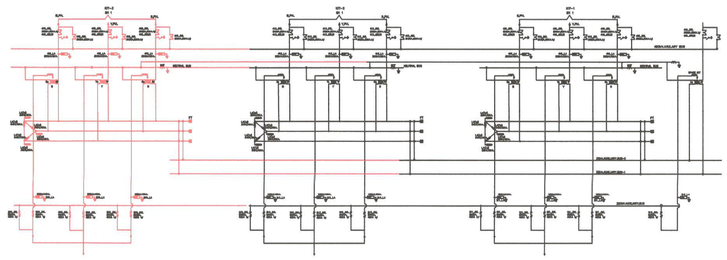
Thanptitanda Drawings

33kV.TERTIARRY ARANGEMENT



BILL OF QUANTITY FOR 400kV.EQUIPEMENTS

Sr.No	EQUIPEMENT	LEGEND	QUANTITY
1.	CIRCUIT BREAKER 420kV.3150A.50KA.3P. SF6 W/O.PIR WT SS.		01 EA.
2.	ISOLATOR WITH 1 E/S.420kV.3150A.1-PH. CENTRE BREAK		03 EA
3.	ISOLATOR WITHOUT E/S.420kV.3150A. 50KA.1-PH. CENTRE BREAK		03 EA
4.	CURRENT TRANSFORMER 420kV. 3000-1500-750/1A.5C.50KA.0.2 DT.		06 EA
5.	CVT 420kV.3C.W/O. TC.$\frac{400KV}{\sqrt{3}}$/ $\frac{110V}{\sqrt{3}}$ Y-PH.		01 EA
6.	LIGHTENING ARRESTER 390kV.10KA.CL-III PORCELAIN GAPLESS		03 EA
7.	167 MVA, 400/220/33kV.,1PHASE ICT.		----
8.	BUS POST INSULATOR 420kV.SOLID CORE		11 EA
9.	ISOLATOR WITH 1 E/S.420kV.3150A.3-PH. CENTRE BREAK GANG OPERATED		02 SET

400kV. GANTRY STRUCTURES: T1+P=01Nos, B1MX=01Nos.

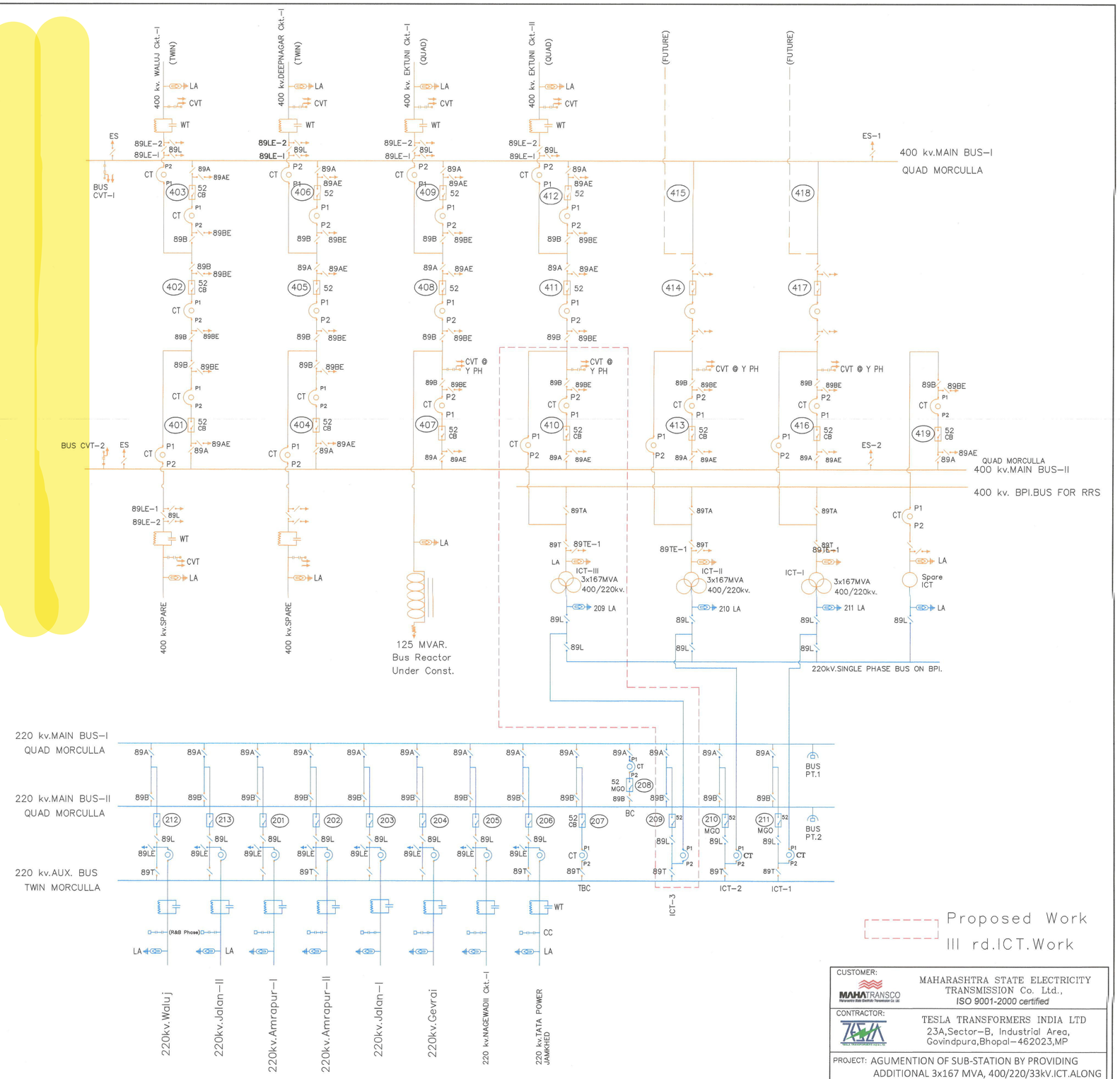
BILL OF QUANTITY FOR 220kV.EQUIPEMENTS

Sr.No	EQUIPEMENT	LEGEND	QUANTITY
1.	CIRCUIT BREAKER 245kV. 200A. 50KA.3 SEC. BIL 1050 KVp.1PHASE TRIPPING GANG OPERATED		01 SET
2.	245kV.3PH.HORIZONTAL DOUBLE BREAK,2000A. 40KA./3 SEC.BIL 1050KVp.ISOLATOR WITHOUT EARTH SWITCH.		04 SET.
3.	245kV.1PH.HORIZONTAL DOUBLE BREAK,2000A. 40KA./3 SEC.BIL 1050KVp.ISOLATOR WITHOUT EARTH SWITCH.		06 EA
4.	245kV.1600-800/1A. 5C. 40KA.CURRENT TRANSFORMER.[0.2SEC]		03 EA
5.	BUS POST INSULATOR.		06 EA
6.	SURGE ARRESTER 198 kV.10KA.MO GAPLESS		03 EA

220kV. GANTRY STRUCTURES: T1+P=01Nos, B1MX=01Nos.

BILL OF QUANTITY FOR 33kV.EQUIPEMENTS.

1	BUS POST INSULATOR 36kV.SOLID CORE		68 EA
2	SURGE ARRESTER 54kV.10KA.STN MO GAPLESS		03 EA
3	SURGE ARRESTER 39kV.10KA.STN MO GAPLESS		03 EA
4	NEUTRAL CT 36kV.2000/1A 1C		01 EA
5	POTENTIAL TRANSFORMER 36kV. $\frac{33kV}{\sqrt{3}}$/ $\frac{110V}{\sqrt{3}}$ 3C		03 EA



Proposed Work
III rd.ICT.Work

Recommended for approval pl.

Executive Engineer
400 KV RS Dn. Thaptitanda

Additional Executive Engineer
400KV R.S Division Thaptitanda

Superintending Engineer
EHV O & M Circle,
MSETCL, Aurangabad

REFERENCE DRAWING Nos.

1. MSETCL S.L.D. REFERENCE OF M/s.Jyoti Structures DRG. No. J-818/A'bad-II/P_SLD/001-R3 Dtd.17-02-2012.
2. LOA.No. SE/EHV/PCA/Tech/1972 DATE 14 OCT. 2024

CUSTOMER: MAHATRANSCO — MAHARASHTRA STATE ELECTRICITY TRANSMISSION Co. Ltd., ISO 9001-2000 certified

CONTRACTOR: TESLA — TESLA TRANSFORMERS INDIA LTD, 23A,Sector-B, Industrial Area, Govindpura,Bhopal-462023,MP

PROJECT: AGUMENTION OF SUB-STATION BY PROVIDING ADDITIONAL 3x167 MVA, 400/220/33kV.ICT.ALONG WITH HV AND IV BAYS RAPID RESTORATION SCHEEME AT THAPTITANDA S/S. Rfx no. 7000029771

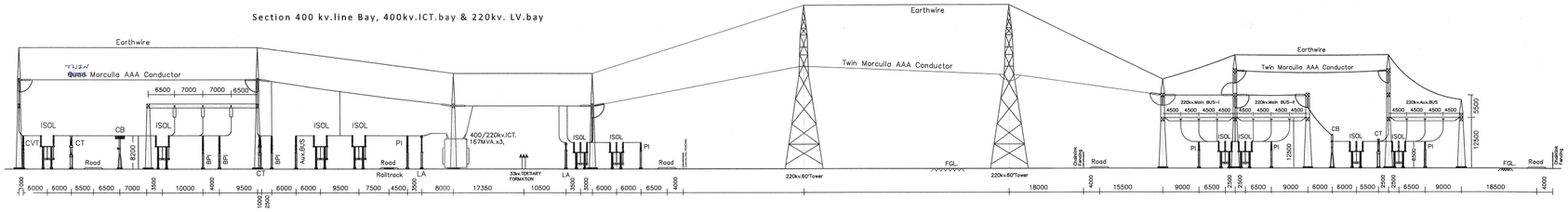
TITLE: SINGLE LINE DIAGRAM OF 400/220/33kV. THAPTITANDA SUB-STATION.

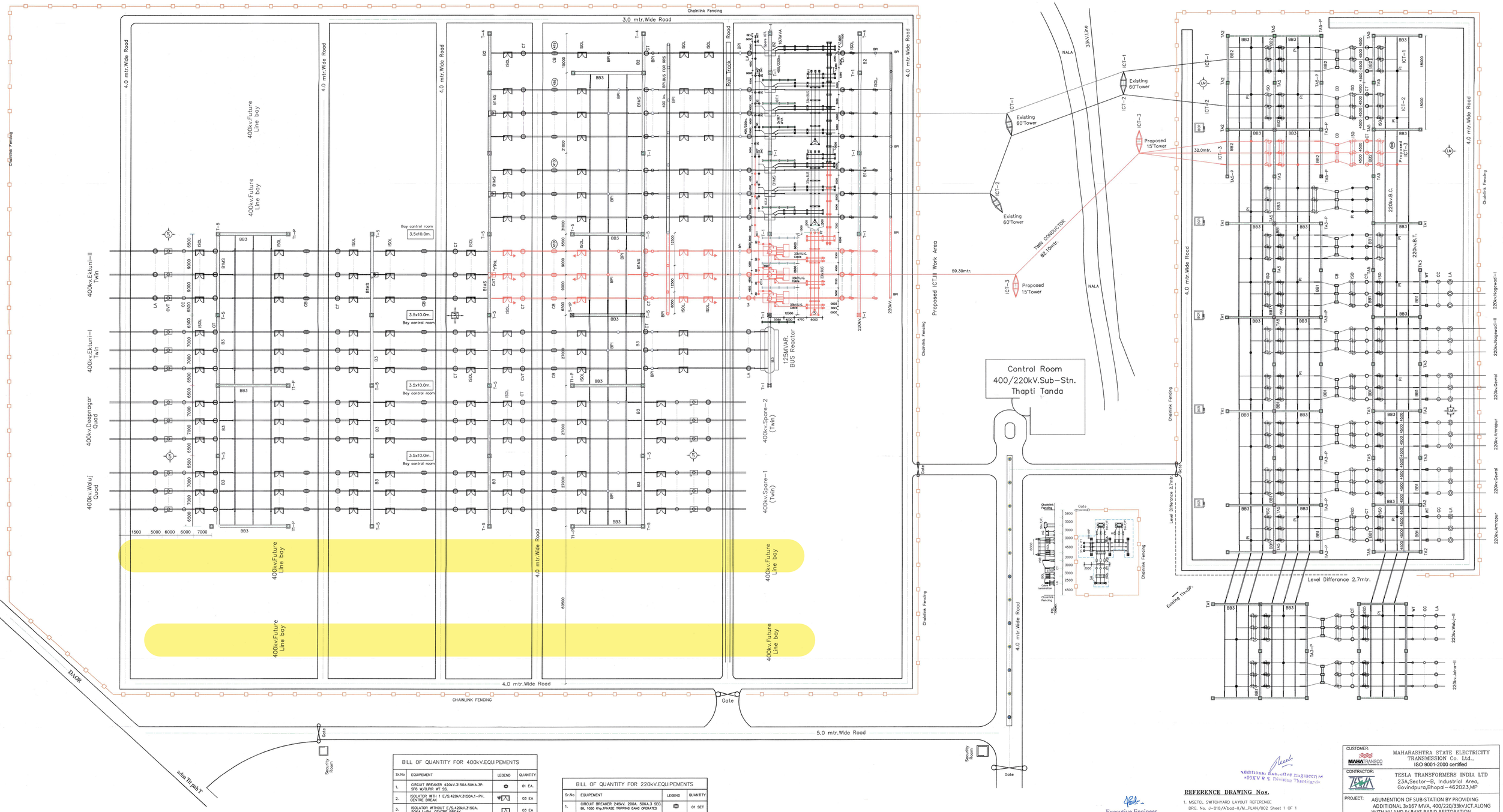
DRAWN	MSB	DATE: 25/11/2024	
CHECKED	RUR	SCALE: N.T.S.	
APPROVED	KP	SIZE: A1	SHEET No. 1 OF 1 / REV. R1
PASSED	SV		
DRG. No.	TTL-MSTCL-TT-ELE-01	Scale: N.T.S.	DATE 22/12/2024

K.N.Shardul

NORTH

Scale :- 1 : 500





BILL OF QUANTITY FOR 400kV.EQUIPEMENTS

Sr.No	EQUIPEMENT	LEGEND	QUANTITY
1.	CIRCUIT BREAKER 420kV.3150A.50KA.3P. SF6 W/O.PIR WT SS.		01 EA.
2.	ISOLATOR WITH 1 E/S.420kV.3150A.1-PH. CENTRE BREAK		03 EA
3.	ISOLATOR WITHOUT E/S.420kV.3150A. 50KA.1-PH. CENTRE BREAK		03 EA
4.	CURRENT TRANSFORMER 420kV. 3000-1500-750/1A.5C.50KA.0.2 D.T.		06 EA
5.	CVT 420kV.3C.W/O. TC-400kV/ $\sqrt{3}$ / 110V/ $\sqrt{3}$ Y-PH.		01 EA
6.	LIGHTENING ARRESTER 396kV.10KA.CL-III PORCELAIN GAPLESS		03 EA
7.	167 MVA, 400/220/33kV.1PHASE ICT.	ICT	----
8.	BUS POST INSULATOR 420kV.SOLID CORE		11 EA
9.	ISOLATOR WITH 1 E/S.420kV.3150A.3-PH. CENTRE BREAK GANG OPERATED		02 SET

400kV. GANTRY STRUCTURES: T1+P=01Nos, B1MX=01Nos.

BILL OF QUANTITY FOR 220kV.EQUIPEMENTS

Sr.No	EQUIPEMENT	LEGEND	QUANTITY
1.	CIRCUIT BREAKER 245kV. 200A. 50KA.3 SEC. BIL 1050 kVp.1PHASE TRIPPING GANG OPERATED		01 SET
2.	245kV.3PH.HORIZONTAL DOUBLE BREAK.2000A. 40KA./3 SEC.BIL 1050kVp.ISOLATOR WITHOUT EARTH SWITCH.		04 SET.
3.	245kV.1PH.HORIZONTAL DOUBLE BREAK.2000A. 40KA./3 SEC.BIL 1050kVp.ISOLATOR WITHOUT EARTH SWITCH.		06 EA
4.	245kV.1600-800/1A. 5C. 40KA.CURRENT TRANSFORMER.[0.2SEC]		03 EA
5.	BUS POST INSULATOR.		06 EA
6.	SURGE ARRESTER 198 kV.10KA.MO GAPLESS		03 EA

220kV. GANTRY STRUCTURES: T1+P=01Nos, B1MX=01Nos.

BILL OF QUANTITY FOR 33kV.EQUIPEMENTS.

1	BUS POST INSULATOR 36kV.SOLID CORE		68 EA
2	SURGE ARRESTER 54kV.10KA.STN MO GAPLESS		03 EA
3	SURGE ARRESTER 39kV.10KA.STN MO GAPLESS		03 EA
4	NEUTRAL CT 36kV.2000/1A 1C		01 EA
5	POTENTIAL TRANSFORMER 36kV. 33kV/ $\sqrt{3}$ / 110V/ $\sqrt{3}$ 3C		03 EA
6	33kV.U.G.Cable Single Core		

Additional Executive Engineer
400KV R S Division Thaptitanda

Executive Engineer
400 KV RS Dn.Thaptitanda

Superintending Engineer
EHV O & M Circle,
MSETCL. Aurangabad

K.N.Shardul
9421291937

REFERENCE DRAWING Nos.

1. MSETCL SWITCHYARD LAYOUT REFERENCE DRG. No. J-818/A'bad-II/M_PLAN/002 Sheet 1 OF 1 Dtd.17.02.2012
2. LOA.No. SE/EHV/PCA/Tech/1972 DATE 14 OCT. 2024

Legend

Proposed Work

III rd.ICT.Work

All Dimensions are in m.m.

REV. NO.	DESCRIPTION	DRAWN	CHKD.	APPD.	DATE
R2	ISSUED FOR APPROVAL				22/03/2025
R1	ISSUED FOR APPROVAL				22/12/2024
R0	ISSUED FOR APPROVAL				22/11/2024

CUSTOMER: MAHATRANSCO — MAHARASHTRA STATE ELECTRICITY TRANSMISSION Co. Ltd., ISO 9001-2000 certified

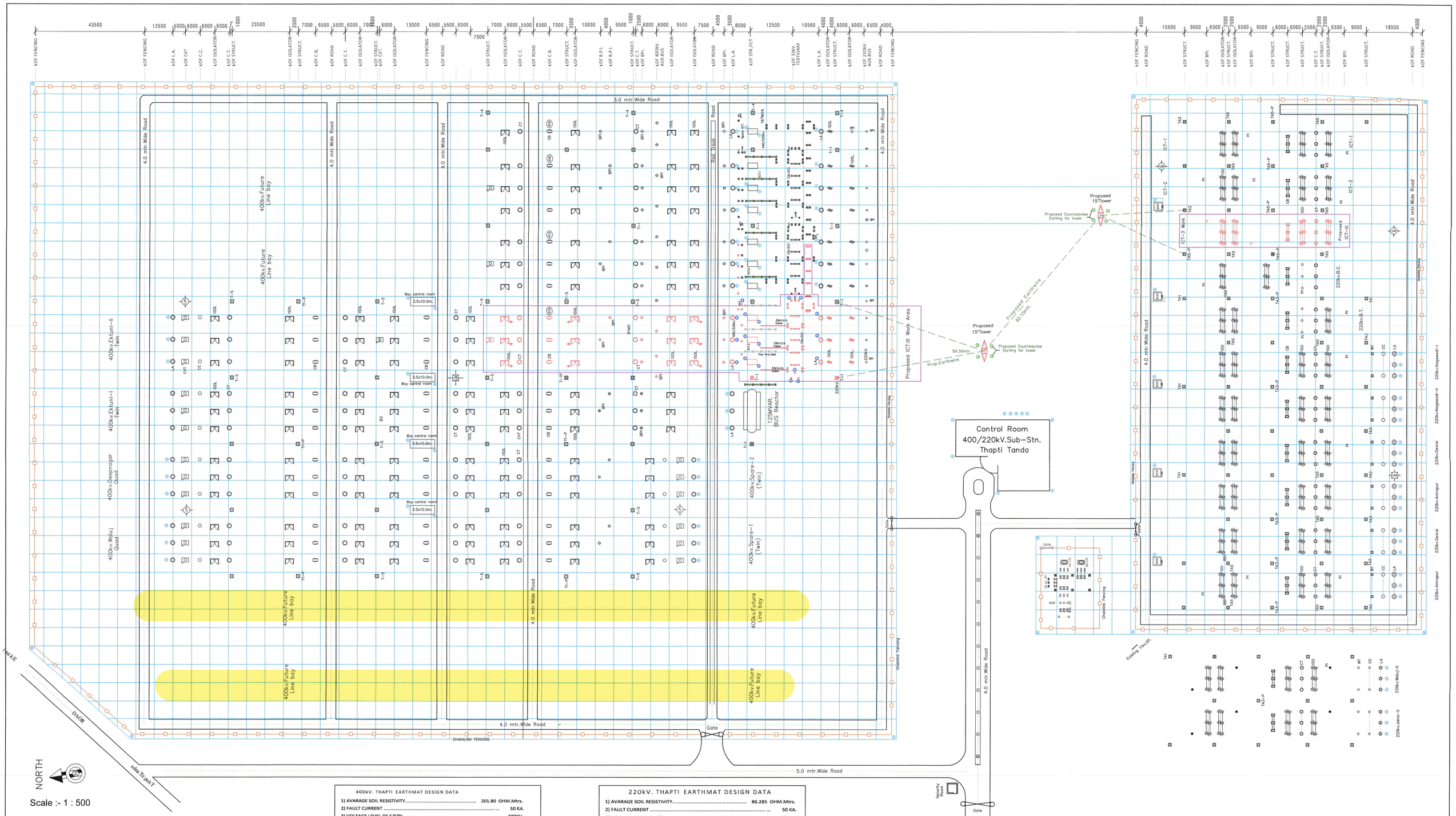
CONTRACTOR: TESLA — TESLA TRANSFORMERS INDIA LTD 23A,Sector-B, Industrial Area, Govindpura,Bhopal-462023,MP

PROJECT: AGUMENTION OF SUB-STATION BY PROVIDING ADDITIONAL 3x167 MVA, 400/220/33kV.ICT.ALONG WITH HV AND IV BAYS RAPID RESTORATION SCHEEME AT THAPTITANDA S/S. Rfx no. 7000029771

TITLE: ELECTRICAL LAYOUT OF 400/220/33kV. THAPTITANDA SUB-STATION.

