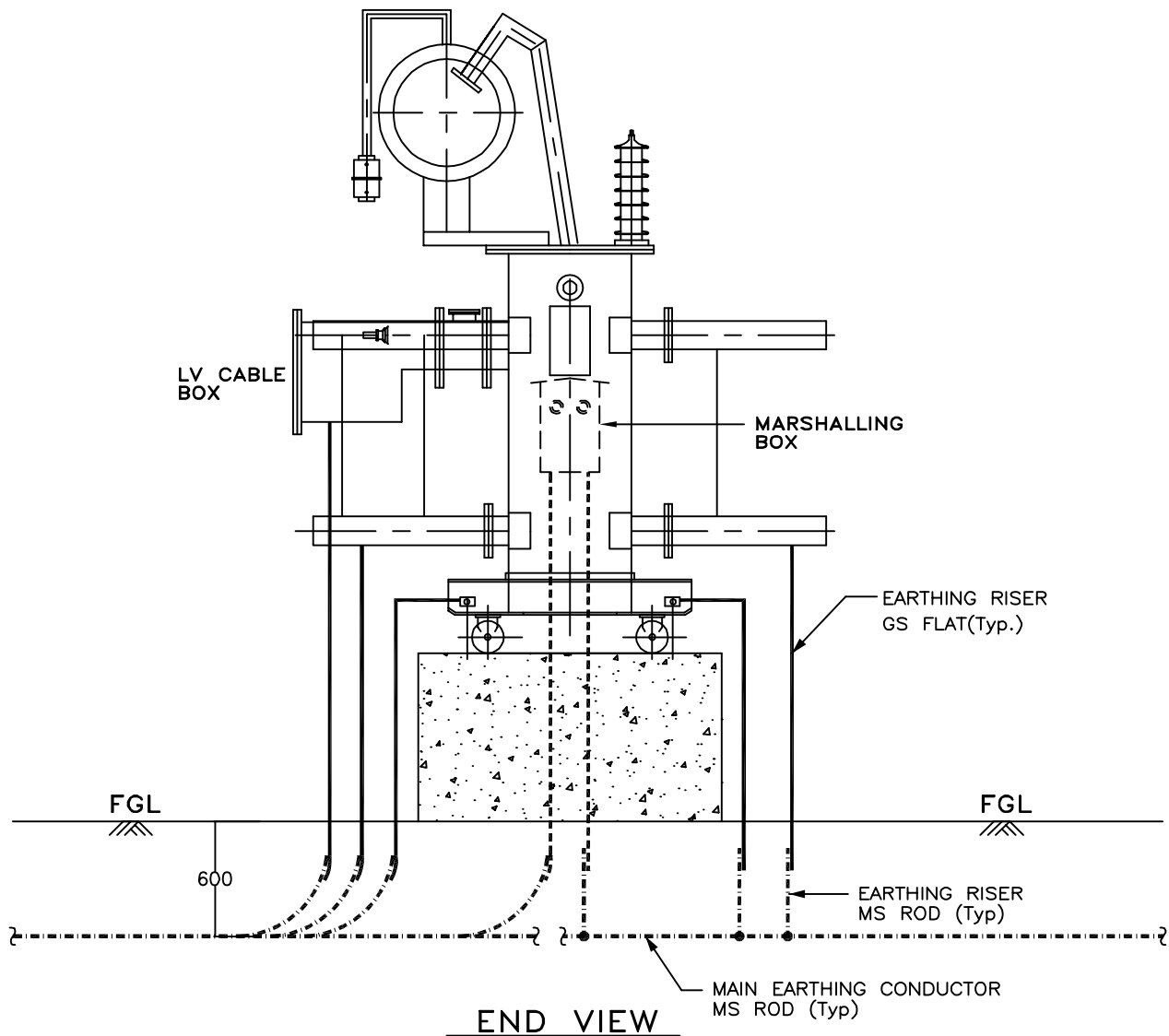


PROJECT :- TECHNICAL SPECIFICATION-
SWITCHYARD ERECTION

TITLE:- STANDARD EARTHING DETAILS

<i>KKPashar</i>	<i>KKPashar</i>	Dec-2013	Drawing No.: C/ENG/STD/EARTHINGS/09 SHEET # 25
CKD BY	PRPD BY	Date	

EARTHING OF LT TRANSFORMER



RELEASED FOR CONTRUCTION

POWER GRID CORPORATION
OF INDIA LIMITED
(A Government of India Enterprise)



PROJECT :- TECHNICAL SPECIFICATION-
SWITCHYARD ERECTION

TITLE:- STANDARD EARTHING DETAILS

<i>KK Parshar</i>	<i>KK Parshar</i>	Dec-2013	Drawing No.: C/ENG/STD/EARTHINGS/09 SHEET # 26
CKD BY	PRPD BY	Date	

EARTHING OF PYLON SUPPORTS

Pylon supports shall be grounded through 50x6mm GI flat to the ring around the Pylon supports of 75x12mm GI flat which in turn is connected to the main grid (40 mm dia MS rod) at 2 to 3 points as available.

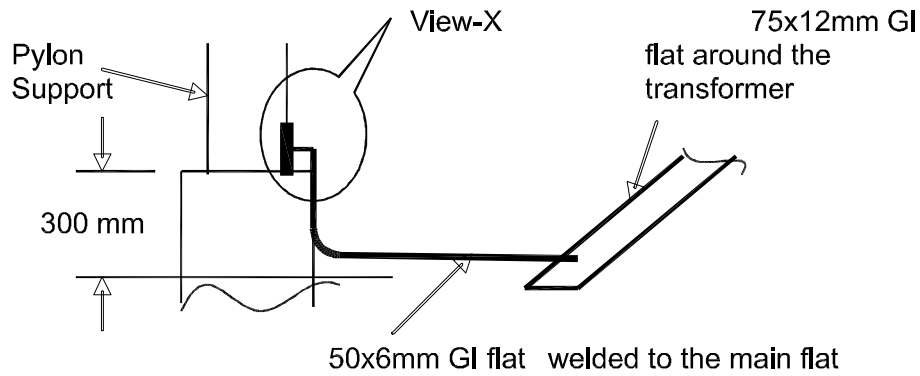


Fig.- Elevation (Earthing of Pylon Supports)

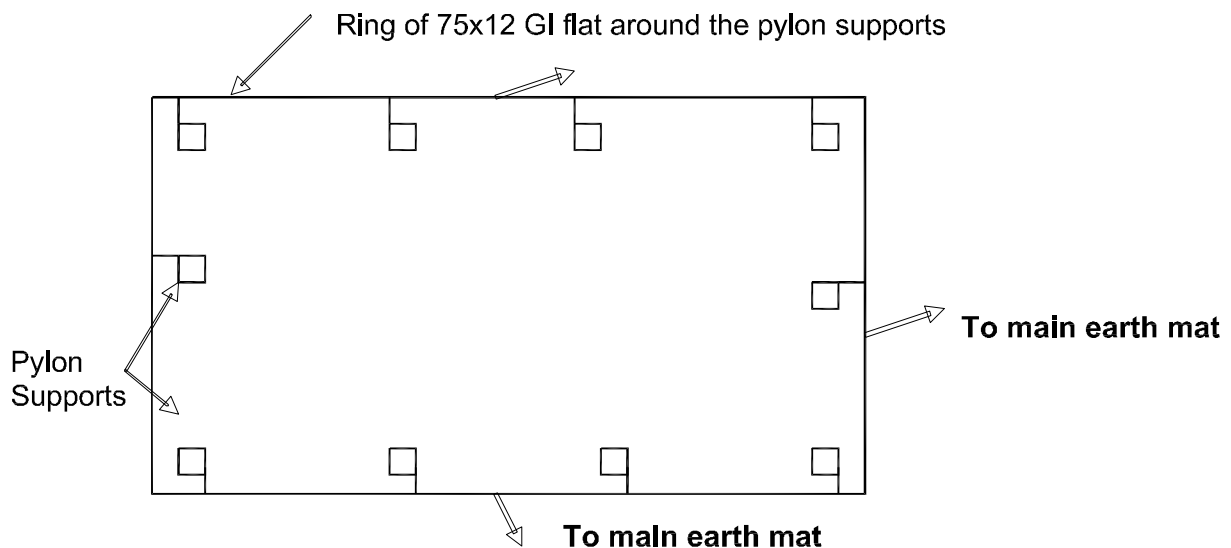



Fig.- Layout (Earthing of Pylon Supports)

RELEASED FOR CONTRUCTION

POWER GRID CORPORATION OF INDIA LIMITED (A Government of India Enterprise)			 पावरग्रिड
PROJECT :- TECHNICAL SPECIFICATION- SWITCHYARD ERECTION			
TITLE:- STANDARD EARTHING DETAILS			
<i>SKPashkar</i>	<i>SKPashkar</i>	Dec-2013	Drawing No.: C/ENG/STD/EARTHINGS/09 SHEET # 27
CKD BY	PRPD BY	Date	

EARTHING OF HYDRANT/ HVW SPRAY PIPING

These pipes shall be grounded at pump house through 50x6mm GI flat connected to the main flat, 75x12mm running around the room.

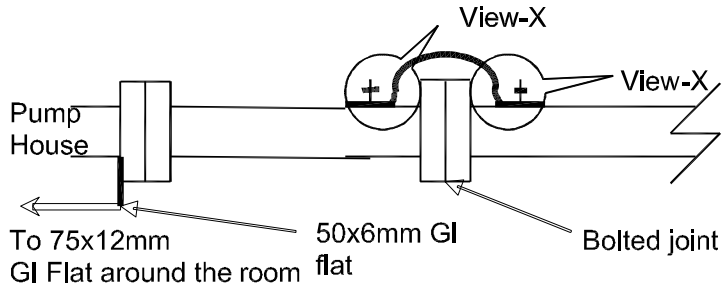


Fig.-Earthing of Hydrant / HVW Spray Piping

EARTHING OF HYDRANT POST/ HOSE BOX

A bolt shall be welded to these structures at the time of installation which can be used to connect them to the nearest riser or main 75x12mm GI flat through 50x6mm GI flat.