DRAWN	MSB	DATE: 25/11/2024	
CHECKED	RUR	SCALE: 1:500	
APPROVED	KP	SIZE: A0	SHEET No. 1 OF 1
PASSED	SV		REV. R2

DRG. No. TTL-MSETCL-TT-ELE-002



400kV. THAPTI EARTHMAT DESIGN DATA

1) AVARAGE SOIL RESISTIVITY..... 201.80 OHM.Mtrs.
2) FAULT CURRENT ..... 50 KA.
3) VOLTAGE LEVEL OF S/STN ..... 400KV.
4) EQUILANT LENGTH OF SWITCHYARD FOR CALCULATION IN MTRS. .... 351.35 Mtrs.
5) EQUILANT BREADTH OF SWITCHYARD FOR CALCULATION IN MTRS. ... 262.5 Mtrs
6) No.OF ELECTRODES (C.I.PIPE,150mm.dia)..... 98 Nos.
EXCLUDING CONTROL ROOM AND PLCC.
7) LENGTH OF ELECTRODES ..... 3.0 Mtrs.
8) CONDUCTOR SPACING ..... 07.5 Mtrs.
9) No.OF PARALLEL CONDUCTORS LENGTHWISE..... 37 Nos.
10) No.OF PARALLEL CONDUCTOR BREADTHWISE..... 49 Nos.
11) LENGTH OF GRID CONDUCTOR ALONG LENGTH OF SWITCHYARD. 12995.95 Mtrs.
12) LENGTH OF GRID CONDUCTOR ALONG BREADTH OF SWITCHYARD. 13058.5 Mtrs.
13) LENGTH OF EQUIPEMENT RISER AND AUXILIARY MAT IN SWITCHYARD.2490 Mtr.
14) TOTAL LENGTH OF EARTH CONDUCTORS IN SWITCHYARD..... 28839.45 Mtrs
15) E.STEP = TOLERABLE TOUCH POTENTIAL 1695.535Volts
16) E-TOUCH = TOLERABLE TOUCH POTENTIAL ..... 510.8817 Volts.
17) ACTUAL STEP POTENTIAL..... 438.86 Volts.
18) ACTUAL TOUCH POTENTIAL ..... 458.88 Vlts.
19) SIZE OF CONDUCTOR 75x12mm.M.S.Flat
20) GROND RESISTANCE (Rg) ..... 0.3029 OHMS.
21) SIZE OF RISERS FOR EQUIPEMENT EARTHING 50x8mm.G.I.Flat

Ref:-Drg.No.J-818/A'bad-II/EMT/10 Dtd.23.08.2010,Sheet,1of 2

Proposed Earthpit for III rd.ICT.Work..... 18 Nos.

220kV. THAPTI EARTHMAT DESIGN DATA

1) AVARAGE SOIL RESISTIVITY..... 86.285 OHM.Mtrs.
2) FAULT CURRENT ..... 50 KA.
3) VOLTAGE LEVEL OF S/STN ..... 220KV.
4) EQUILANT LENGTH OF SWITCHYARD FOR CALCULATION IN MTRS. ..... 120 Mtrs.
5) EQUILANT BREADTH OF SWITCHYARD FOR CALCULATION IN MTRS. ..... 220 Mtrs
6) No.OF ELECTRODES (C.I.PIPE,150mm.dia)..... 55 Nos.
INCLUDING CONTROL ROOM AND PLCC.
7) LENGTH OF ELECTRODES ..... 3.0 Mtrs.
8) CONDUCTOR SPACING ..... 07.5 Mtrs.
9) No.OF PARALLEL CONDUCTORS LENGTHWISE..... 31 Nos.
10) No.OF PARALLEL CONDUCTOR BREADTHWISE..... 17 Nos.
11) LENGTH OF GRID CONDUCTOR ALONG LENGTH OF SWITYARD..... 3720 Mtrs.
12) LENGTH OF GRID CONDUCTOR ALONG BREADTH OF SWITCHYARD.... 3740 Mtrs.
13) LENGTH OF EQUIPEMENT RISER AND AUXILIARY MAT IN SWITCHYARD.1090 Mtr.
14) TOTAL LENGTH OF EARTH CONDUCTORS IN SWITCHYARD..... 8703 Mtrs
15) E.STEP = TOLERABLE TOUCH POTENTIAL 1674.536Volts
16) E-TOUCH = TOLERABLE TOUCH POTENTIAL ..... 505.634 Volts.
17) ACTUAL STEP POTENTIAL..... 410.10 Volts.
18) ACTUAL TOUCH POTENTIAL ..... 442.38 Vlts.
19) SIZE OF CONDUCTOR ..... 75 x 12mm.M.S.Flat
20) GROND RESISTANCE (Rg) ..... 0.2454 OHMS.
21) SIZE OF RISERS FOR EQUIPEMENT EARTHING ..... 50 x 8mm.G.I.Flat

Ref:-Drg.No.J-818/A'bad-II/EMT/10 Dtd.23.08.2010,Sheet,2of 2

Legend

Proposed Area for 400/220/33kV. III rd.ICT. Existing earth grid is used, no changes in the present earth grid.The given calculations are from old/existing earthmat work

Proposed Earthpit for 400/220/33kV. III rd.ICT.Work

The Prop.earthpit & Equipments will be connect to nearest exist.earth grid through riser as per site condition

All Dimensions are in m.m.othrwise specified.

Additional Executive Engineer (M)
400KV R S Division Thaptitanda

Executive Engineer
400 KV RS Dn. Thaptitanda

Superintending Engineer
EHV O & M Circle,
MSETCL. Aurangabad

K.N.Shordu
9421291937

REFERENCE DRAWING Nos.

1. MSETCL SWITCHYARD LAYOUT REFERENCE DRG. No. J-818/A'bad-II/EMT/010 Sheet 1 OF 2 AND 2 OF 2 Dtd.23.08.2012
2. LOA.No. SE/EHV/PCA/Tech/1972 DATE 14 OCT. 2024

REV. NO.	DESCRIPTION	DRAWN	CHKD.	APPD.	DATE
R1	As per mail Dt.4 march 2025				08/03/2025
R0	ISSUED FOR APPROVAL				23/01/2025

CUSTOMER: MAHATRANSCO — MAHARASHTRA STATE ELECTRICITY TRANSMISSION Co. Ltd., ISO 9001-2000 certified

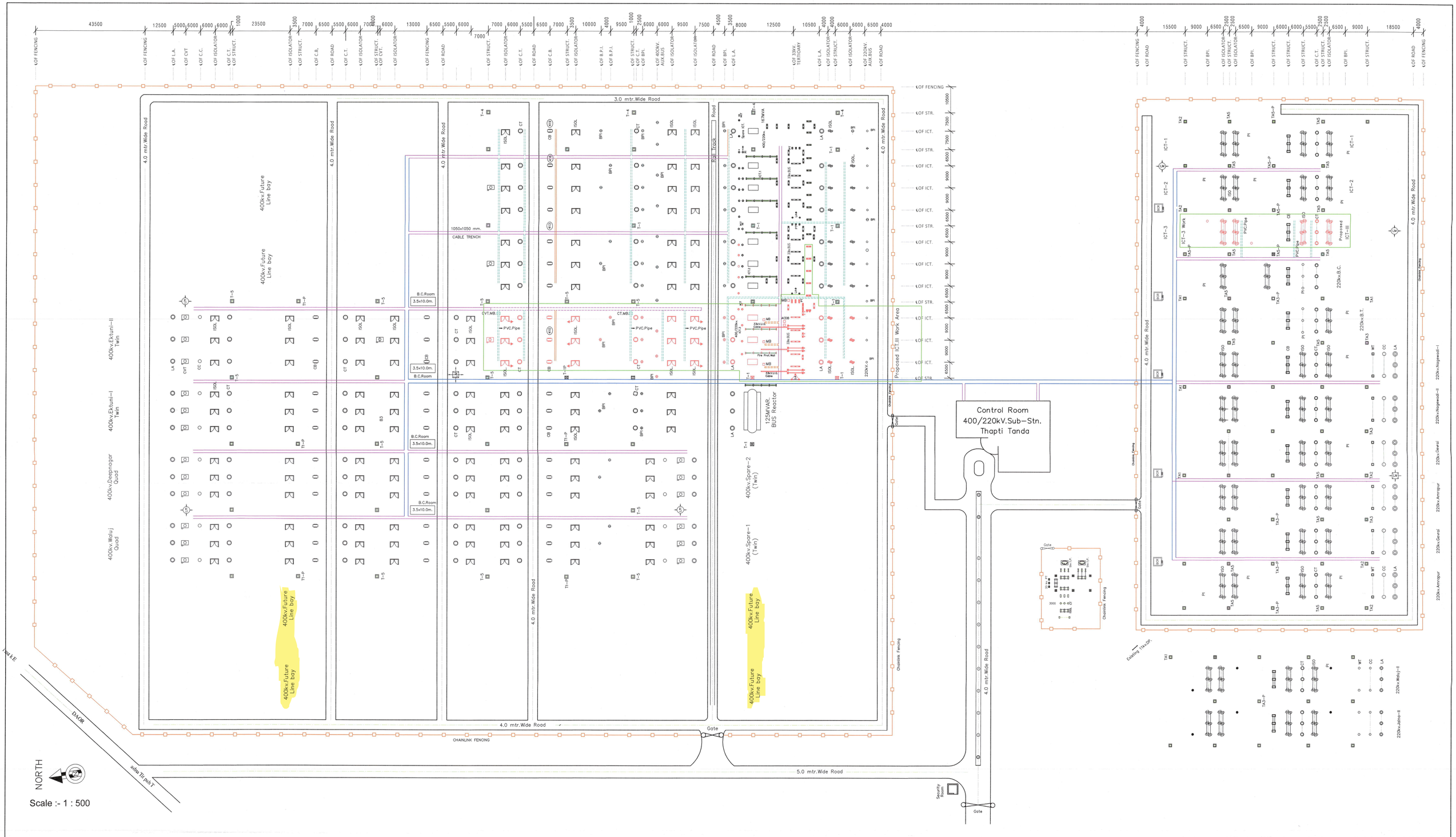
CONTRACTOR: TESLA TRANSFORMERS INDIA LTD 23A,Sector-B, Industrial Area, Govindpura,Bhopal-462023,MP

PROJECT: AGUMENTION OF SUB-STATION BY PROVIDING ADDITIONAL 3x167 MVA, 400/220/33kV.ICT.ALONG WITH HV AND IV BAYS RAPID RESTORATION SCHEEME AT THAPTITANDA S/S. Rfx no. 7000029771

TITLE: EARTHMAT LAYOUT OF 400/220/33kV. THAPTITANDA SUB-STATION.

DRAWN	MSB	DATE: 23/01/2025	
CHECKED	RUR	SCALE: 1:500	
APPROVED	KP	SIZE: A0	SHEET No. 1 OF 1 — REV. R1
PASSED	SV		

DRG. No. TTL-MSETCL-TT-EMT-006



Legend

Existing Cabletrench

- 1500x1500mm.Cable Trench
- 1050x1050mm.Cable Trench

Proposed Cabletrench for III rd.ICT.Work

- 1050x1050mm.Cable Trench
- 500x500mm.Cable Trench
- 100mm.Ø PVC Pipe

Proposed Work Area

All Dimensions are in m.m.

REFERENCE DRAWING Nos.

1. MSETCL SWITCHYARD LAYOUT REFERENCE DRG. No. J-818/A'bad-II/CT/003 Sheet 1 OF 2 AND 2 OF 2 Dtd.24.07.2012
2. LOA.No: SE/EHV/PCA/Tech/1972 DATE 14 OCT. 2024

REV. NO.	DESCRIPTION	DRAWN	CHKD.	APPD.	DATE
R2	ISSUED FOR APPROVAL				22/03/2025
R1	As per mail Dtd.04.03.2025				06/03/2025
R0	ISSUED FOR APPROVAL				03/01/2025

Superintending Engineer
EHV O & M Circle,
MSETCL, Aurangabad

Executive Engineer
400 KV RS Dn.Thaptitanda

Additional Executive Engineer
400KV R.S. Division Thaptitanda

K.N.Shardul
9421291937

CUSTOMER: MAHATRANSCO — MAHARASHTRA STATE ELECTRICITY TRANSMISSION Co. Ltd., ISO 9001-2000 certified

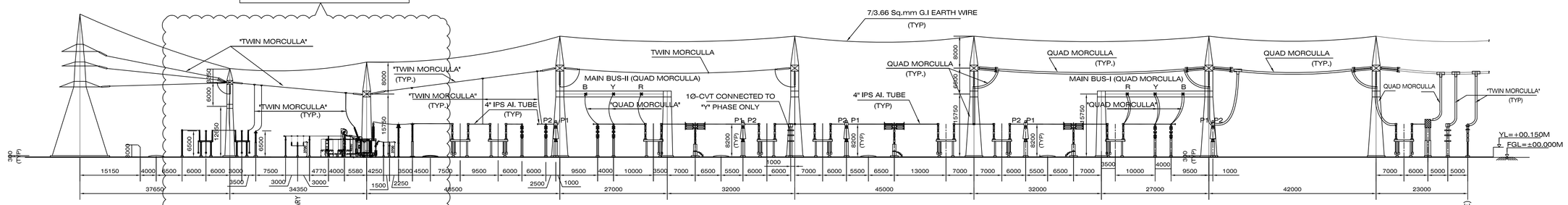
CONTRACTOR: TESLA TRANSFORMERS INDIA LTD, 23A,Sector-B, Industrial Area, Govindpura,Bhopal-462023,MP

PROJECT: AUGMENTATION OF SUB-STATION BY PROVIDING ADDITIONAL 3x167 MVA, 400/220/33kV. ICT. ALONG WITH HV. AND LV. BAYS RAPID RESTORATION SCHEEME AT THAPTITANDA S/S. Rfx.no. 7000029771

TITLE: CABLE TRENCH LAYOUT OF 400/220/33kV. THAPTITANDA SUB-STATION.

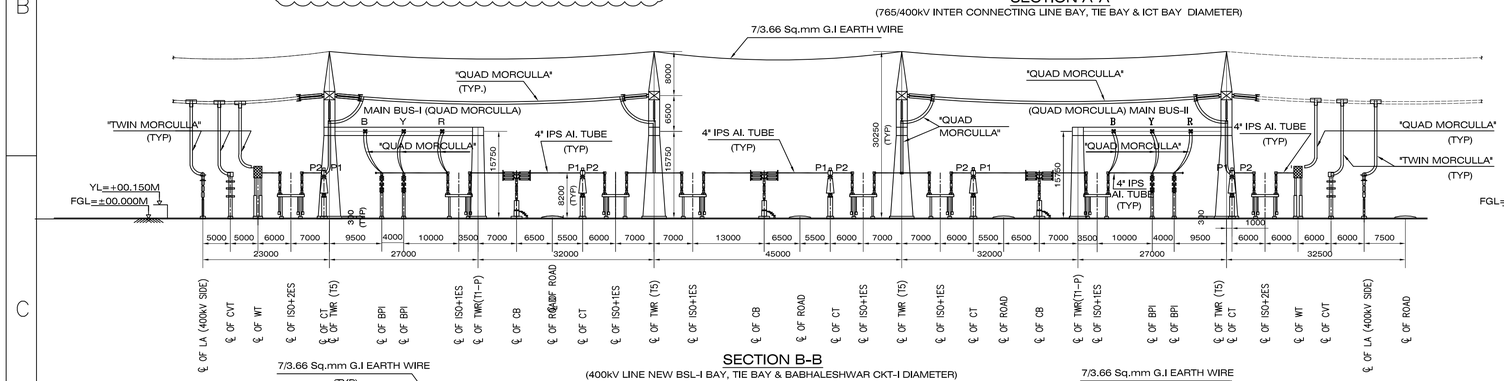
DRAWN	MSB	DATE: 03/01/2025	
CHECKED	RUR	SCALE: 1:500	
APPROVED	KP	SIZE: A0	SHEET No. 1 OF 1 / REV. R2
PASSED	SV		

DRG. No. TTL-MSETCL-TT-CT-07



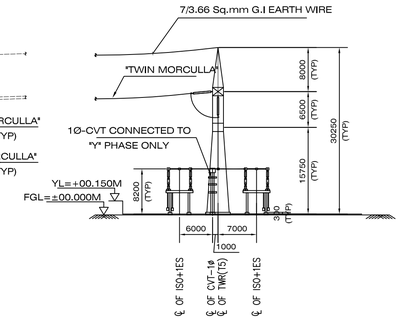
SECTION A-A

(765/400kV INTER CONNECTING LINE BAY, TIE BAY & ICT BAY DIAMETER)



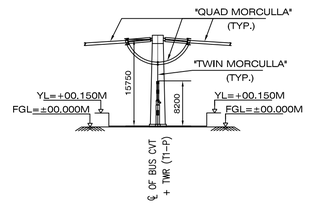
SECTION B-B

(400kV LINE NEW BSL-I BAY, TIE BAY & BABHALESHWAR CKT-I DIAMETER)



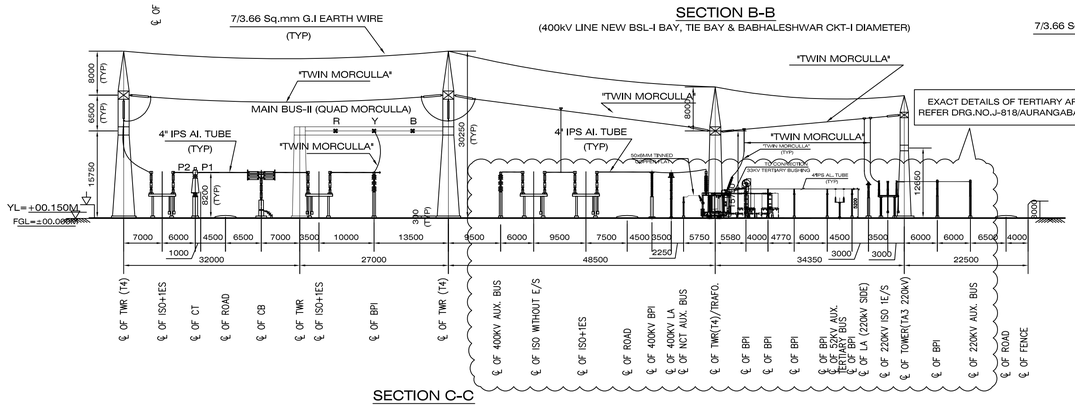
SECTION E-E

(TYPICAL ARRANGEMENT OF 400kV 1 PHASE CVT)



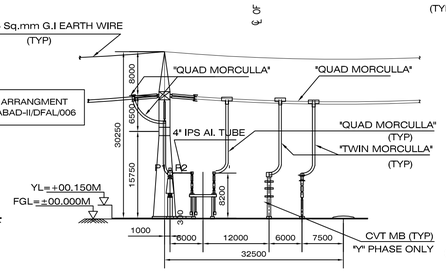
SECTION F-F

(TYPICAL ARRANGEMENT FOR BUS CVT'S)



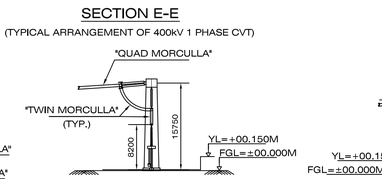
SECTION C-C

(SPARE ICT BAY-1Ø)



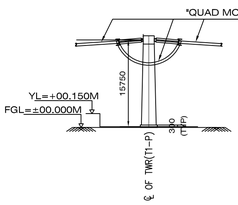
SECTION D-D

(400kV LINE BAY - "Y" PHASE ONLY - WITHOUT WAVE TRAP)



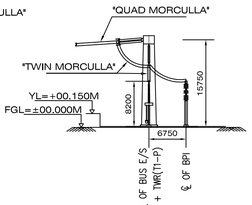
SECTION G-G

(TYPICAL ARRANGEMENT FOR BUS EARTH SWITCH)



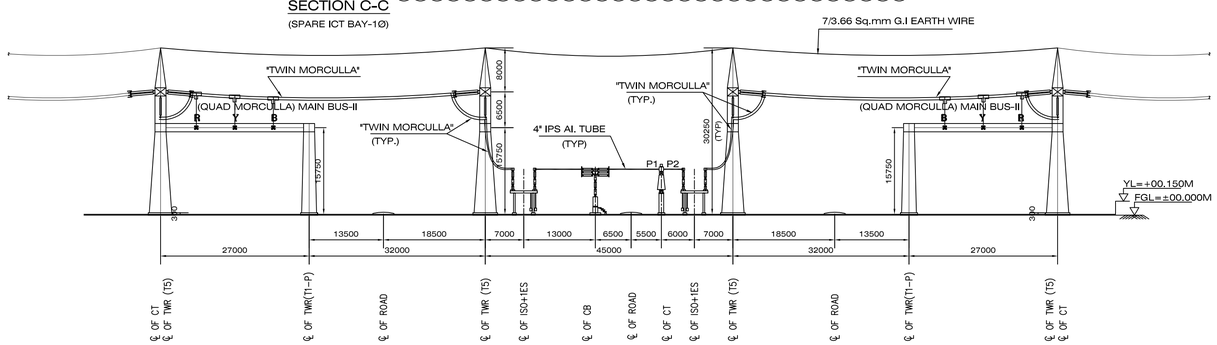
SECTION H-H

(MAIN BUS I & II)



SECTION J-J

(CONNECTOIN FOR SPARE ICT THROUG 'Y' PHASE)
FOR MAIN BUS-II



SECTION K-K

(400KV LINE NEW BSL - II (FUTURE),TIE BAY AND BUS REACTOR (FUTURE) DIAMETER)

NOTES:-

1. ALL DIMENSIONS ARE IN mm & LEVELS, CO-ORDINATES ARE IN METERS. UNLESS OTHERWISE SPECIFIED.
2. ALL EQUIPMENT AND STRUNG BUS BAR WILL BE PROTECTED FROM LIGHTNING STROKE BY MEANS OF SHIELD WIRE
3. ALL OUTDOOR PLINTH LEVEL SHALL BE 300mm ABOVE YARD LEVEL (YL) OR 450mm ABOVE FGL.