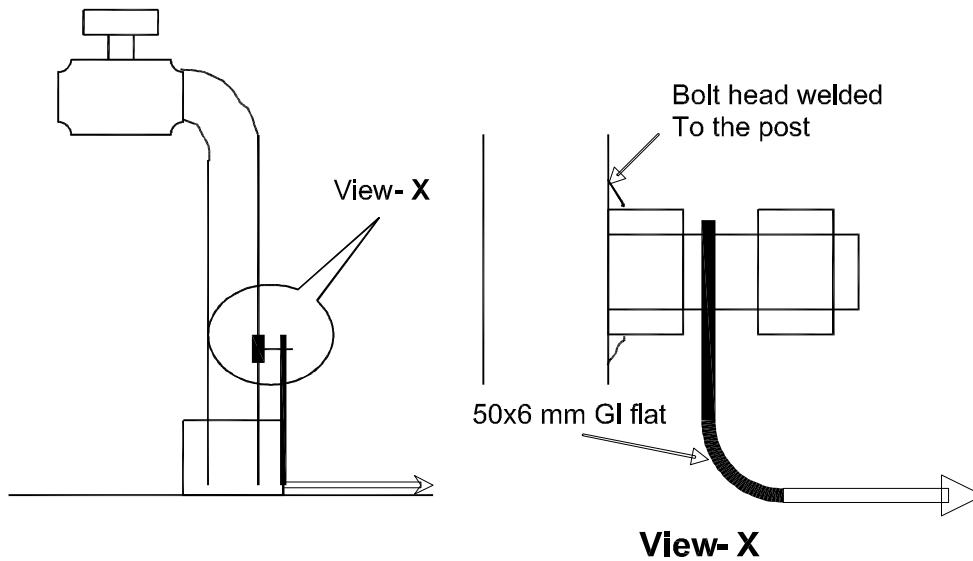



Fig.- Earthing of hydrant box / hose box

RELEASED FOR CONTRUCTION

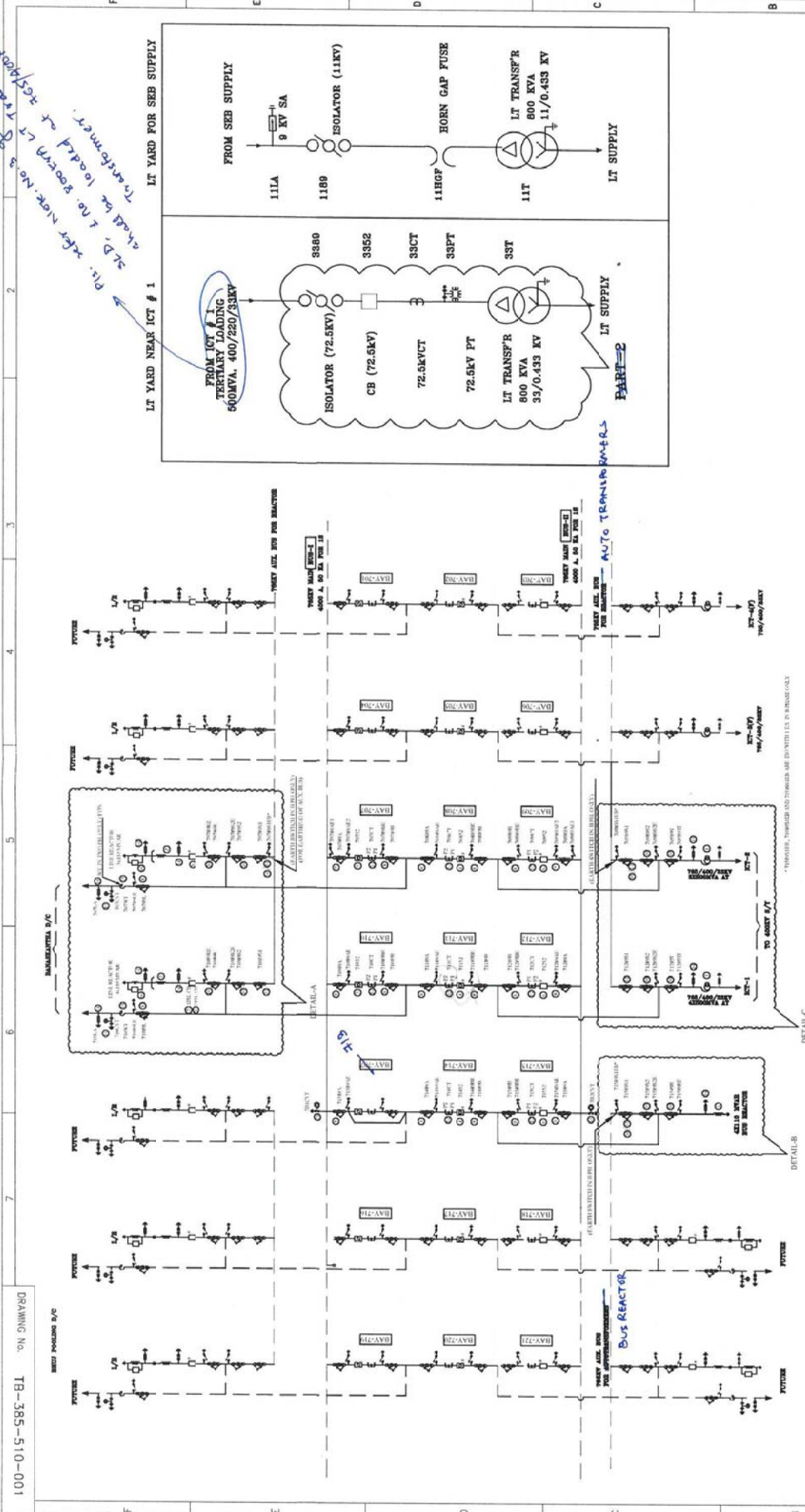
POWER GRID CORPORATION OF INDIA LIMITED (A Government of India Enterprise)			 पावरग्रिड
PROJECT :- TECHNICAL SPECIFICATION- SWITCHYARD ERECTION			
TITLE:- STANDARD EARTHING DETAILS			
<i>HK Parshar</i>	<i>HK Parshar</i>	Dec-2013	Drawing No.: C/ENG/STD/EARTHINGS/09 SHEET # 28
CKD BY	PRPD BY	Date	