JSL REFERENCE DRAWING :-

1. MASTER PLAN FOR 400/220KV AURANGABAD-II (THAPTI-TANDA) S/S
   DRG. NO. J-818/AURANGABAD-II/ELP/002 R2 SHEET NO. 1 OF 1
2. ELECTRICAL LAYOUT PLAN OF 400KV SWITCHYARD OF 400/220KV AURANGABAD-II (THAPTI-TANDA) S/S
   DRG. NO.J-818/AURANGABAD-II/PLAN/003 R2 SHEET NO. 1 OF 2

REV	DESCRIPTION	SIGN	DATE
3	REVISED AS PER MSETCL APPROVAL LETTER DT. 28.02.2012	NNJ	14.05.12
2	REVISED AS PER MSETCL REQUIREMENT DURING DISCUSSIONS ON DT. 31.01.12 AND 07.02.12	NNJ	17.02.12
1	REVISED AS PER LETTER DT. 27.07.11 AND DISCUSSIONS ON 09.08.11 WITH MSETCL OFFICIALS AT AURANGABAD	NNJ	24.08.11

OWNER	MAHARASHTRA STATE ELECTRICITY TRANSMISSION COMPANY LIMITED
PROJECT	ESTABLISHMENT OF 400/220KV S/S AT KUDUS AND AURANGABAD–II
LOA NO.	CE/TRANS. PROJ./TKC–I/34–59/5490 DT. 07.04.2011
TITLE	ELECTRICAL LAYOUT SECTION OF 400KV SWITCHYARD OF 400/220 KV AURANGABAD–II (THAPTI–TANDA) SUB–STN

JYOTI STRUCTURES LTD.
VALECHA CHAMBER'S
5TH&6TH FLR.NEW LINK ROAD,
OSHIWARA, ANDHERI (W)
MUMBAI – 400 053

APPD.	NNJ	DATE:	02/07/11
CHKD.	NNJ		
DESIGN	AVP	SCALE:	1:550
DRAWN	ANKUSH		

DRG. NO: J–818/AURANGABAD–II/SEC./004 REV. R3

SHEET NO. 1 OF 2

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Ektuni S/s Drawings

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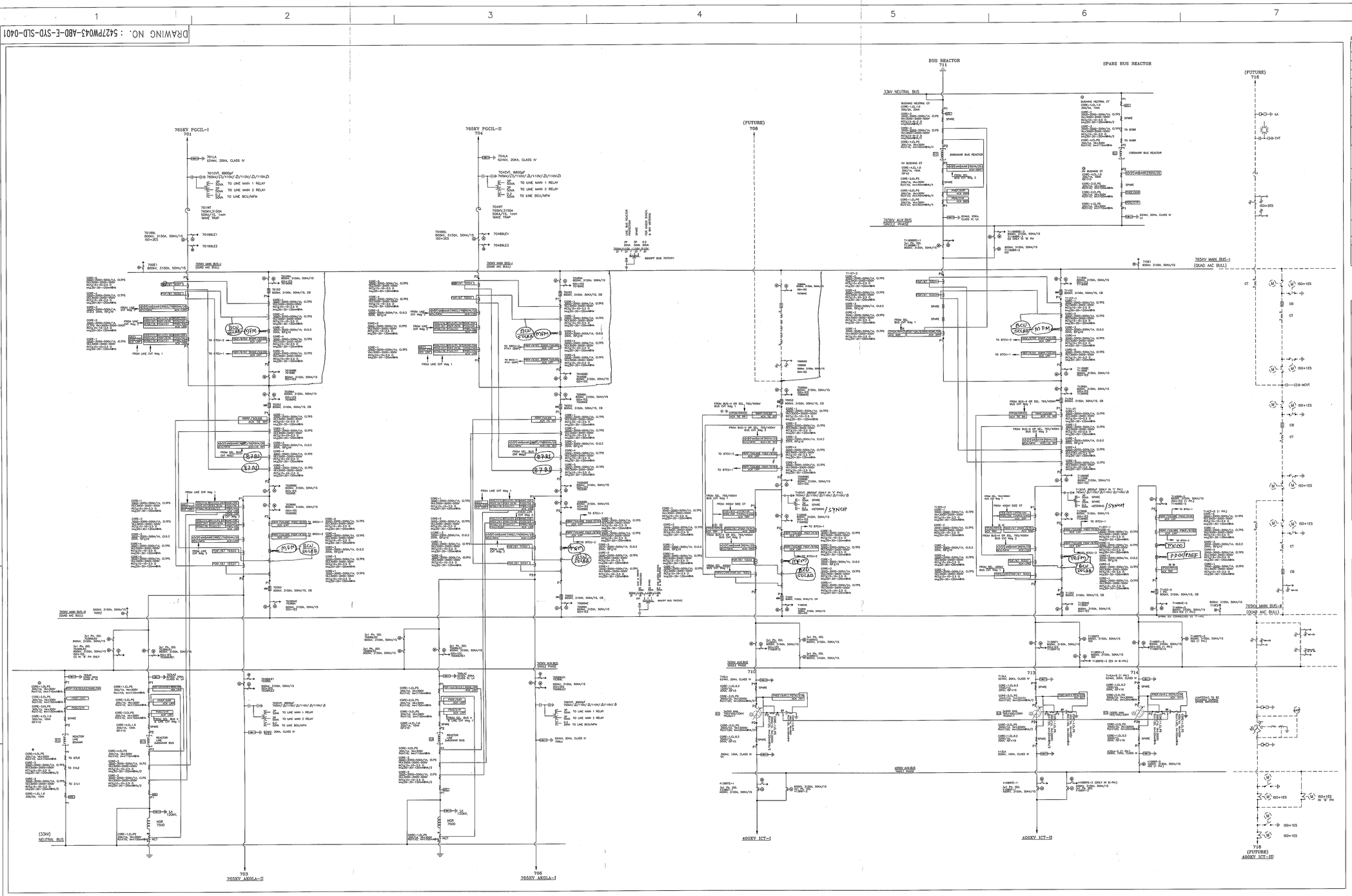
DRAWING NO. : 5427PW043-ABD-E-SYD-SLD-0401



BILL OF QUANTITY OF 765kV EQUIPMENTS

FIGN. No.	DESCRIPTION	IDENTIFICATION	SYMBOL AS PER IEC	QTY PRESENT SCHM.	QTY TENDER	QTY DIFFERENCE
1.	800kV,3150A,50kA,1sec, 3-PHASE CIRCUIT BREAKER WITHOUT PIR & WITHOUT C.S.	761S2, 762S2		0	6	0
2.	800kV,3150A,50kA,1sec, 3-PHASE CIRCUIT BREAKER WITHOUT PIR & WITH C.S.	71852, 71152, 71253, 71352		4	3	+1
3.	800kV,3150A,50kA,1sec, 3-PHASE CIRCUIT BREAKER WITH PIR & WITHOUT C.S.	76152, 76252, 76553, 76652		4	3	+1
4.	800kV,3150A,50kA,1sec, 3-PHASE CIRCUIT BREAKER WITH PIR & WITH C.S.	71652		1	2	-1
5.	800kV,3150A,50kA,1sec, 1-PHASE CIRCUIT BREAKER WITHOUT PIR & WITHOUT C.S.	71452-S		1	1	0
6.	800kV,3150A,50kA,1sec, 3-PHASE, ISOLATOR WITH 1 E/S	76184A,76184, 76585,76584, 71584B,71584A, 71584, 71584C, 76184C, 76184B, 76585C,76585A, 76585B,76584C, 76584A,76584B, 71584C,71584B, 71584A, 76584C, 76584A,76584B, 76584C,76584A,76584B, 71584C,71584A,71584B, 76584C,76584A,76584B, 71584C,71584A,71584B, 76584C,76584A,76584B, 71584C,71584A,71

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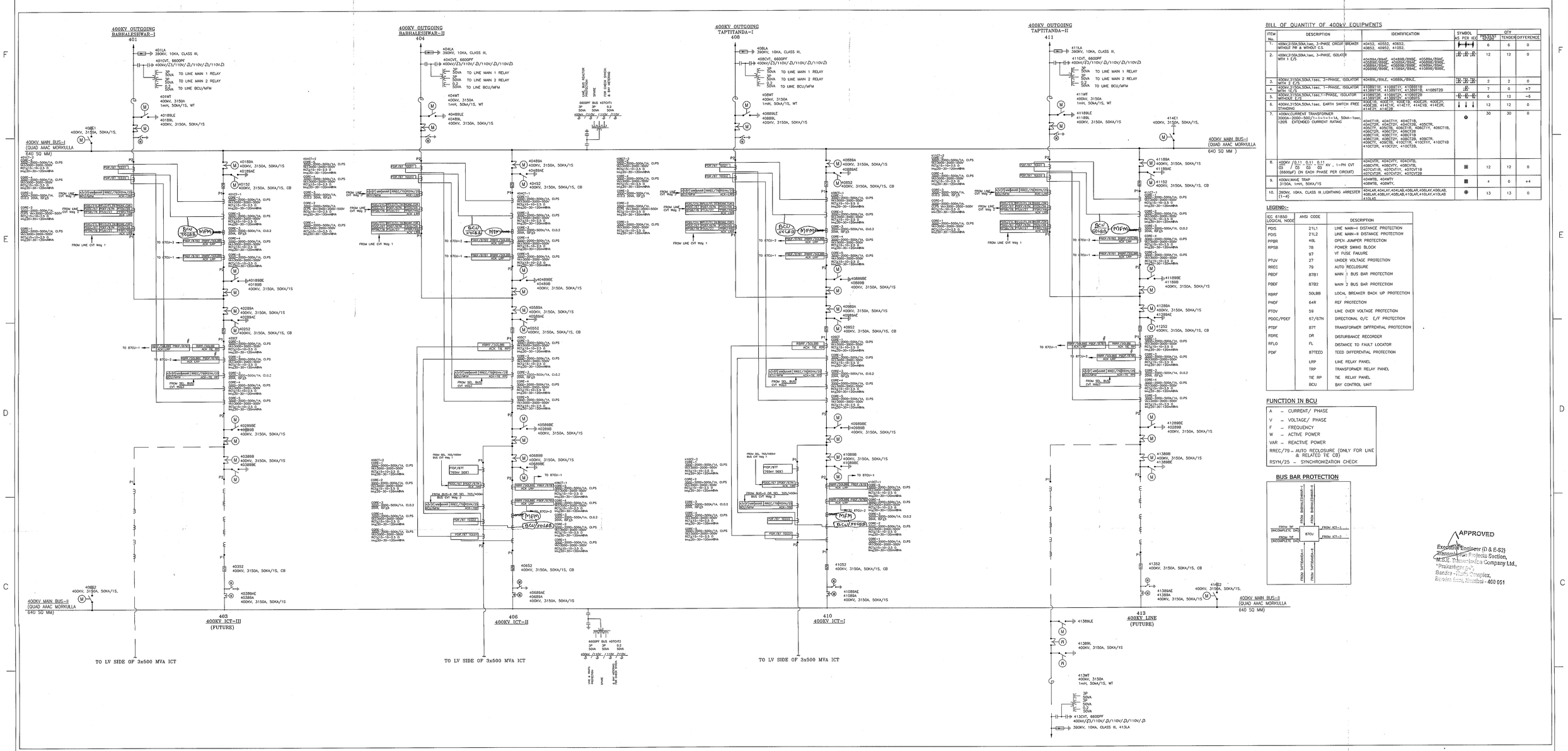
DRAWING NO. : 5427PW043-ABD-E-SYD-SLD-0401



BILL OF QUANTITY OF 400kV EQUIPMENTS

ITEM No.	DESCRIPTION	IDENTIFICATION	SYMBOL AS PER IEC	QTY PROPOSED BY MSETCL	QTY TENDER	QTY DIFFERENCE
1.	400kV,3150A,50kA,1sec, 3-PHASE CIRCUIT BREAKER WITHOUT PIR & WITHOUT C.S.	40452, 40552, 40652, 40852, 40952, 41052,		6	6	0
2.	400kV,3150A,50kA,1sec, 3-PHASE, ISOLATOR WITH 1 E/S	40489A/89AE, 40489B/89BE, 40589A/89AE, 40589B/89BE, 40689A/89AE, 40689B/89BE, 40889A/89AE, 40889B/89BE, 40989A/89AE, 40989B/89BE, 41089A/89AE, 41089B/89BE,		12	12	0
3.	400kV,3150A,50kA,1sec, 3-PHASE, ISOLATOR WITH 2 E/S	40489L/89LE, 40889L/89LE,		2	2	0
4.	400kV,3150A,50kA,1sec, 1-PHASE, ISOLATOR WITH 1E/S	41089T1R, 41089T1Y, 41089T1B 41389T1R, 41389T1Y, 41389T1B, 41089T2B		7	0	+7
5.	400kV,3150A,50kA,1sec,1-PHASE, ISOLATOR WITHOUT E/S	41089T2R, 41089T2Y, 41089T2B 41389T2R, 41389T2Y, 41389T2B		6	12	+6
6.	400kV,3150A,50kA,1sec, EARTH SWITCH FREE STANDING	40CE1R, 40CE1Y, 40CE1B, 40CE2R, 40CE2Y, 40CE2B, 414E1R, 414E1Y, 414E1B, 414E2R, 414E2Y, 414E2B		12	12	0
7.	400kV,CURRENT TRANSFORMER 3000A-2000-500/1-1-1-1=1A, 50kA-1sec, 1205 EXTENDED CURRENT RATING	404CT1R, 404CT1Y, 404CT1B, 404CT2R, 404CT2Y, 404CT2B, 405CTR, 405CTY, 405CTB, 406CT1R, 406CT1Y, 406CT1B, 406CT2R, 406CT2Y, 406CT2B 408CT1R, 408CT1Y, 408CT1B 408CT2R, 408CT2Y, 408CT2B, 409CTR, 409CTY, 409CTB, 410CT1R, 410CT1Y, 410CT1B 410CT2R, 410CT2Y, 410CT2B,		30	30	0
8.	400kV /0.11 , 0.11 , 0.11 / 0.1 , 0.1 , 0.1 , 0.1 KV , 1-PH CVT (6600pF) ON EACH PHASE PER CIRCUIT	404CVTR, 404CVTY, 404CVTB, 408CVTR, 408CVTY, 408CVTB, 407CVT1R, 407CVT1Y, 407CVT1B 407CVT2R, 407CVT2Y, 407CVT2B		12	12	0
9.	400kV,WAVE TRAP 3150A, 1min, 50kA/1S	404WTB, 404WTY 408WTB, 408WTY,		4	0	+4
10.	390kV, 10KA, CLASS III,LIGHTNING ARRESTER (1-ø)	404LAR,404LAY,404LAB,406LAR,406LAY,406LAB, 408LAR,408LAY,408LAB,410LAR,410LAY,410LAB 410LAR,		13	13	0

LEGEND:-

IEC 61850 LOGICAL NODE	ANSI CODE	DESCRIPTION
PDIS	21L1	LINE MAIN-I DISTANCE PROTECTION
PDIS	21L2	LINE MAIN-II DISTANCE PROTECTION
PPBR	46L	OPEN JUMPER PROTECTION
PPSB	78	POWER SWING BLOCK
PTUV	27	VT FUSE FAILURE
RREC	79	AUTO RECLOSURE
PBDF	87B1	MAIN 1 BUS BAR PROTECTION
PBDF	87B2	MAIN 2 BUS BAR PROTECTION
RBRF	50LBB	LOCAL BREAKER BACK UP PROTECTION
PHDF	64R	REF PROTECTION
PTOV	59	LINE OVER VOLTAGE PROTECTION
PDOC/PDEF	67/67N	DIRECTIONAL O/C E/F PROTECTION
PTDF	87T	TRANSFORMER DIFFRENTIAL PROTECTION
RDRE	DR	DISTURBANCE RECORDER
RFLO	FL	DISTANCE TO FAULT LOCATOR
PDIF	87TEED	TEED DIFFERENTIAL PROTECTION
	LRP	LINE RELAY PANEL
	TRP	TRANSFORMER RELAY PANEL
	TIE RP	TIE RELAY PANEL
	BCU	BAY CONTROL UNIT

FUNCTION IN BCU

A – CURRENT/ PHASE
V – VOLTAGE/ PHASE
F – FREQUENCY
W – ACTIVE POWER
VAR – REACTIVE POWER
RREC/79 – AUTO RECLOSURE (ONLY FOR LINE & RELATED TIE CB)
RSYN/25 – SYNCHRONIZATION CHECK

BUS BAR PROTECTION

APPROVED
Executive Engineer (D & E-S2)
Transmission Projects Section,
M.S.E. Transmission Company Ltd.,
"Prakashganga",
Bandra-Kurla Complex,
Bandra East, Mumbai - 400 051

NOTES

1. RELAY METER SHOWN IN THE BOX IS INBUILT FEATURE OF DEVICE.
2. # BUS BAR PROTECTION RELAY TO BE SHIFTED FROM TIE PANEL TO FUTURE BAY PANEL DURING AUGMENTATION.
3. MANUAL JUMPERING TO BE DONE FOR CONNECTING SPARE ICT/REACTOR IN PLACE OF FAULTY/TAKEN OUT ICT W.r.t. PHASE (EITHER R-Y, Y-B, B-R)

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☐ RECORD ☐ EXECUTION
ALSTOM T&D INDIA LTD.
DT. 12/04/13 SIGN.

REFR. DRG. NO.	DESCRIPTION

REV.	DESCRIPTION	DRAWN	SIGN.	CHECKED	SIGN.	APPROVED	SIGN.	STATUS
REV6		Name / Date		Name / Date		Name / Date		
REV5		Name / Date		Name / Date		Name / Date		
REV4		Name / Date		Name / Date		Name / Date		
REV3		Name / Date		Name / Date		Name / Date		
REV2	REVISED AS PER MSETCL DISCUSSION & COMMENTS DTD. 17/03/2013 & 09/04/2013	Name SSM / Date 09/04/13		Name SHM/MNH / Date 09/04/13		Name NAG/SSC / Date 09/04/13		
REV1	REVISED AS PER MSETCL COMMENTS	Name HVP / Date 28/02/13		Name MNH / Date 28/02/13		Name SSC / Date 28/02/13		
REV0	FOR APPROVAL	Name HVP / Date 29/12/12		Name MNH / Date 29/12/12		Name SSC / Date 29/12/12		

OWNER: MAHATRANSCO — MAHARASHTRA STATE ELECTRICITY TRANS.CO.LTD.

PROJECT : 765/400KV SUB-STATION EKTUNI, AURANGABAD

LOA REF MSETCL/CO/C&M./COTRACTS/C-5//765KVA'BAD/T-501/9147 DT. 30.06.2012

TITLE : 765/400KV SUBSTATION SINGLE LINE DIAGRAM

A0 ALSTOM — ALSTOM T&D INDIA LTD (FORMERLY AREVA T&D INDIA LTD) VULCAN INSURANCE BLDG (3RD FL) VEER NARIMAN ROAD, CHURCHGATE MUMBAI – 400 020

DRAWING NO. 5427PW043-ABD-E-SYD-SLD-0401 | TOTAL SH. 3 | SH.No. 2 of 3 | REV. 2 | SCALE NTS

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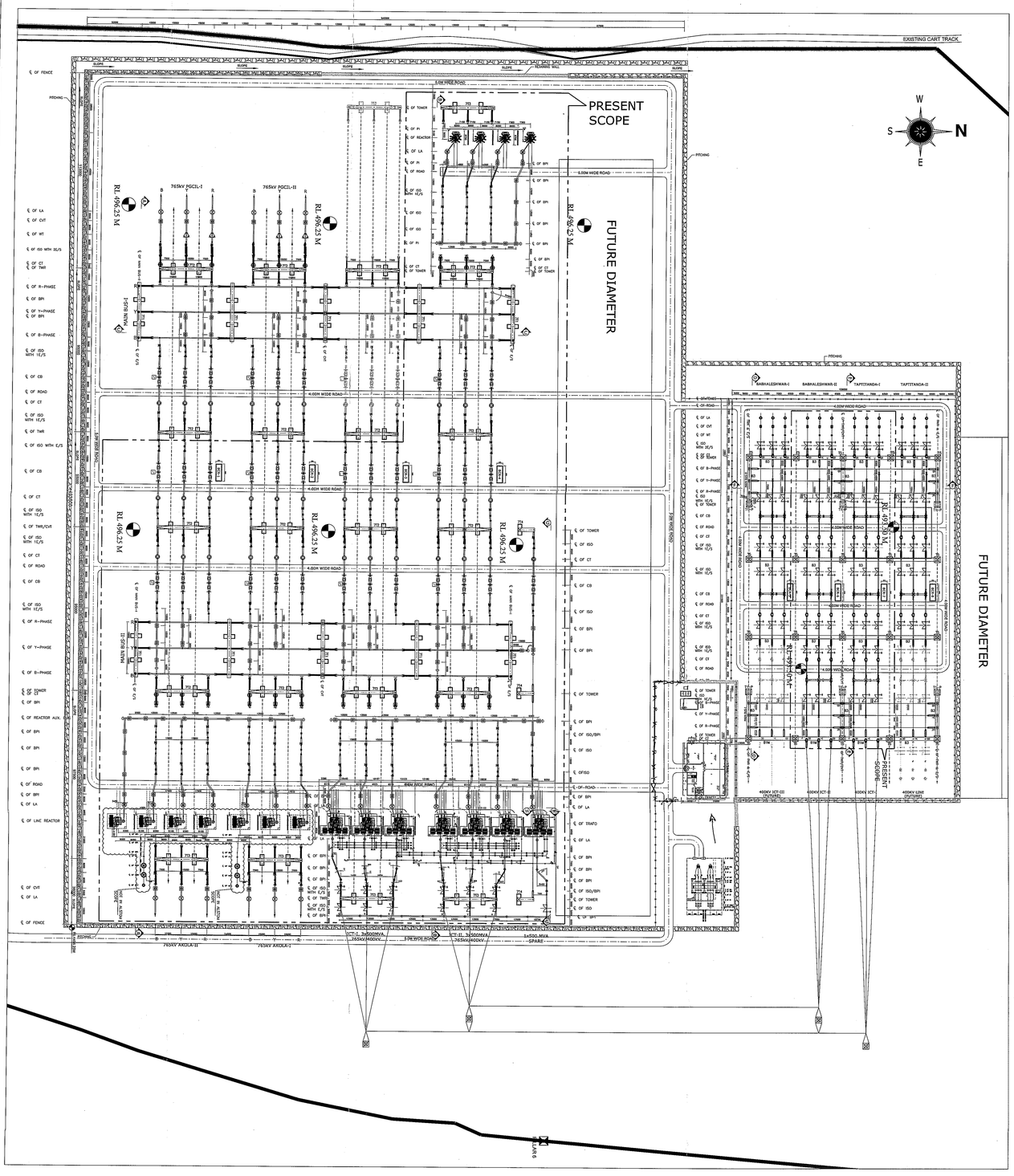


765kV CONDUCTOR & STRINGING DETAILS

SL.NO.	DESCRIPTION	SUB-CONDUCTOR	TENSION INSULATOR STRING/PHASE	CONNECTION HEIGHT (FROM TOP OF PLINTH)
1.	MAIN BUS-I & II	QUAD AAC BULL CONDUCTOR WITH 450MM SUB-CONDUCTOR SPACING	DOUBLE TENSION-120 kN DISC	27.0 mtr.
2.	JACKBUS	QUAD AAC BULL CONDUCTOR WITH 450MM SUB-CONDUCTOR SPACING	DOUBLE TENSION-120 kN DIST	39.0 mtr.
3.	DROPPERS	QUAD AAC BULL CONDUCTOR WITH 450MM SUB-CONDUCTOR SPACING	SINGLE SUSPENSION-120kN DISC	-
4.	EQUIPMENT INTERCONNECTION	4.5" IPS AL. TUBE /QUAD AAC BULL CONDUCTOR WITH 450MM SPACING	-	14.0 mtr.
5.	EARTHWIRE	7/3.66mm GI WIRE (10.98mm DIA)	-	46.5 mtr.
6.	INTERCONNECTION BETWEEN 765/400kV TRAFO TO 400kV SUB-STATION	QUAD AAAC 640 MORKULLA CONDUCTOR WITH 450MM SUB-CONDUCTOR SPACING	DOUBLE TENSION 120 kN DISC (400kV CONNECTION)	39.0 mtr. AT 765kV END 15.0/22.0 mtr. AT 400kV END

400kV CONDUCTOR & STRINGING DETAILS

SL.NO.	DESCRIPTION	SUB-CONDUCTOR	TENSION INSULATOR STRING/PHASE	CONNECTION HEIGHT (FROM TOP OF PLINTH)
1.	MAIN BUS-I & II	QUAD AAAC 640 MORKULLA CONDUCTOR WITH 450MM SUB-CONDUCTOR SPACING	DOUBLE TENSION 120 kN DISC	15.0 mtr.
2.	JACKBUS #	QUAD AAAC 640 MORKULLA CONDUCTOR WITH 450MM SUB-CONDUCTOR SPACING	DOUBLE TENSION 120 kN DISC	22.0 mtr.
3.	DROPPERS #	QUAD AAAC 640 MORKULLA CONDUCTOR WITH 450MM SUB-CONDUCTOR SPACING	SINGLE SUSPENSION-120kN DISC	-
4.	EQUIPMENT INTERCONNECTION	4.0" IPS AL. TUBE/TWIN/QUAD AAAC 640 MORKULLA CONDUCTOR WITH 450MM SPACING	-	8.0 mtr.
5.	EARTHWIRE	7/3.66mm GI WIRE (10.98mm DIA)	-	29.5 mtr.

BILL OF QUANTITY OF 765kV EQUIPMENTS

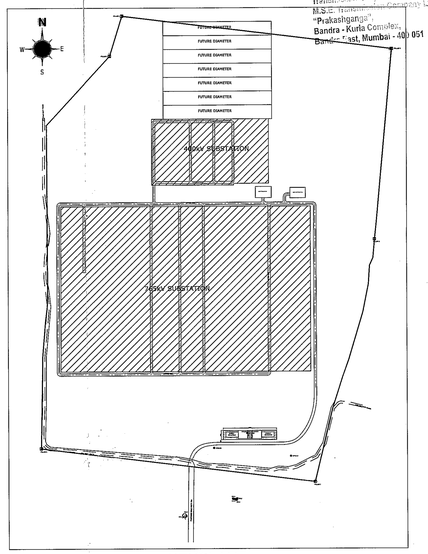
ITEM No.	DESCRIPTION	IDENTIFICATION	SYMBOL AS PER IEC	QTY PRESENT SCOPE	QTY TENDER	QTY DIFFERENCE
1.	800kV,3150A,50kA,1sec, 3-PHASE CIRCUIT BREAKER WITHOUT PIR & WITHOUT C.S.	70152, 70452		0	0	0
2.	800kV,3150A,50kA,1sec, 3-PHASE CIRCUIT BREAKER WITHOUT PIR & WITH C.S.	71052, 71152, 71252, 71352		4	3	+1
3.	800kV,3150A,50kA,1sec, 3-PHASE CIRCUIT BREAKER WITH PIR & WITHOUT C.S.			0	3	-3
4.	800kV,3150A,50kA,1sec, 3-PHASE CIRCUIT BREAKER WITH PIR & WITH C.S.	70952, 70252, 70352, 70552, 70652		5	2	+3
5.	800kV,3150A,50kA,1sec, 1-PHASE CIRCUIT BREAKER WITHOUT PIR & WITH C.S.	71452-S		1	1	0
6.	800kV,3150A,50kA,1sec, 3-PHASE, ISOLATOR WITH 1 E/S	70289A/89AE, 70289B/89BE, 71389B/89BE, 70389A/89AE, 70389B/89BE, 70589A/89AE, 70589B/89BE, 70689A/89AE, 70689B/89BE, 71089A/89AE, 70989A/89AE, 70989B/89BE, 71189A/89AE, 71189B/89BE, 71289A/89AE, 71289B/89BE, 71389A/89AE	M M	18	16	+2
7.	800kV,3150A,50kA,1sec, 3-PHASE, ISOLATOR WITH 2 E/S	70389L/89LE, 70689L/89LE,		2	2	0
8.	800kV,3150A,50kA,1sec,1-PHASE, ISOLATOR WITH 1 E/S	71089T1R, 71089T1Y, 71089T1B, 71389T1R, 71389T1Y, 71389T1B, 71189BR1R, 71189BR1Y, 71189BR1B, 70389LR1R, 70389LR1Y, 70389LR1B, 71489A, 71489B, 70689LR1R, 70689LR1Y, 70689LR1B, 71389T3R, 71189T3B, 70389T3B, 71489T1-S.	M M	21	24	-3
9.	800kV,3150A,50kA,1sec,1-PHASE, ISOLATOR WITHOUT E/S	71089T2B, 71389T2B, 71189BR2B, 70389LR2B, 70689LR2B, 71489T2-S, 71089T2R, 71089T2Y, 70689LR2R, 70689LR2Y, 71389T2R, 71389T2Y, 71189BR2R, 71189BR2Y, 70389LR2R, 70389LR2Y 71089T3R, 71089T3Y, 71389T3R, 71389T3Y 71189BR3R, 71189BR3Y, 70389LR3R, 70389LR3Y 70689LR3R, 70689LR3Y, 71089T3B, 70689LR3B	M	28	17	+11
10.	800kV,3150A,50kA,1sec, EARTH SWITCH FREE STANDING	700E1R, 700E1Y, 700E1B, 700E2R, 700E2Y, 700E2B, 715E1R, 715E1Y, 715E1B, 715E2R, 715E2Y		12	12	0
11.	800kV,CURRENT TRANSFORMER 3000A-2000-500/1-1-1-1-1A, 50kA-1sec, 120% EXTENDED CURRENT RATING	701CT1R, 701CT1Y, 701CT1B, 701CT2R, 701CT2Y, 701CT2B, 702CTr, 702CTy, 702CTB, 703CT1R, 703CT1Y, 703CT1B, 703CT2R, 703CT2Y, 703CT2B, 704CT1R, 704CT1Y, 704CT1B, 704CT2R, 704CT2Y, 704CT2B, 705CTR, 705CTY, 705CTB, 706CT1R, 706CT1Y, 706CT1B, 706CT2R, 706CT2Y, 706CT2B, 709CTR, 711CT2R, 711CT2Y, 711CT2B, 709CTY, 709CTB, 710CT1R, 710CT1Y, 710CT1B, 710CT2R, 710CT2Y, 710CT2B, 711CT1R, 711CT1Y, 711CT1B, 712CTR, 712CTY, 712CTB, 713CT1R, 713CT1Y, 713CT1B, 713CT2R, 713CT2Y, 713CT2B, 714CTr		43	41	+2
12.	800kV $\frac{0.11}{\sqrt{3}}$ / $\frac{0.11}{\sqrt{3}}$ $\frac{0.11}{\sqrt{3}}$ $\frac{0.11}{\sqrt{3}}$ kV, 1-PH CVT (8800pF) (IN EACH PHASE PER CIRCUIT)	701CVTR, 701CVTY, 701CVTB 703CVTR, 703CVTY, 703CVTB 704CVTR, 704CVTY, 704CVTB 706CVTR, 706CVTY, 706CVTB 707CVT1R, 707CVT1Y, 707CVT1B, 710CVT1Y 707CVT2R, 707CVT2Y, 707CVT2B, 713CVT1Y		14	14	0
13.	800kV,WAVE TRAP 3150A, 50kA/1S, 1mH	701WTR, 701WTY 704WTR, 704WTY		0	0	0
14.	624kV, 20KA, CLASS IV LIGHTNING ARRESTER (1-ø)	703LA1R, 703LA1Y, 703LA1B 703LA2R, 703LA2Y, 703LA2B, 703LAS 706LA1R, 706LA1Y, 706LA1B 706LA2R, 706LA2Y, 706LA2B 710LAR, 710LAY, 710LAB 711LAR, 711LAY, 711LAB, 711LAS 712LAR, 712LAY, 712LAB, 714LAS		24	23	+1

BILL OF QUANTITY OF 400kV EQUIPMENTS

ITEM No.	DESCRIPTION	IDENTIFICATION	SYMBOL AS PER IEC	QTY PRESENT SCOPE	QTY TENDER	QTY DIFFERENCE
1.	400kV,3150A,50kA,1sec, 3-PHASE CIRCUIT BREAKER WITHOUT PIR & WITHOUT C.S.	40452, 40552, 40652, 40852, 40952, 41052,		6	6	0
2.	400kV,3150A,50kA,1sec, 3-PHASE, ISOLATOR WITH 1 E/S	40489A/89AE, 40489B/89BE, 40589A/89AE, 40589B/89BE, 40689A/89AE, 40689B/89BE, 40889A/89AE, 40889B/89BE, 40989A/89AE, 40989B/89BE, 41089A/89AE, 41089B/89BE,		12	12	0
3.	400kV,3150A,50kA,1sec, 3-PHASE, ISOLATOR WITH 2 E/S	40489L/89LE, 40889L/89LE,		2	2	0
4.	400kV,3150A,50kA,1sec, 1-PHASE, ISOLATOR WITH 1E/S	41089T1R, 41089T1Y, 41089T1B 41389T1R, 41389T1Y, 41389T1B, 41089T2B		7	0	+7
5.	400kV,3150A,50kA,1sec,1-PHASE, ISOLATOR WITHOUT E/S	41089T2R, 41089T2Y, 41089T2B 41389T2R, 41389T2Y, 41089T3		6	12	-6
6.	400kV,3150A,50kA,1sec, EARTH SWITCH FREE STANDING	400E1R, 400E1Y, 400E1B, 400E2R, 400E2Y, 400E2B, 414E1R, 414E1Y, 414E1B, 414E2R, 414E2Y, 414E2B.		12	12	0
7.	400kV,CURRENT TRANSFORMER 3000A-2000-500/1-1-1-1-1A, 50kA-1sec, 120% EXTENDED CURRENT RATING	404CT1R, 404CT1Y, 404CT1B, 404CT2R, 404CT2Y, 404CT2B, 405CTR, 405CTY, 405CTB, 406CT1R, 406CT1Y, 406CT1B, 406CT2R, 406CT2Y, 406CT2B 408CT1R, 408CT1Y, 408CT1B 408CT2R, 408CT2Y, 408CT2B, 409CTR, 409CTY, 409CTB, 410CT1R, 410CT1Y, 410CT1B 410CT2R, 410CT2Y, 410CT2B,		30	30	0
8.	400kV $\frac{0.11}{\sqrt{3}}$ / $\frac{0.11}{\sqrt{3}}$ $\frac{0.11}{\sqrt{3}}$ $\frac{0.11}{\sqrt{3}}$ kV, 1-PH CVT (4400pF) (IN EACH PHASE PER CIRCUIT)	404CVTR, 404CVTY, 404CVTB, 408CVTR, 408CVTY, 408CVTB, 407CVT1R, 407CVT1Y, 407CVT1B 407CVT2R, 407CVT2Y, 407CVT2B		12	12	0
9.	400kV,WAVE TRAP 3150A, 1mH, 50kA/1S	404WTB, 404WTY 408WTB, 408WTY,		0	0	0
10.	396kV, 10KA, CLASS III LIGHTNING ARRESTER (1-ø)	404LAR,404LAY,404LAB,406LAR,406LAY,406LAB, 408LAR,408LAY,408LAB,410LAR,410LAY,410LAB 410LAS		13	13	0

BILL OF QUANTITY OF 33kV EQUIPMENTS

Sl.No.	SYMBOL	IDENTIFICATION	DESCRIPTION	QTY AS PER CONTRACT
1		NCT-1, NCT-2, NCT-3	33kV NEUTRAL CT (400/1A)	03
2		54kV	54kV LA	06
3		39kV LA	39kV LA	06
4		33kV PT	33kV PT	06
5		66kV BPI	66kV BPI	133
6		33kV BPI	33kV BPI	76



KEYPLAN

MINIMUM AIR CLEARANCE - AS PER IEC 61936

SL.No.	DESCRIPTION	765kV SYSTEM	400kV SYSTEM	52kV SYSTEM	33kV SYSTEM
1	PHASE TO PHASE CONDUCTOR TO CONDUCTOR ROD TO STRUCTURE	 7600 9400	 4000 4200	 480	 320
2	PHASE TO GROUND CONDUCTOR TO STRUCTURE ROD TO STRUCTURE	 4900 6400	 3500	 480	 320
3	SECTIONAL CLEARENCE	10300	6500	3500	3100

SYSTEM PARAMETERS:-

Sl.No.	DESCRIPTION OF PARAMETER	765kV SYSTEM	400kV SYSTEM	ICT TERTIARY SYSTEM
1	SYSTEM OPERATING VOLTAGE	765kV	400kV	33kV
2	MAX. OPERATING VOLTAGE OF THE SYSTEM (rms)	800kV	420kV	72.5kV
3	RATED FREQUENCY	50Hz	50Hz	50Hz
4	NO. OF PHASES	3	3	3
5	RATED INSULATION LEVELS			
	i) FULL WAVE LIGHTNING IMPULSE WITHSTAND VOLTAGE (1.2/50microsec.)	±2100kVp	±1550kVp	±325kVp
	ii) SWITCHING IMPULSE WITHSTAND VOLTAGE (250/2500microsec.) DRY & WET	±1550kVp	±1050kV	–
	iii) ONE MINUTE POWER FREQUENCY DRY WITHSTAND VOLTAGE (rms)	830kVp	630kV	–
	iii) ONE MINUTE POWER FREQUENCY DRY & WET WITHSTAND VOLTAGE (rms)	–	–	140kV
6	CORONA EXTINCTION VOLTAGE	508kV	320kV	-
7	MAX. RADIO INTERFERENCE VOLTAGE LEVEL AT CORONA EXTINCTION VOLTAGE (rms).	2500 micro volts	1000 micro volts	-
8	RATED 3-PH. SYMMETRICAL SHORT CIRCUIT CURRENT WITHSTAND CAPACITY	50kA/1sec.	50kA/1sec.	25kA/1sec.
9	SYSTEM NEUTRAL EARTHING	EFFECT. EARTHED	EFFECT. EARTHED	33kV UN-EARTHED
10	MINIMUM CREEPAGE DISTANCE (25MM/kV)	20000mm	10500mm	1813mm

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2. LA's & OTHER EQUIPMENTS COMING IN WITHDRAWAL DIRECTION OF TRANSFORMER & REACTOR SHALL HAVE REMOVABLE TYPE SUPPORT STRUCTURE AND PLINTH TOP FLUSHED WITH RAIL LEVEL.
3. DEAD END TOWER ERECTION AND OUTGOING STRINGING OF LINE CONDUCTOR & SHIELD WIRE ARE NOT IN ALSTOM SCOPE BUT LINE EQUIPMENT CONNECTION SHALL BE DONE BY ALSTOM.
4. SUPPLY ERECTION, TESTING & COMMISSIONING OF LINE REACTORS INCLUDING (NGR, 120kV LA, 33kV NCT & TERM. CONNECTOR OF REACTOR), SHALL NOT BE IN ALSTOM SCOPE.
5. LOCATION OF LINE EQUIPMENTS SHOWN ARE CONSIDERING TOWER WITHOUT DEVIATION. CHANGES IF REQUIRED TO BE COMMUNICATED BY MSETCL.
6. FIRE RESISTANT WALL BETWEEN 765kV LINE REACTORS UNITS ARE NOT IN ALSTOM SCOPE.
7. CHANGE IN BOQ., WITH RESPECT TO TENDER DRAWING TO BE FINALISED SEPARATELY WITH SCOPE AMMENDMENTS.
8. NOTWITHSTANDING THE DETAILS SHOWN IN THIS DRAWING FOR SAKE OF COMPLETENESS THE SCOPE OF WORKS SHALL BE AS GUIDED BY CONTRACT.
9. LIGHTNING PROTECTION SHALL BE WITH SHIELD WIRE.
10. ~~MAIN APPROCH ROAD SHOWN IN THE LAYOUT IS NOT IN ALSTOM SCOPE.~~
11. CHANGE IN QTYS FOR MAIN EQUIPMENTS AND LOT ITEMS, WITH RESPECT TO TENDER STAGE QTYS DUE TO CHANGE IN SCOPE AT EXECUTION STAGE, WILL BE PROVIDED IN SEPERATE SHEET/LETTER.
12. INTERNAL DIMENSION OF BCR SHALL BE 3.5m(W) x 10m(L).
13. FIRE WALL DIMENSIONS FOR ICT IS 10700(L)x12300(H)
14. FIRE WALL DIMENSIONS FOR BUS REACTOR IS 7800(L)x12300(H)

REFR. DRG. NO.	DESCRIPTION
5427PW043-ABD-E-SYD-ARR-0011	OVERALL PLOT PLAN 765/400kV OUTDOOR YARD
5427PW043-ABD-E-SYD-ARR-0002	ELEVATION VIEW OF 765/400kV OUTDOOR YARD
5427PW043-ABD-E-SYD-SLD-0401	PROTECTION AND METERING SLD FOR 765/400kV AIS SUBSTATION

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☐ PROTO ☐ CONSTRUCTION
☐ PLANNING ☐ REFERENCE
☐ MANUFACTURING ☐ INDENT
☐ RECORD ☐ EXECUTION
ALSTOM T&D INDIA LTD
DT. 06/09/2013 KOTHI SIG.