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN MM.)

DRWING NO. TB-385-510-00

PIV. refer note No. 2 & 3
 1. No. 1000V LT Transformer
 should be loaded at 75% power

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NOA NO. : CC-CS/484-WR2/SS-2953/11/C8/NOA-1&2/5727 & 5728 DT. 31.03.16	POWER GRID CORPORATION OF INDIA LIMITED
ADDITIONAL INFORMATION W.O.No. 85005	NAME OF CUSTOMER/PROJECT SUBSTATION PACKAGE-SS01 FOR CONSTRUCTION OF 765/400/220KV BHUJ S/S & EXT. OF 765KV BANASKANTHA S/S UNDER GREEN ENERGY CORRIDOR ISTS PART - C (PART-1)
STATUS OF DRAWING CONTRACT DISTRIBUTION OF PERMITS	PROJECT / NAME JS
REV. DATE ALTERED CHECKED APPROVED	DATE 16.04.16
ZONE	SCALE NTS
	CARD CODE
	PROJECT TITLE SINGLE LINE DIAGRAM FOR 765/400/220KV BHUJ S/S.
	DRAWING NO. TB-385-510-001
	SHEET NO. / TOTAL SHEET 01 / 02

765KV SINGLE LINE DIAGRAM

APPROVED

DATE: 16/04/16

BY: [Signature]

FOR: [Signature]

COMPLIANCE Dwg. PATH NAME :
 INVENTORY No. :
 SIGN. & DATE :
 REF. DRG. No. :

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN MM.)

100-385-510-001

DRWING No.

TO 765KV
ICT-3 (F) ICT-4 (F)
765/400/33KV
42000VA AT
30000VA AT

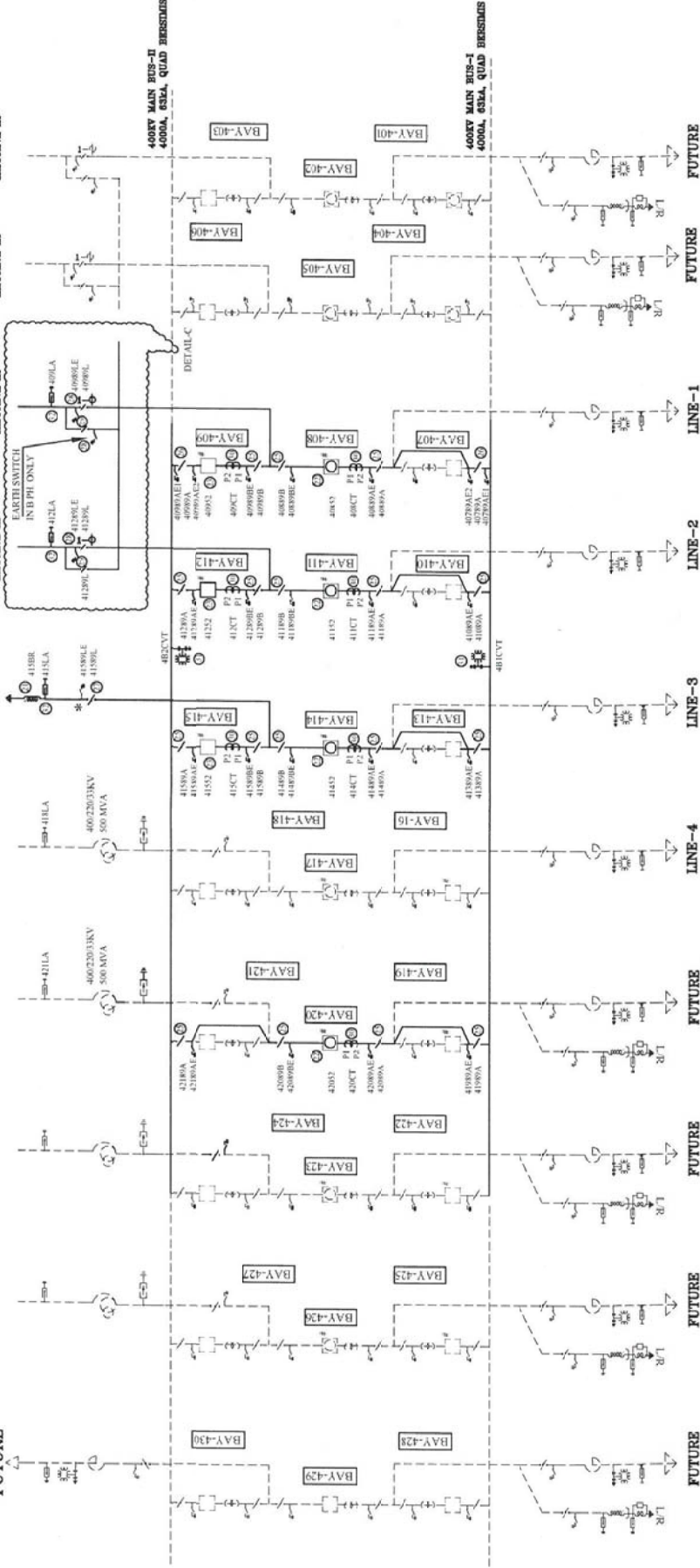
TO 765KV
ICT-1
765/400/33KV
42000VA AT
30000VA AT

125 MVAR
B/R

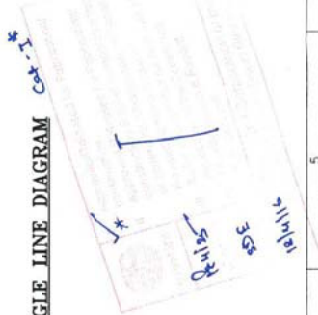
TO 220KV S/Y

220KV

FUTURE



NOA NO. : CC-CS/484-WR2-SS-2853/11/G8/NOA-1&2/5727 & 5728 DT. 31.03.16	
ADDITIONAL INFORMATION W.O.No. 85603	NAME OF CUSTOMER/PROJECT POWER GRID CORPORATION OF INDIA LIMITED SUBSTATION PACKAGE-SS01 FOR CONSTRUCTION OF 765/400/220KV BHUJ S/S & EXT. OF 765KV BAMASKANTHA S/S UNDER GREEN ENERGY CORRIDOR ISTS PART-C (PART-1)
STATUS OF DRAWING CONTRACT DISTRIBUTION OF PRINTS	
REV. DATE ALTERED CHECKED APPROVED	REVISIONS NO. DATE BY REASON
SCALE NTS	DATE OF SHEET 06.04.16
SINGLE LINE DIAGRAM FOR 765/400/220KV BHUJ S/S.	
DRAWING NO. / SHEET NO. 02 / 03	