REV.	DESCRIPTION	DRAWN	SIGN.	CHECKED	SIGN.	APPROVED	SIGN.	STATUS
REV6		Date		Date		Date		
REV5		Date		Date		Date		
REV4	REVISED AS PER MSETCL HO DISCUSSION & COMMENTS DTD. 02/09/2013 & MSETCL AURANGABAD DISCUSSION COMMENTS DTD. 05-09-2013	Name HVP Date 05.09.13		Name MNH Date 05.09.13		Name SSC Date 05.09.13		
REV3	TERTIARY & NEUTRAL BUS ARRANGEMENT SHOWN, TYPE OF TOWER FOR 765kV MARKED, FIRE WALL DIMENSIONS MARKED, ARCHITECTURAL OF CONTROL ROOM BUILDING SHOWN.	Name HVP Date 23.08.13		Name MNH Date 23.08.13		Name SSC Date 23.08.13		
REV2	REVISED AS PER MSETCL DISCUSSION & COMMENTS DTD. 17/03/2013 & 09/04/2013	Name HVP Date 10.04.13		Name MNH Date 10.04.13		Name SSC Date 10.04.13		
REV1	REVISED AS PER MSETCL COMMENTS	Name HVP Date 28.02.13		Name MNH Date 28.02.13		Name SSC Date 28.02.13		
REV0	FOR CLIENT APPROVAL	Name HVP Date 29.12.12		Name MNH Date 29.12.12		Name SSC Date 29.12.12		

APPROVED
Executive Engineer (Z.T.S-S2)
Transmission Project Section,
M.S.E. Holding Co. Ltd.
"Prakashgadh",
Bandra - Kurla Complex,
Bandra (East), Mumbai - 400 051

OWNER: MAHATRANSCO — MAHARASHTRA STATE ELECTRICITY TRANS.CO.LTD.

PROJECT : 765/400KV SUB-STATION EKTUNI, AURANGABAD

LOA REF MSETCL/CO/C&M./COTRACTS/C-5//765KVA'BAD/T-501/9147 DT. 30.06.2012

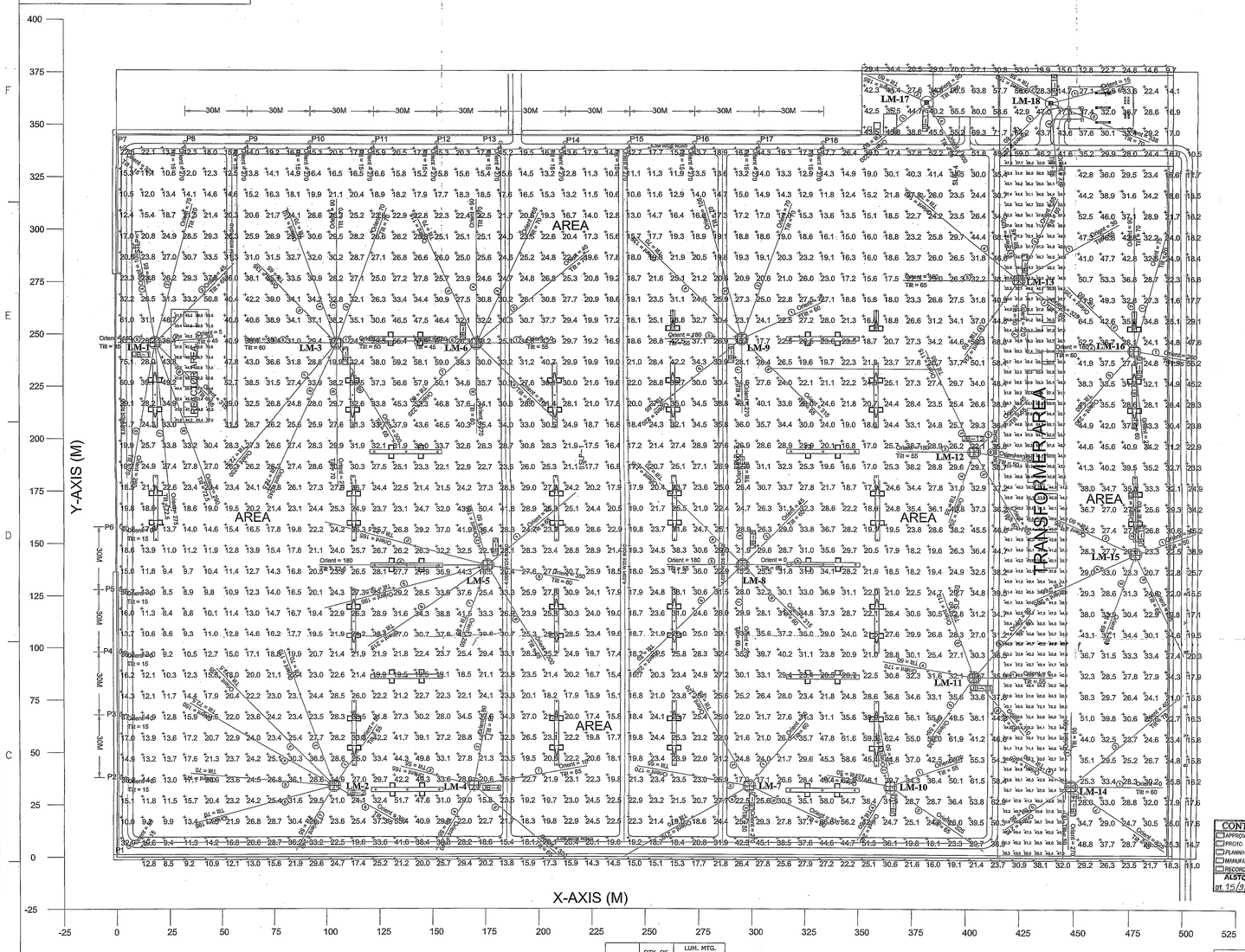
TITLE : LAYOUT PLAN FOR 765/400KV OUTDOOR YARD

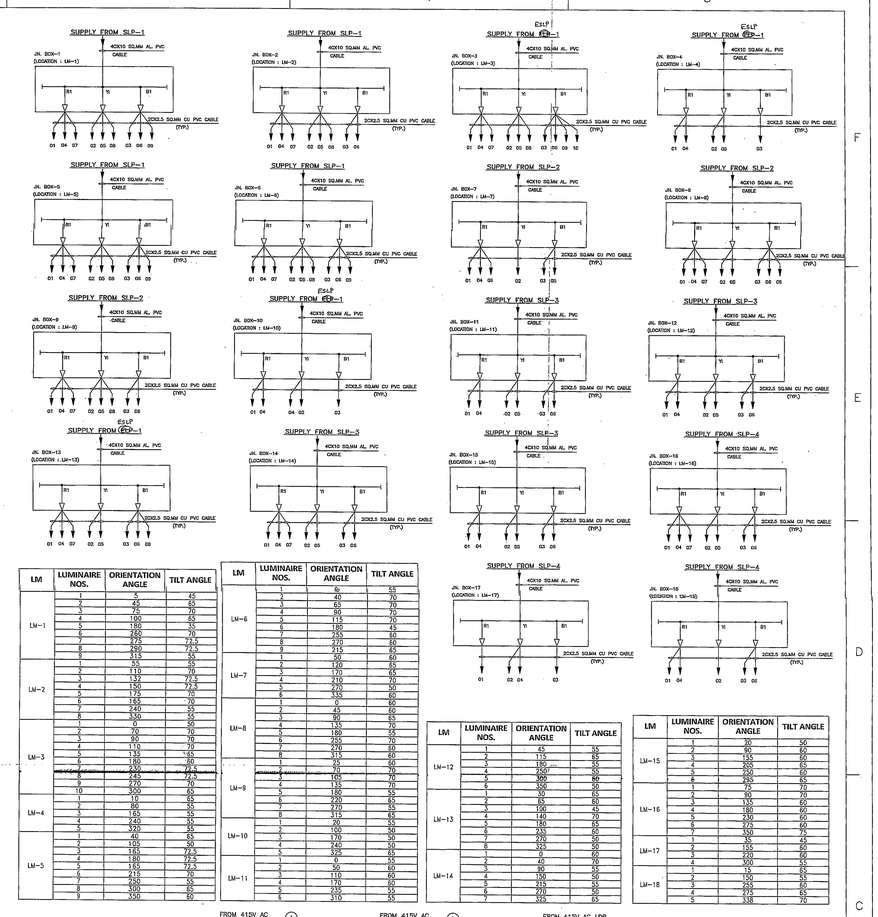
A0 ALSTOM — ALSTOM T&D INDIA LTD (FORMERLY ARIVA T&D INDIA LTD) VULCAN INSURANCE BLDG (3RD FL) VEER NARIMAN ROAD, CHURCHGATE MUMBAI - 400 020

DRAWING NO. 5427PW043-ABD-E-SYD-ARR-0001 | TOTAL SH. 2 | SH.No. 1 | REV. 4 | SCALE 1:1000 | 1 OF 2

Revised dtg recd. on 12.9.13

DRAWING NO. :5427PW043-ABD-E-SYD-SYS-0809



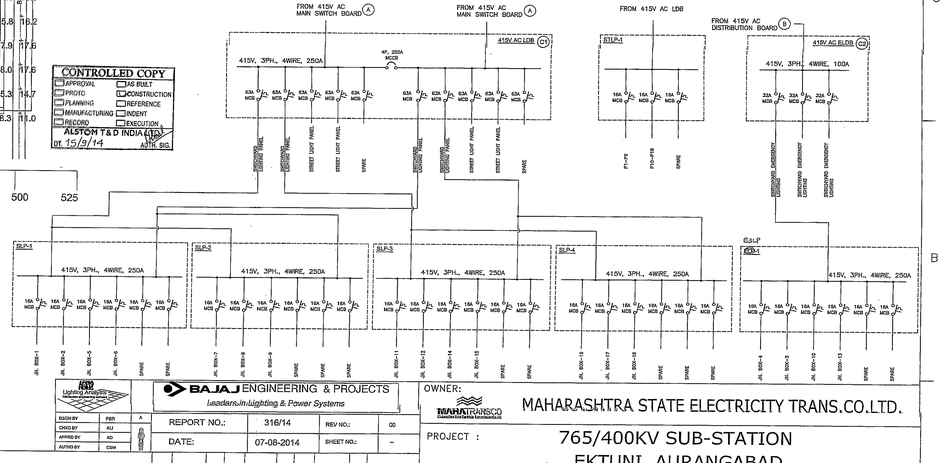


LM	LUMINAIRE NOS.	ORIENTATION ANGLE	TILT ANGLE
LM-1	1	5	45
	2	45	65
	3	75	70
	4	100	65
	5	180	35
	6	260	70
	7	275	72.5
	8	280	72.5
	9	315	55
LM-2	1	33	55
	2	110	70
	3	132	72.5
	4	150	72.5
	5	175	70
	6	183	70
	7	240	55
	8	330	55
LM-3	1	0	55
	2	70	70
	3	90	70
	4	110	70
	5	135	65
	6	180	60
	7	225	72.5
	8	245	72.5
	9	270	70
LM-4	1	300	65
	2	10	55
	3	60	55
	4	165	55
	5	240	55
	6	320	55
	7	40	55
	8	105	50
	9	160	72.5
LM-5	1	180	72.5
	2	185	55
	3	215	70
	4	250	55
	5	300	65
	6	350	60

LM	LUMINAIRE NOS.	ORIENTATION ANGLE	TILT ANGLE
LM-6	1	40	70
	2	40	70
	3	65	70
	4	80	70
	5	115	70
	6	180	45
	7	255	80
	8	270	80
	9	315	65
LM-7	1	50	60
	2	100	65
	3	170	65
	4	210	70
	5	270	50
	6	335	60
LM-8	1	0	60
	2	45	60
	3	90	65
	4	135	75
	5	180	70
	6	255	70
	7	270	60
	8	315	60
LM-9	1	25	60
	2	70	70
	3	105	70
	4	135	70
	5	180	55
	6	220	65
	7	270	55
	8	315	65
LM-10	1	20	55
	2	100	50
	3	170	50
	4	240	50
	5	325	65
LM-11	1	0	50
	2	50	60
	3	110	60
	4	170	60
	5	235	55
	6	310	55

LM	LUMINAIRE NOS.	ORIENTATION ANGLE	TILT ANGLE
LM-12	1	45	55
	2	115	65
	3	180	65
	4	250	55
	5	300	60
	6	350	50
LM-13	1	30	65
	2	60	60
	3	100	45
	4	140	70
	5	180	65
	6	235	60
	7	270	50
	8	325	50
LM-14	1	0	60
	2	40	70
	3	90	55
	4	150	50
	5	215	55
	6	270	50
	7	325	65

LM	LUMINAIRE NOS.	ORIENTATION ANGLE	TILT ANGLE
LM-15	1	30	50
	2	90	60
	3	135	60
	4	205	65
	5	250	60
	6	295	65
	7	350	50
LM-16	1	30	70
	2	75	70
	3	135	60
	4	180	60
	5	230	60
	6	275	60
	7	350	75
LM-17	1	35	45
	2	155	55
	3	220	50
	4	300	55
	5	15	65
	6	150	55
	7	215	55
	8	270	65
	9	335	65
LM-18	1	30	50
	2	90	60
	3	225	50
	4	270	65
	5	335	70



LM-1 TO LM-18 : LIGHTING MASTS (18 NOS.)

P1 TO P18 : 9M SWAGED AND WELDED STEEL TUBULAR POLE (7.5M ABOVE G/L)
BRACKET ARM LENGTH: 0.5M
TILT: 15 DEGREE
LUMINAIRE ON THE POLE: BGEST 150 SV
LAMP: 150W HPSVT+

Luminaire Schedule					
Symbol	Qty	Label	Total Lamp Lumens	LLF	Description
	126	A	108000	0.700	BJENF 24 (2 X 400W HPSVT+)
	18	B	16000	0.700	BGEST 150 SV

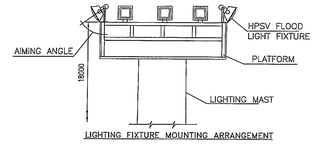
HORIZONTAL ILLUMINATION LEVEL AT EL 0M ABOVE G/L WITHOUT OBSTRUCTIONS:

Calculation Summary								
Label	CalcType	Units	Avg	Max	Min	Min/Avg	Min/Max
AREA	Illuminance	Lux	27.55	90.5	8.4	0.30	0.09
REACTOR AREA	Illuminance	Lux	52.09	73.6	36.9	0.71	0.50
TRANSFORMER AREA	Illuminance	Lux	51.47	92.7	32.8	0.64	0.35

BILL OF MATERIAL

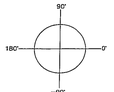
SL. NO.	SYMBOL	DESCRIPTION	CATALOG REF.	QTY.
1		2 X 400W HPSV FLOOD LIGHT FIXTURE WITH CONTROL GEAR SUITABLE FOR OUTDOOR	BAJAJ-BGENF 24 2x400W HPSV T LAMP OR EQ.	126 Nos.
2		1 X 150W HPSV STREET LIGHT FIXTURE WITH CONTROL GEAR SUITABLE FOR OUTDOOR	BAJAJ-BGEST 150SV 1X150W OR EQ.	18 Nos.
3		9.0 M LONG SINGLE ARM STREET LIGHT POLE WITH JUNCTION BOX.		18 Nos.
4		4C X 10 SQ.MM AL., PVC ARMOURED, CABLE		REF NOTE 3
5		2C X 2.5 SQ.MM CU., PVC FLEXIBLE CABLE		REF NOTE 3
6	JB	JUNCTION BOX		18 Nos.

LM. NO.	QTY. OF LUM. 'A'	LUM. MTG. HT.ABOVE GL. (M)
LM-1	9	25
LM-2	8	25
LM-3	10	25
LM-4	5	25
LM-5	9	25
LM-6	9	25
LM-7	5	25
LM-8	8	25
LM-9	8	25
LM-10	5	25
LM-11	6	25
LM-12	6	25
LM-13	8	25
LM-14	7	25
LM-15	6	25
LM-16	7	25
LM-17	4	18
LM-18	5	18



LIGHTING FIXTURE MOUNTING ARRANGEMENT

AIMING ORIENTATION



NOTES

1) ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2) ALL LIGHTING PANELS/DIST BOARDS, JBs, FIXTURES ETC. SHALL BE EARTHED IN COMPLIANCE WITH PROVISION OF IS : 3043
3) THE QUANTITY OF CABLE SHALL BE AS PER THE CABLE SCHEDULE.
4) LM1 TO LM16 ARE 50M HEIGHT AND LM17 & LM18 ARE 18M HEIGHT.

APPROVED
Executive Engineer (D&E-S2)
Projects & Design Section
M.S.E.T.C.L. "Prakashganga"
BKC, Bandra (East),Mumbai - 51

LEGEND:-

AC LDB = AC LIGHTING DISTRIBUTION BOARD (C1)
AC ELDB = AC EMERGENCY LIGHTING DISTRIBUTION BOARD (C2)
SLP = SWITCHYARD LIGHTING PANEL
ESLP = EMERGENCY SWITCHYARD LIGHTING PANEL
STLP = STREET LIGHTING PANEL

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☐ MANUFACTURING ☐ INDENT
☐ RECORD ☐ EXECUTION
ALSTOM T&D INDIA LTD.
DT. 15/9/14 AUTH. SIG.

5427PW043-ABD-E-SYD-ARR-0011	OVERALL PLOT PLAN 765/400kV OUTDOOR YARD
5427PW043-ABD-E-SYD-ARR-0002	ELEVATION VIEW OF 765/400kV OUTDOOR YARD
5427PW043-ABD-E-SYD-ARR-0001	LAYOUT PLAN OF 765/400kV OUTDOOR YARD
REFR. DRG. NO.	DESCRIPTION

REV.	DESCRIPTION	DRAWN	SIGN.	CHECKED	SIGN.	APPROVED	SIGN.	STATUS
REV6								
REV5		Date		Date		Date		
REV4		Name		Name		Name		
REV3		Name / Date		Name / Date		Name / Date		
REV2		Name / Date		Name / Date		Name / Date		
REV1	DESIGN REVISED AS PER DISCUSSION DTD. 21/07/2014	Name YGB / Date 16.08.14		Name MNH / Date 18.08.14		Name BB / Date 18.08.14		
REV0	FOR CLIENT APPROVAL	Name SMM / Date 12.07.14		Name MNH / Date 15.07.14		Name BB / Date 15.07.14		

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☐ MANUFACTURING ☐ INDENT
☐ RECORD ☐ EXECUTION
ALSTOM T&D INDIA LTD.
DT. 20/8/14 AUTH. SIG.

DESIGN BY	PER	A	
CHKD BY	AU		
APPRD BY	AD		
AUTHD BY	CSM		

BAJAJ ENGINEERING & PROJECTS
Leaders in lighting & Power Systems

REPORT NO.:	316/14	REV NO.:	00
DATE:	07-08-2014	SHEET NO.:	–

OWNER: MAHARASHTRA STATE ELECTRICITY TRANS.CO.LTD.