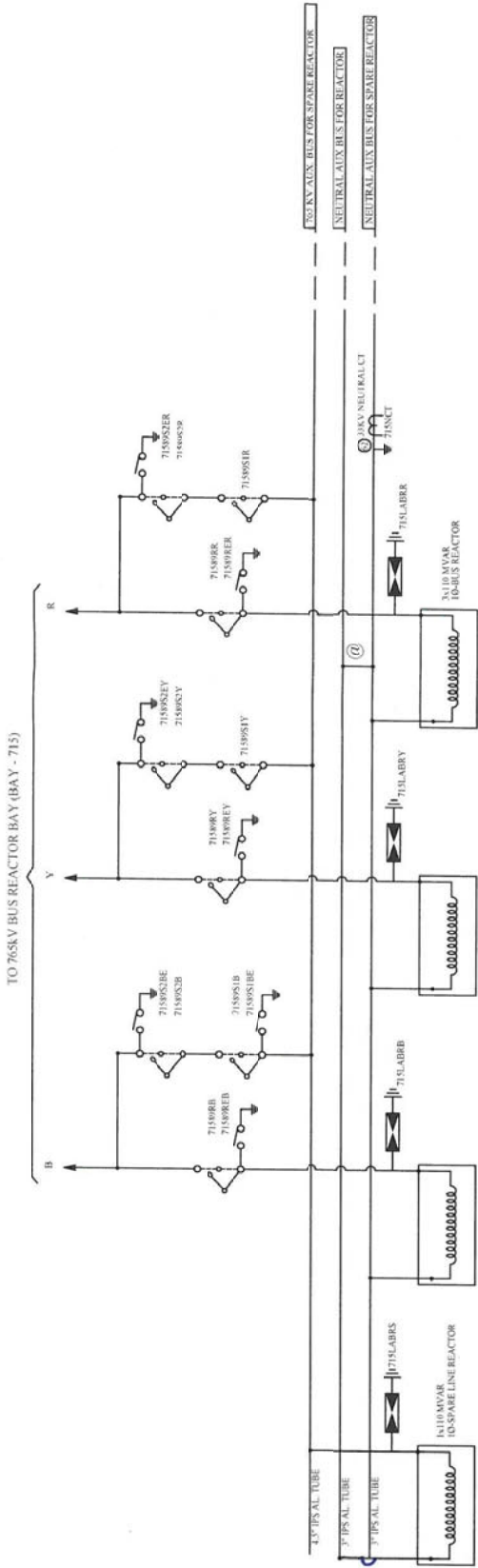
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COMPUTER DWG. PATH NAME :

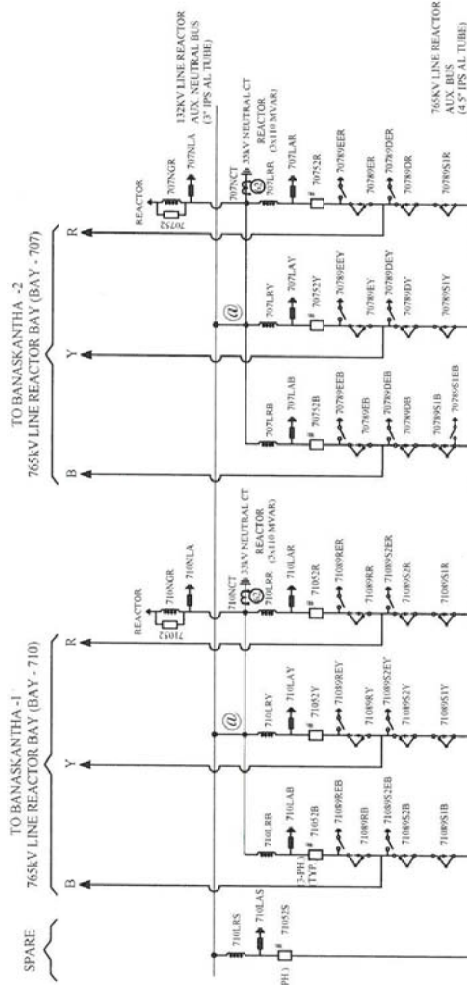
REF. DRG. No.
SIGN. & DATE
INVENTORY No.

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN MM.)

DRAWING No. TB-385-510-001



DETAIL-B
(ARRANGEMENT OF 765KV BUS REACTOR AND AUX. BUS.)



DETAIL-A
(ARRANGEMENT OF 765KV LINE REACTOR AND AUX. BUS.)

Handwritten notes and stamps: 'CDE', '18/11/16', 'Cot-I', and a circular stamp with text in Hindi and English.

NOA NO. : CC-CS/484-WR2/SS-2953/11/G8/NOA-1&2/5727 & 5728 DT. 31.03.16		POWER GRID CORPORATION OF INDIA LIMITED	
ADDITIONAL INFORMATION W.D.No. 85003		SUBSTATION PACKAGE-SSDI FOR CONSTRUCTION OF 765/400/220KV BHUJ S/S & EXT. OF 765KV BANASKANTHA S/S UNDER GREEN ENERGY CORRIDOR ISTS PART-C (PART-1)	
STATUS OF DRAWING CONTRACT		DISTRIBUTION OF PRINTS	
REV.	DATE	ALTERED BY	APPROVED BY
ZONE			
PROJECT / TITLE		SINGLE LINE DIAGRAM FOR 765/400/220KV BHUJ S/S.	
SCALE		NTS	
DRAWING NO.		TB-385-510-001	
SHEET NO.		04	
DATE		06.04.16	

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COMPUTER DRG. PATH NAME :

REF. DRG. NO.

SIGN. & DATE

INVENTORY No.

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN MM.)

100-015-58E-BL 00 ONMWAY

BILL OF QTY. FOR 765KV MAIN EQUIPMENTS: (20KA for 1sec)

SL.NO	DESCRIPTION	RATING	QTY (NO. PART-1)	SYMBOL	SCOPE OF SUPPLY	LEGEND
1	500MVA (1-PH) AUTOTRANSFORMER	765-400/33KV	7		PGCIL	T
2	110MVAR LINE REACTOR (1-PH) WITH NGR(250 Ohm)	765KV	7		PGCIL	LNOR
3	110MVAR BUS REACTOR (1-PH)	765KV	4		PGCIL	BR
4	SF6 CIRCUIT BREAKER WITH CR, WITH CSD (1-PH)	3150A	3		PGCIL	52
5	SF6 CIRCUIT BREAKER WITH CR, WITHOUT CSD (1-PH)	3150A	2		PGCIL	52
6	SF6 CIRCUIT BREAKER WITHOUT CR, WITH CSD (3-PH)	3150A	5		PGCIL	52
7	SF6 CIRCUIT BREAKER WITHOUT CR, WITH CSD (1-PH)	3150A	1		PGCIL	52
8	ISOLATOR WITH ONE ESW (3 PH) VERTICAL KNEE TYPE	3150A	17		BHEL	89/89E
9	ISOLATOR WITH TWO ESW (1 PH) VERTICAL KNEE TYPE	3150A	2		BHEL	89/89E1/89E2
10	ISOLATOR WITH ONE ESW (1 PH) VERTICAL KNEE TYPE	2000A	23		BHEL	89/89E1
11	ISOLATOR WITHOUT ESW (1 PH) VERTICAL KNEE TYPE	2000A	12		BHEL	89
12	CURRENT TRANSFORMER CURRENT RATING	3000A	24		BHEL	CT
13	CVT (1 PH)	58099F	12		BHEL	CVT
14	SURGE ARRESTER (1 PH)	624KV	24		BHEL	LA
15	WAVE TRAP (1 PH) PEDESTAL TYPE	1mH, 3150A	04		BHEL	WT

BILL OF QTY. FOR 400KV MAIN EQUIPMENTS: (63KA for 1sec)

SL.NO	DESCRIPTION	RATING	QTY (NO. PART-1)	QTY (PART-2)	SYMBOL	SCOPE OF SUPPLY	LEGEND
20	500MVA (1-PH) AUTOTRANSFORMER	400/220/33KV	0	X		BHEL	T
21	125MVAR BUS REACTOR (1-PH)	420 KV	1	X		BHEL	BR
22	SF6 CIRCUIT BREAKER WITH CR, WITH CSD (1-PH)	3150A	4	X		BHEL	52
23	SF6 CIRCUIT BREAKER WITHOUT CR, WITH CSD (3-PH)	3150A	3	X		BHEL	52
24	SF6 CIRCUIT BREAKER WITHOUT CR, WITHOUT CSD (3-PH)	3150A	0	X		BHEL	52
25	ISOLATOR WITH ONE ESW (3 PH) DOUBLE BREAK TYPE	3150A	17	X		BHEL	89/89E1/89E2
26	ISOLATOR WITH TWO ESW (1 PH) DOUBLE BREAK TYPE	3150A	2	X		BHEL	89/89E1
27	ISOLATOR WITH ONE ESW (1 PH) DOUBLE BREAK TYPE	2000A	1	X		BHEL	89/89E1
28	ISOLATOR WITH ONE ESW (1 PH) DOUBLE BREAK TYPE	3150A	7	X		BHEL	89/89E1
29	ISOLATOR WITHOUT ESW (1 PH) DOUBLE BREAK TYPE	3150A	5	X		BHEL	89
30	CURRENT TRANSFORMER (1 PH) WITH 120% EXTENDED CURRENT RATING	3000A	21	X		BHEL	CT
31	CVT (1 PH)	44099F	6	X		BHEL	CVT
32	SURGE ARRESTER (1 PH)	336 KV	X	X		BHEL	LA
33	WAVE TRAP (1 PH) PEDESTAL TYPE	0.1mH, 3000A	X	X		BHEL	WT

BILL OF QTY. FOR 127 & 33KV MAIN EQUIPMENTS:

SL.NO	DESCRIPTION	RATING	QTY (NO.)	SYMBOL	SCOPE OF SUPPLY	LEGEND
60	SF6 CIRCUIT BREAKER FOR NGR BYPASS (1-PH)	125KV, 1250A	2		BHEL	52
61	SURGE ARRESTER (1 PH)	120 KV, 10 KA 5 KJ/KV	2		PGCIL	LA
62	NEUTRAL CT (1 PH) WITH 120% EXTENDED CURRENT RATING	33KV	5		PGCIL	CT

Handwritten notes and stamps: "Revis", "SOE", "16/11/16", and a stamp from "POWER GRID CORPORATION OF INDIA LIMITED".