PROJECT : 765/400KV SUB-STATION EKTUNI, AURANGABAD

LOA REF TENDER NO. MSETCL/CO/C&M./COTRACTS/C-5/765KVA'BAD/T-501/9147 DT. 30.06.2012

TITLE : ILLUMINATION LAYOUT FOR 765kV SWITCHYARD

ALSTOM
ALSTOM T&D INDIA LTD.
3rd, FLR, VALCUN INSURANCE BLDG.,
VEER NARIMAN ROAD, CHURCHGATE, MUMBAI - 400 020

A0 fabrikant SUBSTATION ENGINEERS. MUMBAI, INDIA

DRAWING NO. 5427PW043-ABD-E-SYD-SYS-0809

TOTAL SH. 01 | SH.No. 1 | REV 0
SCALE NTS | 1 OF 1

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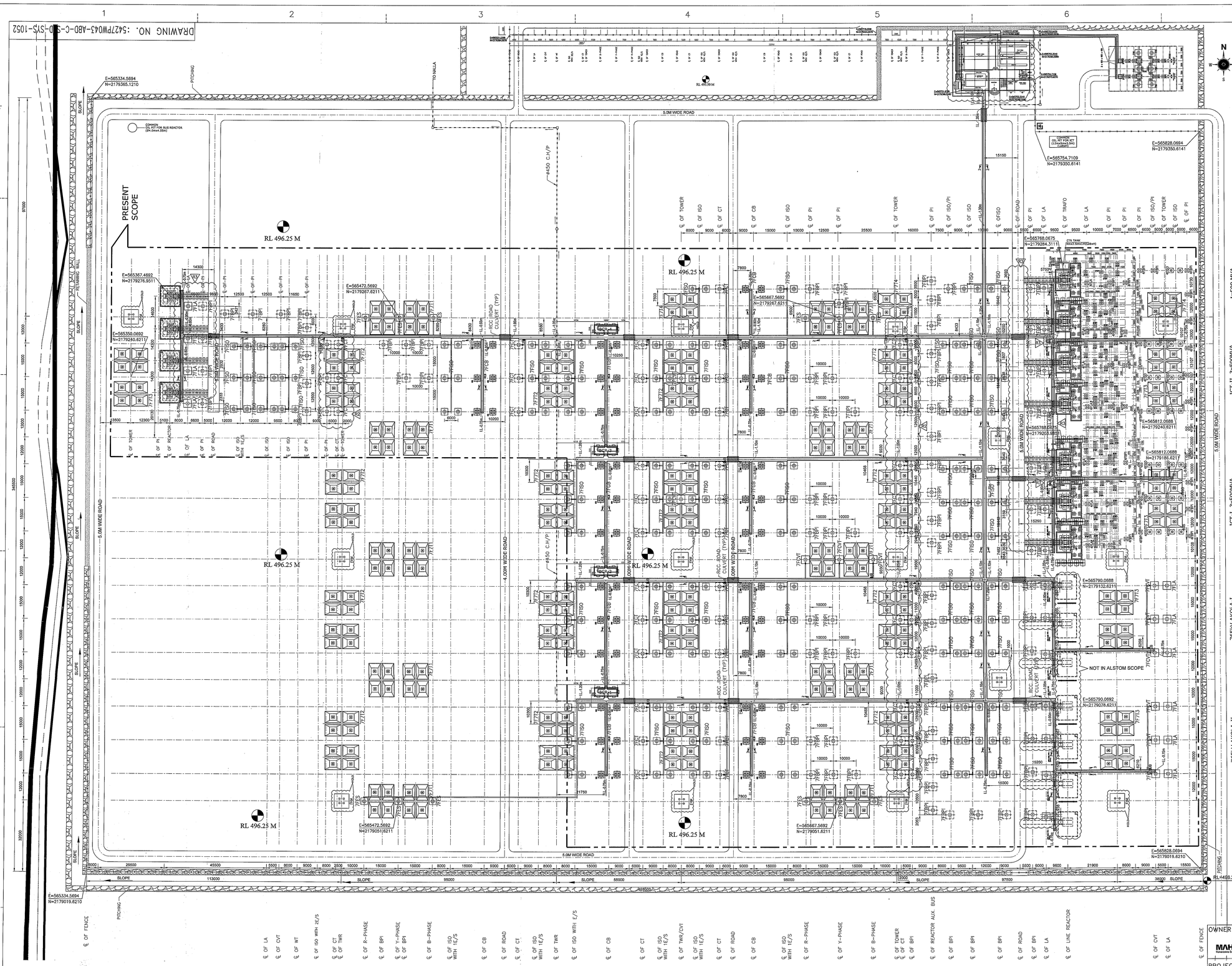
DRAWING NO. :5427PW043-ABD-C-SYD-SYS-1052



SCHEDULE OF TOWER & EQUIPMENT FOUNDATION

765kV SWITCHYARD

SR. NO.	TYPE OF TOWER	FDN MARK	QTY. NOS.	REFERENCE FOUNDATION DRAWING.
1.	7T1	F7T1	10	--
2.	7T2	F7T2	16	
3.	7T3	F7T3	5	
4.	7T4	F7T4	3	

765kV

SR. NO.	TYPE OF TOWER	FDN MARK	QTY. NOS.	REFERENCE FOUNDATION DRAWING.
1.	HM	FHM	11	--

765kV

SR. NO.	TYPE OF EQPT.	FDN MARK	QTY. NOS.	REFERENCE FOUNDATION DRAWING.
1.	LA (1ø)	7FLA	24	--
2.	CVT (1ø)	7FCC	14	
3.	CT (1ø)	7FCT	43	
4.	BPI (1ø)	7FPI	93	
5.	CB (3ø)	7FCB	9	
6.	CB (1ø)	7FCB	1	
7.	ISO (3ø)	7FISO	20	
8.	ISO (1ø)	7FISO	49	
9.	ISO ES(1ø)	7FISO	12	--

400kV

SR. NO.	TYPE OF EQPT.	FDN MARK	QTY. NOS.	REFERENCE FOUNDATION DRAWING.
1.	LA (1ø)	4FLA	7	CECC/200-433
2.	ISO (1ø)	4FISO	1	
3.	ISO (3ø)	4FISO	12	
4.	BPI (1ø)	4FPI	33	

33kV & 66kV

SR. NO.	TYPE OF EQPT.	FDN MARK	QTY. NOS.	REFERENCE FOUNDATION DRAWING.
1.	BPI (1ø)	3FBPI	76	--
2.	66kV BPI	3FBPI	133	--
3.	NCT	3FNCT	3	--
4.	5MJ/33kV LA	3FLA	6	--
5.	33kV PT	3FPT	3	--

1x500 MVA SPARE

ICT-II, 3x500MVA, 765kV/400kV

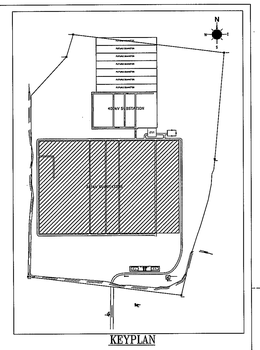
ICT-I, 3x500MVA, 765kV/400kV

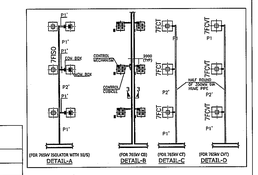
765KV AKOLA-I

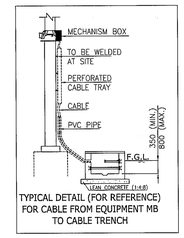
765KV AKOLA-II

REFERENCE DRAWINGS

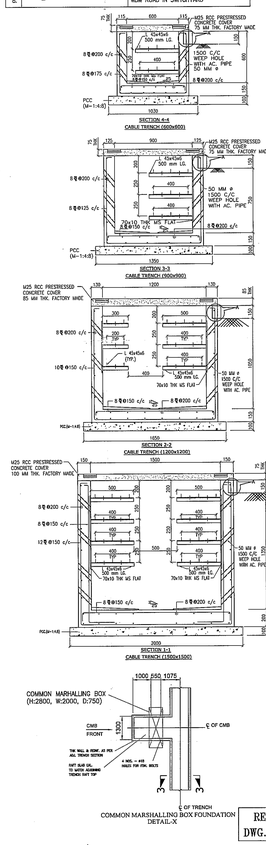
SR. NO.	REFERENCE DRAWING NOS.	DESCRIPTION
1.	EE/CO/ABAD/694	STORE SHED
2.	EE/CO/ABAD/90	CHAIN LINK FENCE
3.	--	RETAINING WALL TYPICAL SECTION
4.	5353PW-902/903/CON-C-SYD-APR-729	CYCLE STAND
5.	RCC CULVERT	TRENCH ROAD CROSSING
6.	EEC/A/939	PRECAST RCC COVER FOR CABLE TRENCH
7.	--	UNLOADING PLATFORM
8.	--	MEM ROAD IN SWITCHYARD







TYPICAL DETAIL (FOR REFERENCE) FOR CABLE FROM EQUIPMENT MB TO CABLE TRENCH



APPROVED
Executive Engineer (D & E-S2)
Transmission Projects Section,
M.S.E. Transmission Company Ltd.,
"Prakashganga",
Bandra - Kurla Complex,
Bandra (E), Mumbai - 400 051

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☑ APPROVAL	AS BUILT
PROTO	CONSTRUCTION
PLANNING	REFERENCE
MANUFACTURING	INDENT
RECORD	EXECUTION

ALSTOM T & D INDIA LTD
DT. 5/11/14 ACTL. SIG.

READ THIS DWG. IN CONJUNCTION WITH DWG. NO.-5427PW043-ABD-E-SYD-ARR-0001

REFR. DRG. NO.	DESCRIPTION
5427PW043-ABD-E-SYD-ARR-0011	OVERALL PLOT PLAN 765/400kV OUTDOOR YARD
5427PW043-ABD-E-SYD-ARR-0002	ELEVATION VIEW OF 765/400kV OUTDOOR YARD
5427PW043-ABD-E-SYD-SLD-0401	PROTECTION AND METERING SLD FOR 765/400kV AIS SUBSTATION

LEGEND:-

- 1500 x 1500 WIDE CABLE TRENCH
- 1200 x 1200 WIDE CABLE TRENCH
- 900 x 900 WIDE CABLE TRENCH
- 600 x 600 WIDE CABLE TRENCH
- HOLD MARK
- HUME PIPE
- UNDER GROUND CABLE
- REVISED MARK
- STONE PITCHING
- RETAINING WALL

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. PLINTH HEIGHT OF FOUNDATION WILL BE +450MM FROM THE FINISHED GROUND LEVEL (F.G.L.) GRAVEL THICKNESS SHALL BE 150mm FROM FGL.
3. NO FOUNDATION SHALL REST IN FILLED UP SOIL. MINIMUM DEPTH OF FOUNDATIONS BELOW NATURAL SOIL SHALL BE 500mm FOR TOWER & 300mm FOR EQUIPMENTS.
4. THE LOCATION OF FOUNDATION BOLTS SHALL BE VERIFIED WITH RESPECTIVE STRUCTURE DRAWINGS BEFORE PLACING THE BOLTS.
5. LOCATION OF FOUNDATIONS FOR CONTROL CUBICLE AND PLATFORM FOR CB FOUNDATIONS SHALL MATCH WITH FINAL EQUIPMENT DRAWING.
6. FOR ANCHOR BOLTS DETAILS REFER SEPARATE DWG.
7. TOP OF ROAD SHOULD BE 150mm. ABOVE GRAVEL LEVEL.
8. MINIMUM SBC AS PER SOIL INVESTIGATION REPORT 20 T/M^2 AT 2.0m DEPTH
9. HALF ROUND HUME PIPE OF DIA 350(B)x450(T)mm TO BE USED FOR CABLE LAYING OF CT, CVT, ISOLATOR, E/S

REV.	DESCRIPTION	DRAWN		CHECKED		APPROVED		STATUS
REV6		Date	Date	Date				
REV5		Date	Date	Date				
REV4		Name / Date	Name / Date	Name / Date				
REV3		Name / Date	Name / Date	Name / Date				
REV2	CABLE ENTRY FOR CONTROL ROOM IS MODIFIED AS PER DISCUSSION DTD. 16/12/2013	Name HVP / Date 06.09.14	Name SYP/MNH / Date 06.09.14	Name SSC / Date 06.09.14				
REV1	AS PER DISCUSSION ON DATED 05/09/2013	Name HVP / Date 20.09.13	Name SYP/MNH / Date 20.09.13	Name SSC / Date 20.09.13				
REV0	FOR CLIENT APPROVAL	Name HVP / Date 07.08.13	Name SYP/MNH / Date 07.08.13	Name SSC / Date 07.08.13				

OWNER: MAHATRANSCO — MAHARASHTRA STATE ELECTRICITY TRANS.CO.LTD.

PROJECT : 765/400KV SUB-STATION EKTUNI, AURANGABAD

LOA REF MSETCL/CO/C&M./COTRACTS/C-5//765KVA'BAD/T-501/9147 DT. 30.06.2012

TITLE : FOUNDATION & CABLE TRENCH LAYOUT FOR 765KV OUTDOOR YARD

A0 ALSTOM — ALSTOM T&D INDIA LTD (FORMERLY ABB/AIA T&D INDIA LTD) VULCAN INSURANCE BLDG (3RD FL) VEER NARIMAN ROAD, CHURCHGATE MUMBAI – 400 020

DRAWING NO. 5427PW043-ABD-C-SYD-SYS-1052 — TOTAL SH. 1 — SH.No. 1 — REV. 2 — SCALE 1:600 — 1 OF 1

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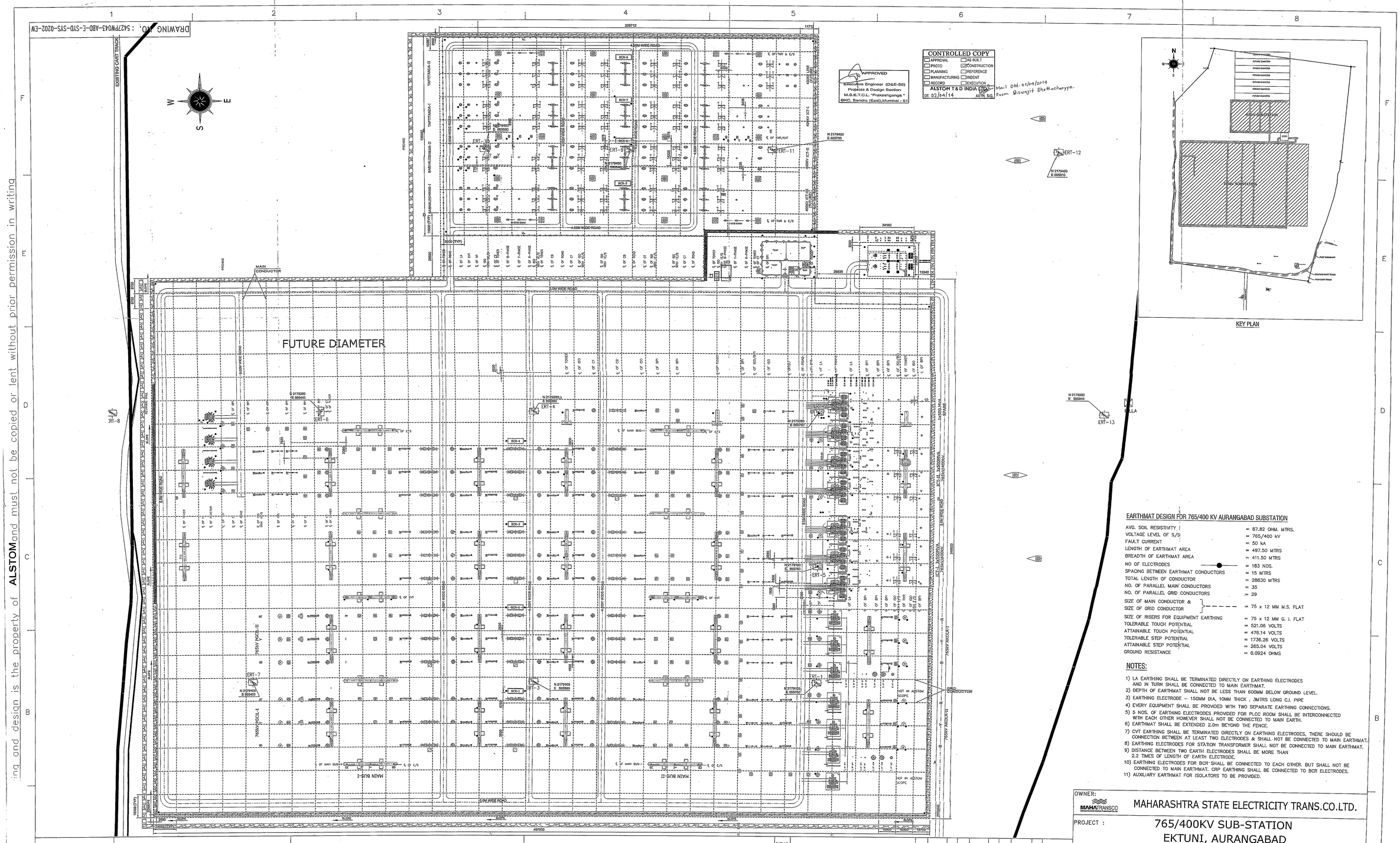
DRAWING NO. : 5427PW043-ABD-E-SYD-SYS-0202-EW



REFR. DRG. NO.	DESCRIPTION
5427PW043-ABD-E-SYD-ARR-0011	OVERALL PLOT PLAN 765/400kV OUTDOOR YARD
5427PW043-ABD-E-SYD-ARR-0001	LAYOUT PLAN VIEW OF 765/400kV OUTDOOR YARD

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APPROVAL / PHOTO / PLANNING / MANUFACTURING / RECORD / AS BUILT / CONSTRUCTION / REFERENCE / INDENT / EXECUTION
ALSTOM T&D INDIA LTD
DT. 10/03/14 AUTH. SIG.

REV.	DESCRIPTION	DRAWN	CHECKED	APPROVED	STATUS
REV6		Date	Date	Date	
REV5		Date	Date	Date	
REV4		Name / Date	Name / Date	Name / Date	
REV3		Name / Date	Name / Date	Name / Date	
REV2		Name / Date	Name / Date	Name / Date	
REV1	REVISED BASED ON DISCUSSION HAD WITH YOU ON DATED 10.02.14 & 25.02.14	Name YGB / Date 05.03.14	Name MNH / Date 05.03.14	Name SSC / Date 05.03.14	
REV0	FOR CLIENT APPROVAL	Name SMM / Date 16.08.13	Name MNH / Date 16.08.13	Name SSC / Date 16.08.13	

OWNER: MAHATRANSCO — MAHARASHTRA STATE ELECTRICITY TRANS.CO.LTD.

PROJECT : 765/400KV SUB-STATION EKTUNI, AURANGABAD

LOA REF TENDER NO. MSETCL/CO/C&M./COTRACTS/C-5/765KVA'BAD/T-501/9147 DT. 30.06.2012

TITLE : EARTHING LAYOUT FOR 765/400kV SWITCHYARD

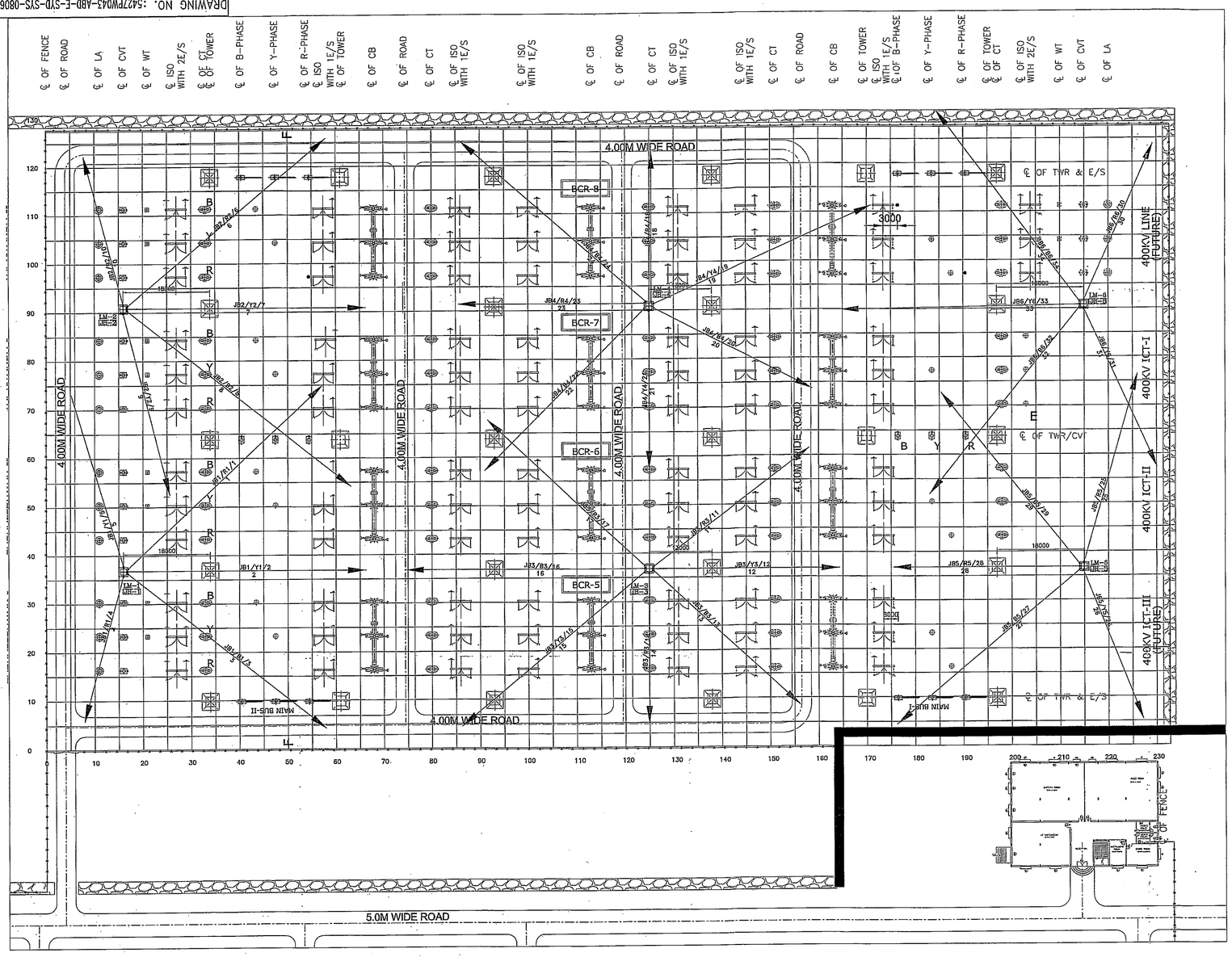
ALSTOM — ALSTOM T&D INDIA LTD. 3rd, FLR, VALCUN INSURANCE BLDG., VEER NARIMAN ROAD, CHURCHGATE, MUMBAI – 400 020

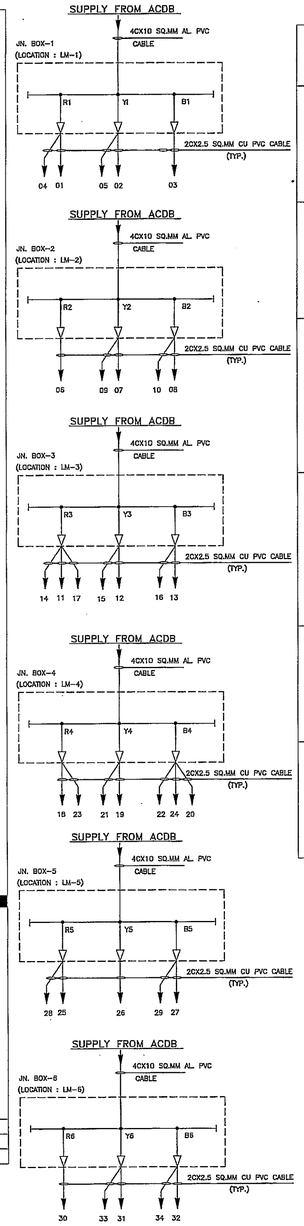
A0 fabrikant SUBSTATION ENGINEERS. MUMBAI, INDIA

DRAWING NO. 5427PW043-ABD-E-SYD-SYS-0202-EW

TOTAL SH. 01 | SCALE 1:100 | SH.No. 01 | REV 1

DRAWING NO. :5427PW043-ABD-E-SYD-SYS-0806





AIMING ANGLE FOR FLOODLIGHT LUMINAIRE

LIGHTING MAST/POLE NO.	LUMINAIRE NO.	MOUNTING HEIGHT (m)	AIMING ANGLE (°) LATERAL	AIMING ANGLE (°) VERTICAL	AIMING POINTS 'X'	AIMING POINTS 'Y'
LM-1	1	18	43	72	57	75
	2	18	0	70	66	37
	3	18	-38	71	58	4
	4	18	-105	60	8	6
	5	18	107	64	5	73
LM-2	6	18	40	71.5	58	126
	7	18	0	70	66	91
	8	18	-38	73	63	54
	9	18	-75.5	65	26	53
	10	18	105	60.5	8	123
LM-3	11	18	37	66	158	62
	12	18	0	65	164	37
	13	18	-42.5	66.5	156	9
	14	18	-90	60	125	5
	15	18	-140	70	86	5
	16	18	-180	70	75	37
	17	18	137	68	91.5	68
LM-4	18	18	90	60	125.5	123
	19	18	24	70	171	112
	20	18	-27	64	159	74
	21	18	-90	61	125	57.5
	22	18	-135	69	91	57
	23	18	-180	65	85.5	92
	24	18	139	70.5	86	125
LM-5	25	18	74	66	226	77
	26	18	-68	61.5	227	5.5
	27	18	-140	70	176	5
	28	18	-180	65	175.5	37
	29	18	129	68.5	185	73
LM-6	30	18	66	63	229	124
	31	18	-65	63.5	230	57
	32	18	-129	70	183	52
	33	18	-179	70	165	90
	34	18	127	70	184	131

FITTING SUMMARY.