NOA NO. : CC-CS/484-WR2/SS-29553/11/C8/NOA-1&2/5727 & 5728 DT. 31.03.16

POWER GRID CORPORATION OF INDIA LIMITED
 SUBSTATION PACKAGE-SS01 FOR CONSTRUCTION OF 765/400/220KV
 BHUJ S/S & EXT. OF 765KV BANASKANTHA S/S
 UNDER GREEN ENERGY CORRIDOR ISTS PART-C (PART-1)

ADDITIONAL INFORMATION
 W.O.No. 85003
 STATUS OF DRAWING
 DISTRIBUTION OF PRINTS

REV. DATE ALTERED BY CHECKED BY APPROVED ZONE

SCALE 4:22

NTS

SINGLE LINE DIAGRAM FOR 765/400/220KV BHUJ S/S.

TB-385-510-001

0

100-010-585-B1 ON 01MAY20

20kV, 1600A, CT
 up to 120% Extended Rating applicable for ICTM #2 and Transfer Bus Bays
 up to 150% Extended Rating applicable for Bus Coupler Bay

Core No.	Current Ratio	Accuracy Class	Output Burden VA	Min kPV (V)	Max RCT in Ohms	Max Im at kPV (mA)	Purpose
1	1600-800/1	PS	-	1600-800	8-4	25mA on 1600/1 Tap 50mA on 800/1 Tap	BUS DIFF CHECK
2	1600-800/1	PS	-	1600-800	8-4	25mA on 1600/1 Tap 50mA on 800/1 Tap	BUS DIFF MAIN
3	1600-800/1	0.2S	20	-	-	-	METERING
4	1600-800/1	PS	-	1600-800	8-4	25mA on 1600/1 Tap 50mA on 800/1 Tap	TRANS BACKUP/LINE BACKUP PROTIN
5	1600-800/1	PS	-	1600-800	8-4	25mA on 1600/1 Tap 50mA on 800/1 Tap	TRANS. DIFF. LINE PROTIN

Accuracy class PS as per IS:2705

220kV CVT:

Ratio	220KV / √3	110KV / √3	110KV / √3 / √3
Sec-I	Class - 3P, 50VA		
Sec-II	Class - 3P, 50VA		
Sec-III	Class - 0.2, 50VA		
Capacitance - 4000 pF (+10%, -5%)			

Rated Voltage Factor: 1.2 Continuous
 1.5 for 30 Seconds

72.5kV, 50A, CT

Core No.	Current Ratio	Accuracy Class	Output Burden VA	Min kPV (V)	Max RCT in Ohms	Max Im at kPV (mA)	Purpose
1	50/1	SPI0	10	-	-	-	OC & F/F
2	50/1	0.5	10	-	-	-	Metering

72.5kV VT:

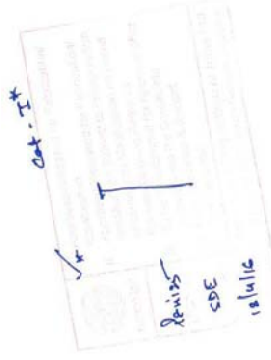
Ratio	33KV / √3	110V / √3	110V / √3 / √3
Sec-I	Class - 3P, 10VA		
Sec-II	Class - 0.5, 10VA		

LEGENDS:-

- PRESENT SCOPE
- FUTURE/EXISTING SCOPE

NOTES:

1. ELECTRICAL CONNECTION SHALL BE MADE MANUALLY DEPENDING UPON 765KV SIDE SWITCHING OF DIFFERENT FEEDERS OF AUTO TRANSFORMER/REACTOR.
2. SUPPLY, ERECTION, TESTING & COMMISSIONING INCLUDING FORMATION OF HV, LV, NEUTRAL, TERTIARY & AUXILIARY BUSES OF 3-500MVA, (765KV / √3) / (400KV / √3), 33KV, 10 AUTO TRANSFORMERS AND LINE BUS REACTOR ARE NOT IN BHEL SCOPE.
3. 765KV WAVE TRAP SHALL BE PROVIDED IN TWO PHASE ONLY.
4. ~~ALL MATERIALS SHALL BE PROVIDED BY THE CLIENT.~~
5. ~~ALL EQUIPMENTS SHALL BE SUPPLIED BY THE CLIENT.~~



NOA NO. : CC-CS/484-WR2/SS-2953/11/G8/NOA-1&2/5727 & 5728 DT. 31.03.16

ADDITIONAL INFORMATION W.O.No. 85003 STATUS OF DRAWING CONTRACT DISTRIBUTION OF PRINTS		NAME OF CUSTOMER/PROJECT POWER GRID CORPORATION OF INDIA LIMITED SUBSTATION PACKAGE-SS01 FOR CONSTRUCTION OF 765/400/220KV BHUJ S/S & EXT. OF 765KV BANASKANTHA S/S UNDER GREEN ENERGY CORRIDOR ISTS PART-C (PART-1)	
REV.	DATE	ALTERED BY	APPROVED BY
ZONE			
BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION		BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION	
SCALE NTS		CARD CODE 422	
DRAWING NO. TB-385-510-001		SHEET NO. 08	