HIGH MAST NO.	FITTING NO.	TOTAL
LM-1	01, 02, 03, 04, 05	05
LM-2	06, 07, 08, 09, 10	05
LM-3	11, 12, 13, 14, 15, 16, 17	07
LM-4	18, 19, 20, 21, 22, 23, 24	07
LM-5	25, 26, 27, 28, 29,	05
LM-6	30, 31, 32, 33, 34	05

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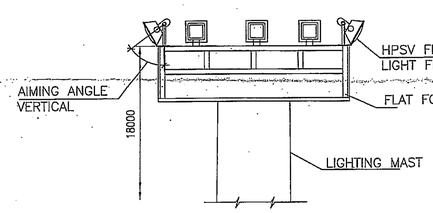
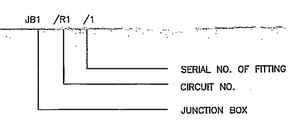
☐ PROTO ☑ CONSTRUCTION
☐ PLANNING ☐ REFERENCE
☐ MANUFACTURING ☐ INDENT
☐ RECORD ☐ EXECUTION
ALSTOM T&D INDIA LTD.
DT. 16/04/14 AUTH. SIG.

BILL OF MATERIAL

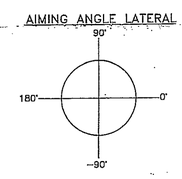
SL. NO.	SYMBOL	DESCRIPTION	CATALOG REF.	QTY.
1		2 X 400W HPSV FLOOD LIGHT FIXTURE WITH CONTROL GEAR SUITABLE FOR OUTDOOR	BAJAJ-BGENF 24 2x400W SV T LAMP	34 Nos.
2		4C X 10 SQ.MM AL., PVC ARMOURED, CABLE		REF NOTE 4
3		2C X 2.5 SQ.MM Cu., PVC FLEXIBLE CABLE		REF NOTE 4
4	JB	JUNCTION BOX		06 Nos.



LIGHTING FIXTURE MOUNTING ARRANGEMENT



LEGEND FOR FITTING



NOTES

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2. THIS DRAWING IS PREPARED BASED ON DESIGN DOCUMENT NO. 5427PW043-ABD-E-SYD-SYS-0802
3. ALL LIGHTING PANELS/DIST BOARDS, JBs, FIXTURES ETC. SHALL BE EARTHED IN COMPLIANCE WITH PROVISION OF IS : 3043
4. THE QUANTITY OF CABLE SHALL BE AS PER THE CABLE SCHEDULE.
5. HEIGHT OF LIGHTING MAST CONSIDERED IS 18M. MSETCL STD. DRG. NO. 06.693

APPROVED
As
Executive Engineer (D&E-92)
Projects & Design Section
M.S.E.T.C.L. "Prakashganga"
BKC, Bandra (East), Mumbai - 51

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☐ PLANNING ☐ REFERENCE
☐ MANUFACTURING ☐ INDENT
☐ RECORD ☐ EXECUTION
ALSTOM T&D INDIA LTD.
DT. 22/03/14 AUTH. SIG.

REFR. DRG. NO.	DESCRIPTION
5427PW043-ABD-E-SYD-ARR-0011	OVERALL PLOT PLAN 765/400kV OUTDOOR YARD (R2)
5427PW043-ABD-E-SYD-ARR-0002	ELEVATION VIEW OF 765/400kV OUTDOOR YARD (R4)
5427PW043-ABD-E-SYD-ARR-0001	LAYOUT PLAN OF 765/400kV OUTDOOR YARD (R4)

REV.	DESCRIPTION	DRAWN	SIGN.	CHECKED	SIGN.	APPROVED	SIGN.	STATUS
REV6		Date		Date		Date		
REV5		Date		Date		Date		
REV4		Name / Date		Name / Date		Name / Date		
REV3		Name / Date		Name / Date		Name / Date		
REV2		Name / Date		Name / Date		Name / Date		
REV1	REVISED AS PER DISCUSSION DTD. 24/03/2014	Name YGB / Date 25.03.14		Name MNR / Date 27.03.14		Name BB / Date 28.03.14		
REV0	FOR CLIENT APPROVAL	Name YGB / Date 19.03.14		Name MNH / Date 19.03.14		Name SSC / Date 19.03.14		

OWNER: MAHATRANSCO — MAHARASHTRA STATE ELECTRICITY TRANS.CO.LTD.

PROJECT : 765/400KV SUB-STATION EKTUNI, AURANGABAD

LOA REF TENDER NO. MSETCL/CO/C&M./COTRACTS/C-5/765KVA'BAD/T-501/9147 DT. 30.06.2012

TITLE : ILLUMINATION LAYOUT FOR 400kV OUTDOOR SWITCHYARD

ALSTOM — ALSTOM T&D INDIA LTD. 3rd, FLR, VALCUN INSURANCE BLDG., VEER NARIMAN ROAD, CHURCHGATE, MUMBAI - 400 020

A1 fabrikant SUBSTATION ENGINEERS. MUMBAI, INDIA

DRAWING NO. 5427PW043-ABD-E-SYD-SYS-0806 | TOTAL SH. 02 | SH.No. 1 | REV | SCALE 1:500 | OF 2 | 1

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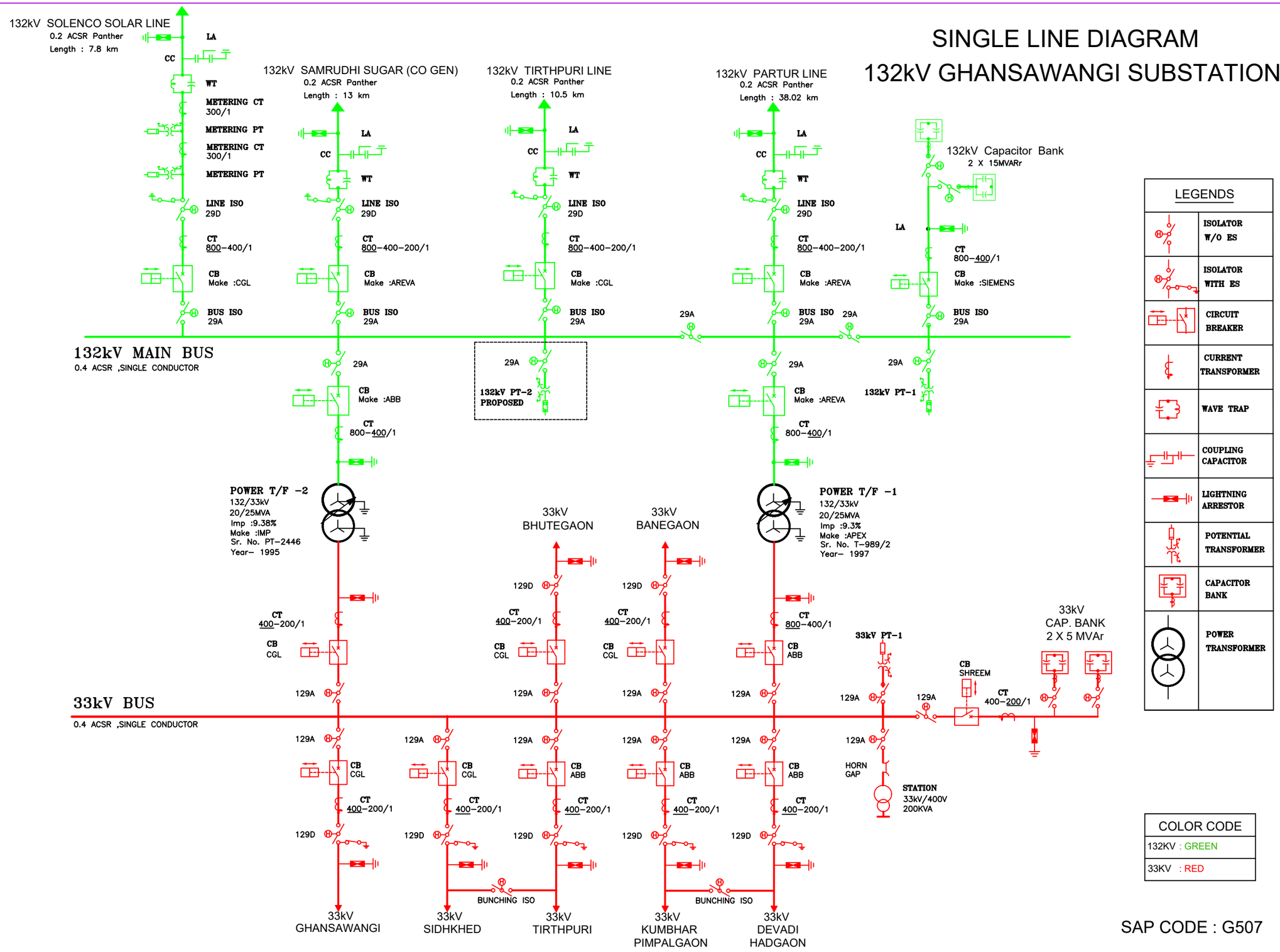
Ghansawangi S/s Drawings

SINGLE LINE DIAGRAM
132kV GHANSAWANGI SUBSTATION



LEGENDS	
	ISOLATOR W/O ES
	ISOLATOR WITH ES
	CIRCUIT BREAKER
	CURRENT TRANSFORMER
	WAVE TRAP
	COUPLING CAPACITOR
	LIGHTNING ARRESTOR
	POTENTIAL TRANSFORMER
	CAPACITOR BANK
	POWER TRANSFORMER

COLOR CODE
132KV : GREEN
33KV : RED

SAP CODE : G507

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd

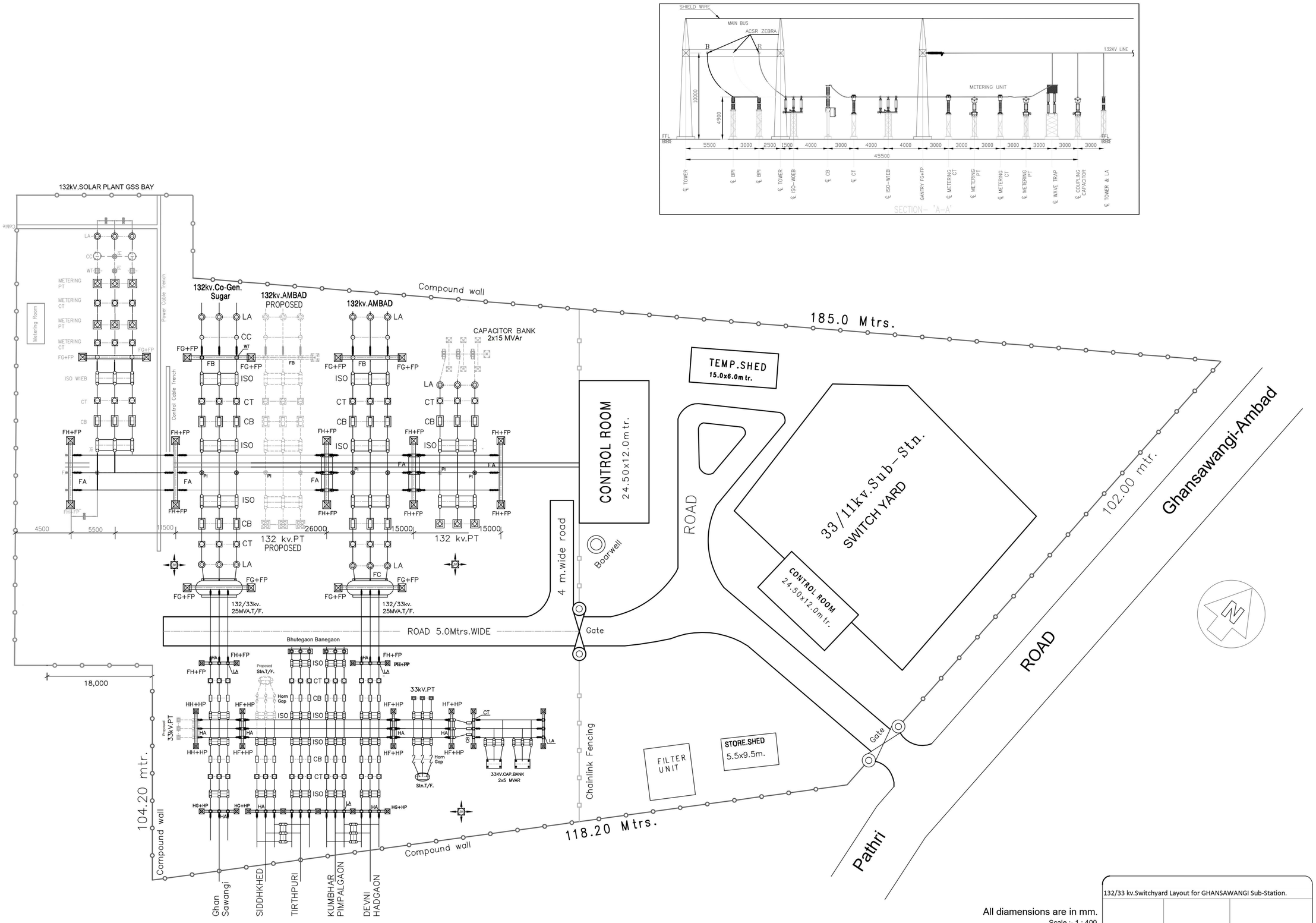
MAHARASHTRA STATE ELECTRICITY TRANSMISSION COMPANY LTD.
EHV O&M DIVISION, JALNA

132/33kV Substation, GHANSAWANGI

Date of Commission: **06-06-2008**

GPS Coordinates: **19.51692 , 75.98938**

Rev: **Date:** 30/07/2025

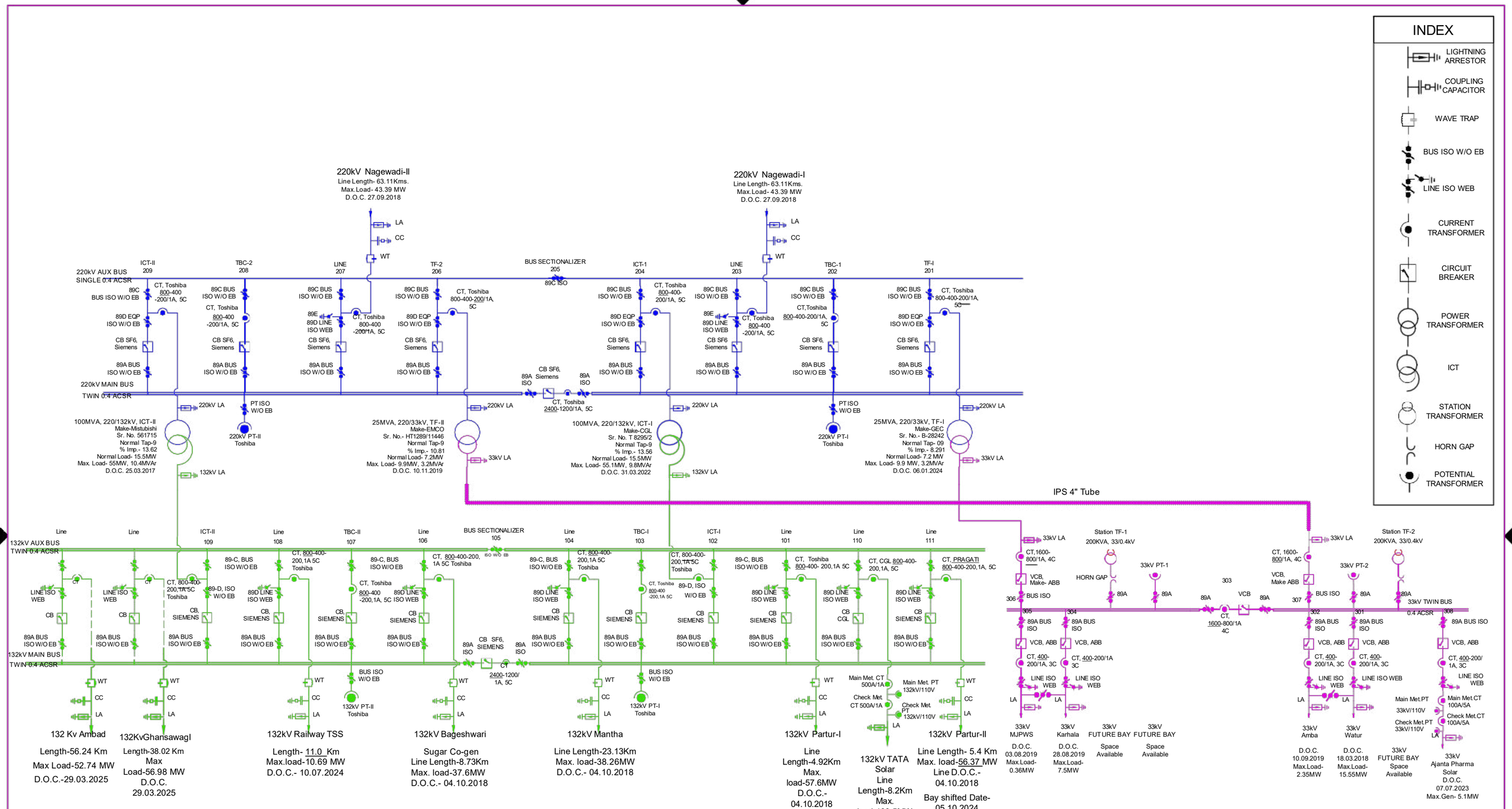


All diamensions are in mm.
Scale :- 1 : 400

132/33 kv.Switchyard Layout for GHANSAWANGI Sub-Station.			
Dy. Executive Engineer	Executive Engineer	Superintending Engineer	
	Scale:- 1 : 400	Drg.No. IE/22/11	Date:- 01.05.2022

132/33kV SUNSTATION GHANSAWANGI, DIST. JALNA

Partur S/s Drawings



COLOR CODE	
400KV	: RED
220KV	:BLUE
132KV	:GREEN
33KV	:PURPLE
11KV	: ORANGE

MAHATRANSCO

MAHARASHTRA STATE ELECTRICITY TRANSMISSION COMPANY LTD.

EHV O&M DIVISION JALNA

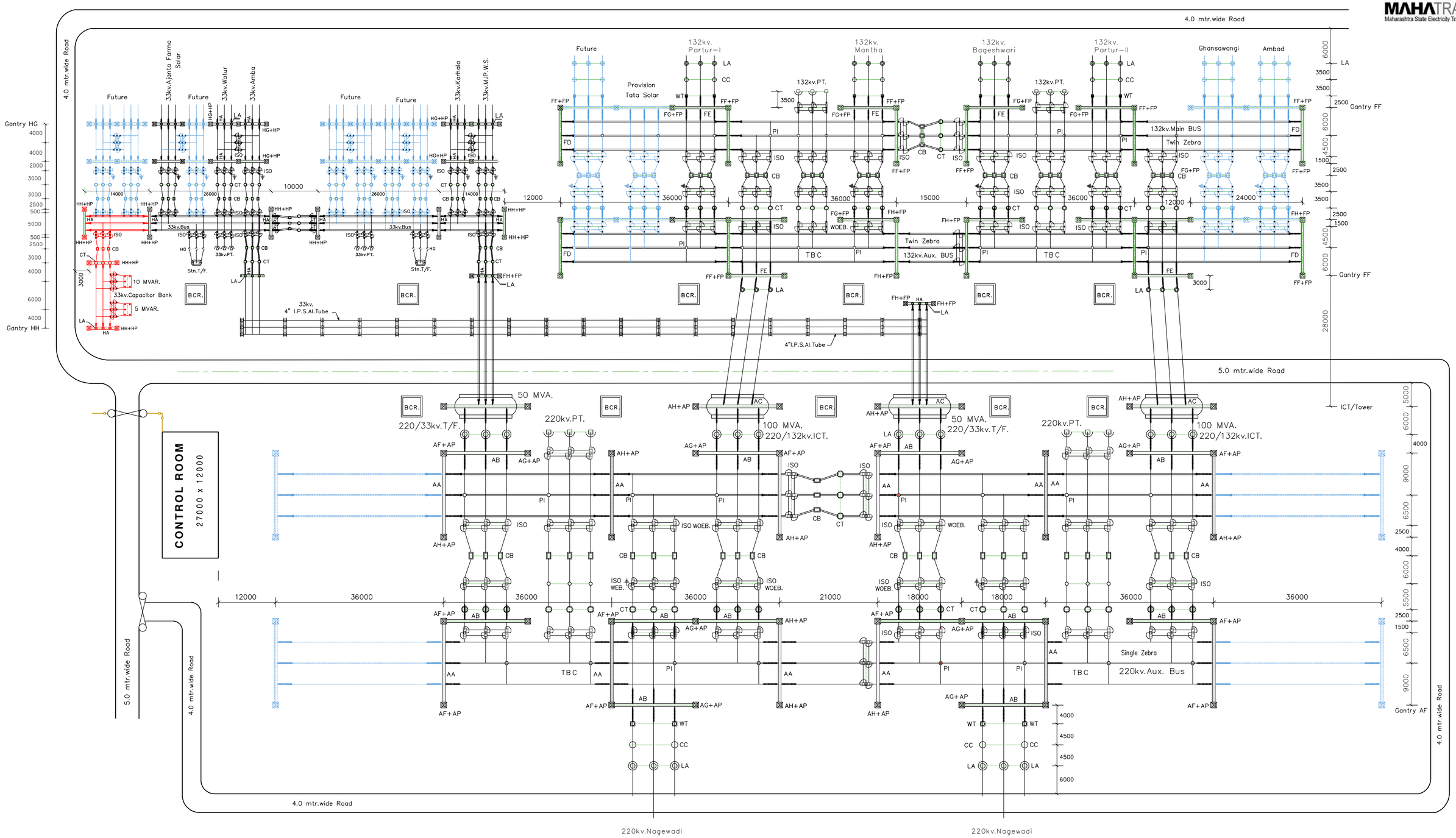
220/132/33kV Substation, Partur (MIDC)

Date of Commission:
25 March 2017
GPS Coordinates:
19.608524; 76.243733
Update Date:__/__/____

Substation
Code: 137012

SAP Loc.
Code- H856

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.



Legend

Proposd 33kv. Capacitor Bank Work

Future Provision

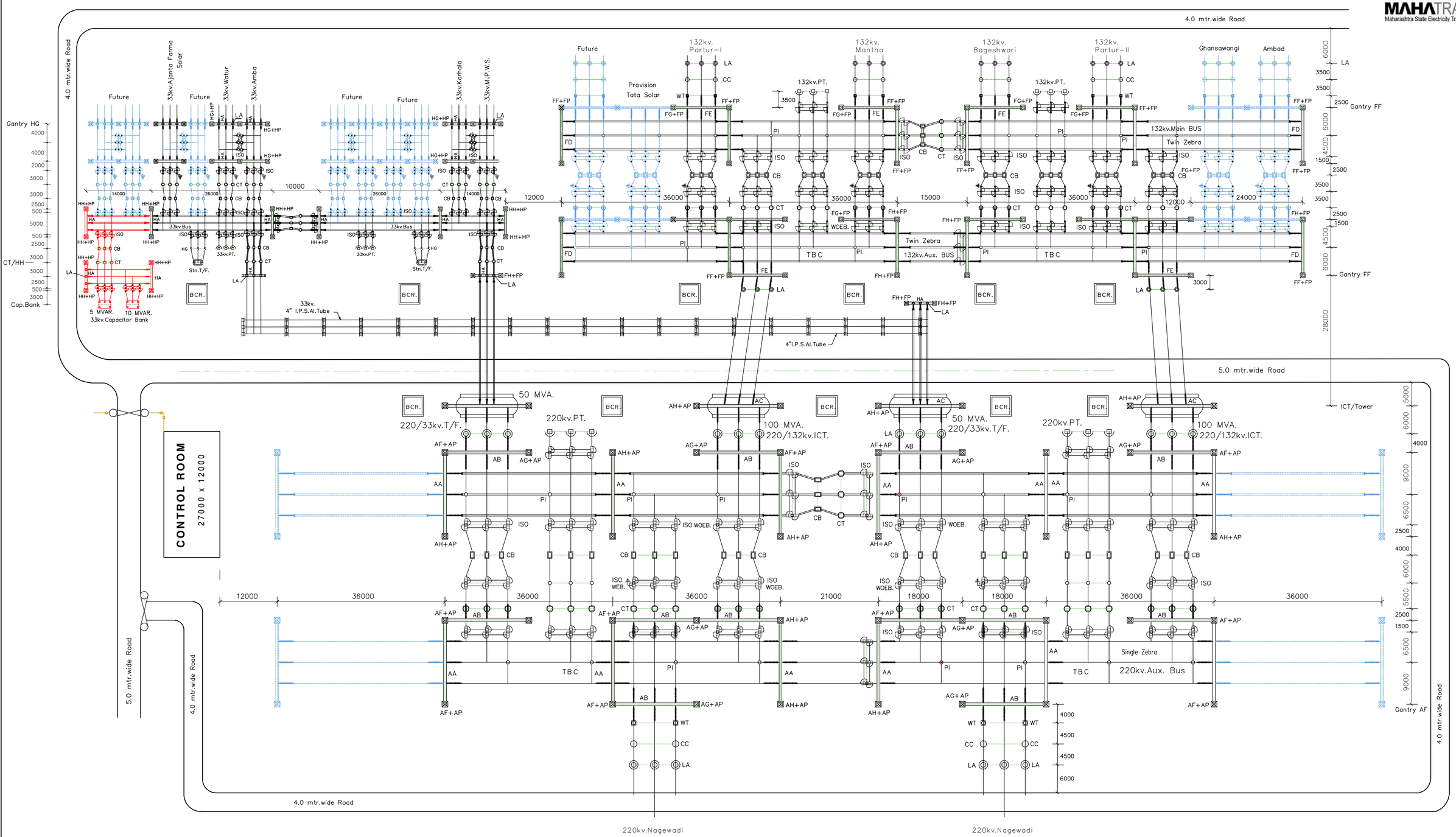
All Dimensions are in m.m.

A

E.H.V.O&M.Division, MSETCL.Jalna.		
220/132/33kv.Sub-Station, Layout for PARTUR Dist.Jalna		
Proposd 33kv. Capacitor Bank Work		
Addl.Exe.Engineer	Executive Engineer	Superintending Engineer
Sub-Stn,Incharge	Scale-1:400	Date.07.08.2023

K.N.Shardul
9421291937

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.



Legend

- Proposd 33kv. Capacitor Bank Work
- Future Provision

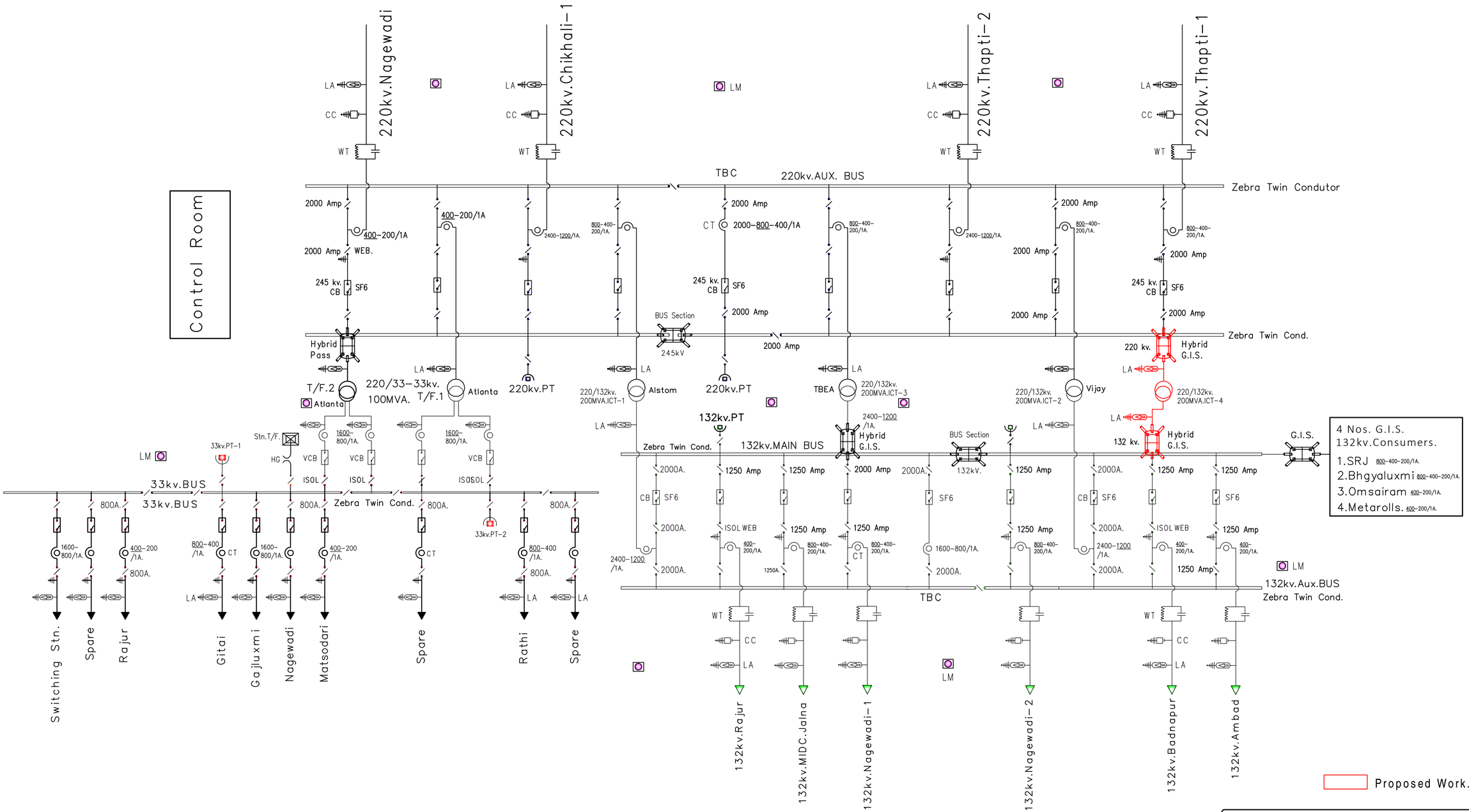
All Dimensions are in m.m.

B

E.H.V.O&M.Division, MSETCL.Jalna.		
220/132/33kv.Sub-Station, Layout for PARTUR Dist.Jalna		
Proposd 33kv. Capacitor Bank Work		
Addl.Exe.Engineer	Executive Engineer	Superintending Engineer
Sub-Stn,Incharge	Scale-1:400	Date.07.08.2023

K.N.Shardul
9421291937

Jalna MIDC Drawings



Symbol	Description
	Lightening Arrester
	Coupling Capacitor
	Potentitiol Transformer
	Isolator Without Earthblade
	Current Transformer
	Wave Trap
	33kv.Capacitor Bank

Symbol	Description
	Stn.Transformer.33/.4kv.
	Horn Gap Fuse
	Lighting Mast
	Isolator With Earth Blade.
	Circuit Breakar
	Power Transformer
	Hybrid Pass

Legend

REFERENCE DRAWING Nos.

1 Switchyard Layout..Drg. Nil Dtd.21.01.23 of EHV.O&M.Division,MSETCL.Chh.Sambhajinagar

2 MSETCL LOI.No. SE/EHV(O&M)/Tech/0725 Dtd.18.06.2025

K.N.Shardul
9421291937

CUSTOMER: Maharashtra State Electricity Transmission Co.Ltd.

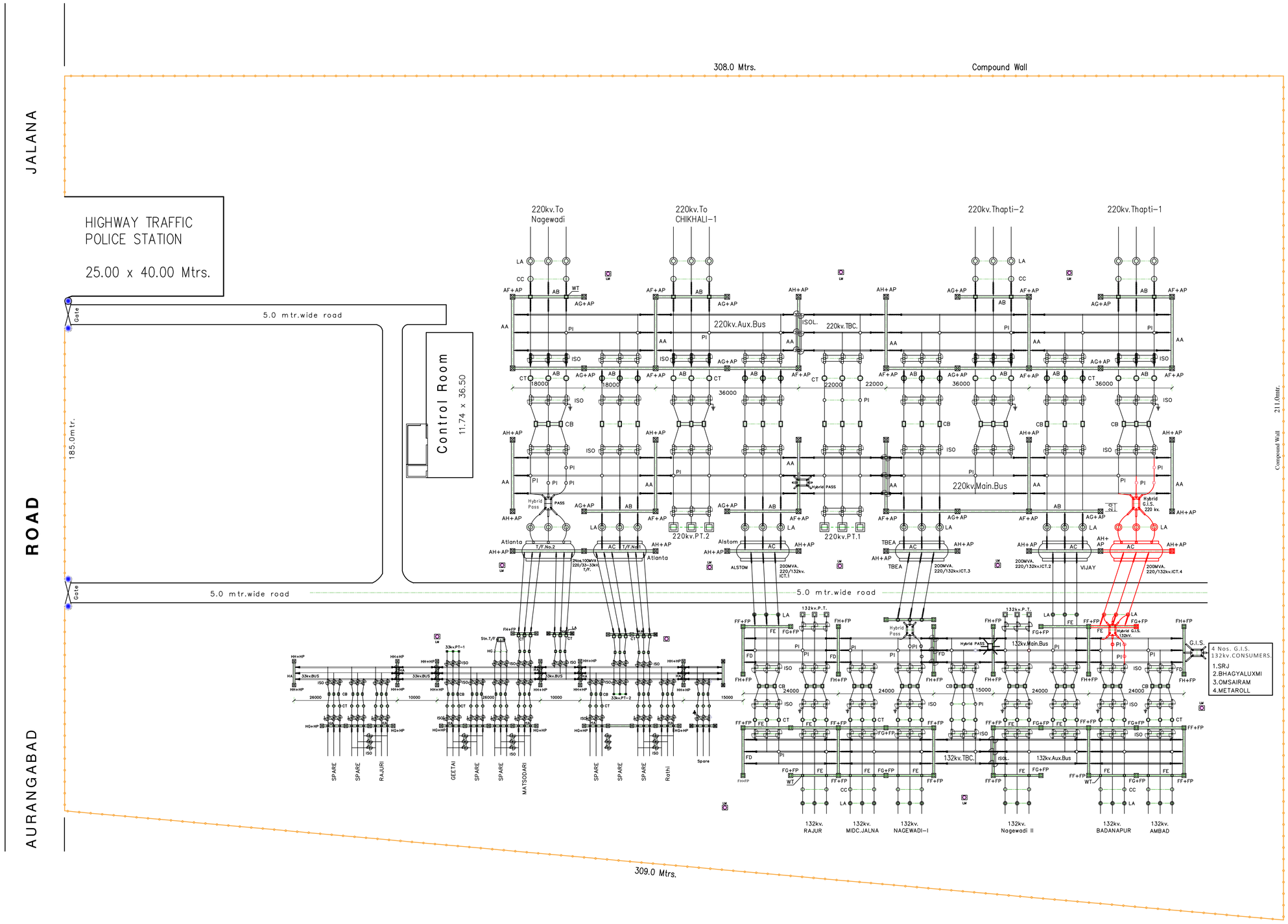
CONTRACTOR: A.B.Corporation,Mumbai

PROJECT: Work of Agumentation of Taransformation capacity at 220kV.JALNA Sub-Stn.by addition of 220/132kV.1x200 MVA.ICT.at HV.&LV. GIS.hybrid switchgear

TITLE: SINGLE LINE DIAGRAM OF 220/132/33kV. JALNA SUB-STATION.

Addl.Exe.Engineer	Executive Engineer	Superintending Engineer

For A.B.Corp.	Scale-1:500	Paper Size: A2	Rivn.R0 Dt.30.6.2025
DRG. No. ABC-MSETCL-JLN-SLD-02		Date-30.06.2025	



NORTH

Scale:-1:500

LEGEND

Lighting Mast

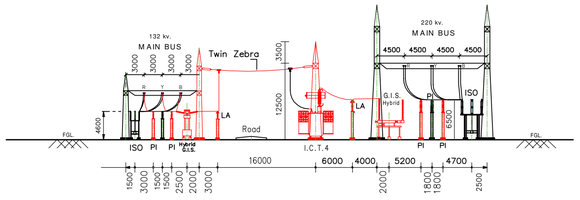
ALL DIAMENSIONS ARE IN M.M.OTHERWISE SPECIFIED.

REFERENCE DRAWING Nos.

1 Switchyard Layout..Drg. Nil Dtd.10.06.23 of EHV.O&M.Division,MSETCL.Jalna

2 MSETCL LOI.No. SE/EHV(O&M)/CSN/Tech/0725 Dtd.18.06.2025

Proposed Work.

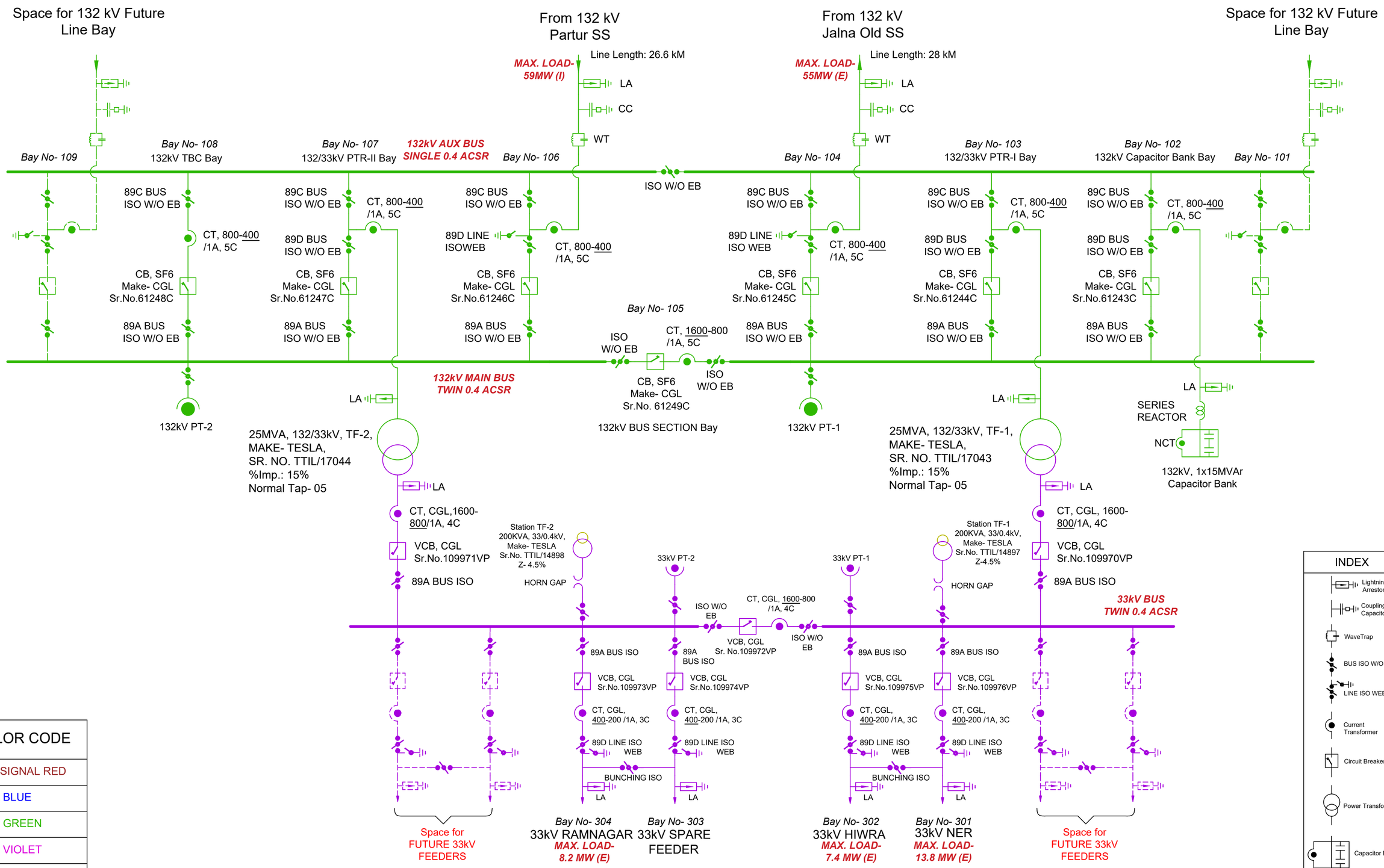


Section Proposed 220/132 kV.hybrid G.I.S.Outdoor Bay for IV th I.C.T

K.N.Shardul
9421291937

CUSTOMER: MAHATRANSCO Maharashtra State Electricity Transmission Co.Ltd.			
CONTRACTOR: A.B.Corporation,Mumbai			
PROJECT: Work of Agumentation of Taransformation capacity at 220kV.JALNA Sub-Stn.by addition of 220/132kV.1x200 MVA.ICT.at HV.&LV. GIS.hybrid switchgear			
TITLE: ELECTRICAL LAYOUT OF 220/132/33kV. JALNA SUB-STATION.			
Addl.Exe.Engineer	Executive Engineer	Superintending Engineer	
For A.B.Corp.	Scale-1:500	Paper Size: A1	Rivn.R0 Dt.30.6.2025
DRG. No. ABC-MSETCL-JLN-ELE-01		Date-30.06.2025	

Utwad S/s Drawings



COLOR CODE	
400KV	:SIGNAL RED
220KV	: BLUE
132KV	: GREEN
33KV	: VIOLET
11KV	: ORANGE

INDEX

- Lightning Arrestor
- Coupling Capacitor
- WaveTrap
- BUS ISO W/O EB
- LINE ISO WEB
- Current Transformer
- Circuit Breaker
- Power Transformer
- Capacitor Bank

MAHATRANSCO

MAHARASHTRA STATE ELECTRICITY TRANSMISSION COMPANY LTD.

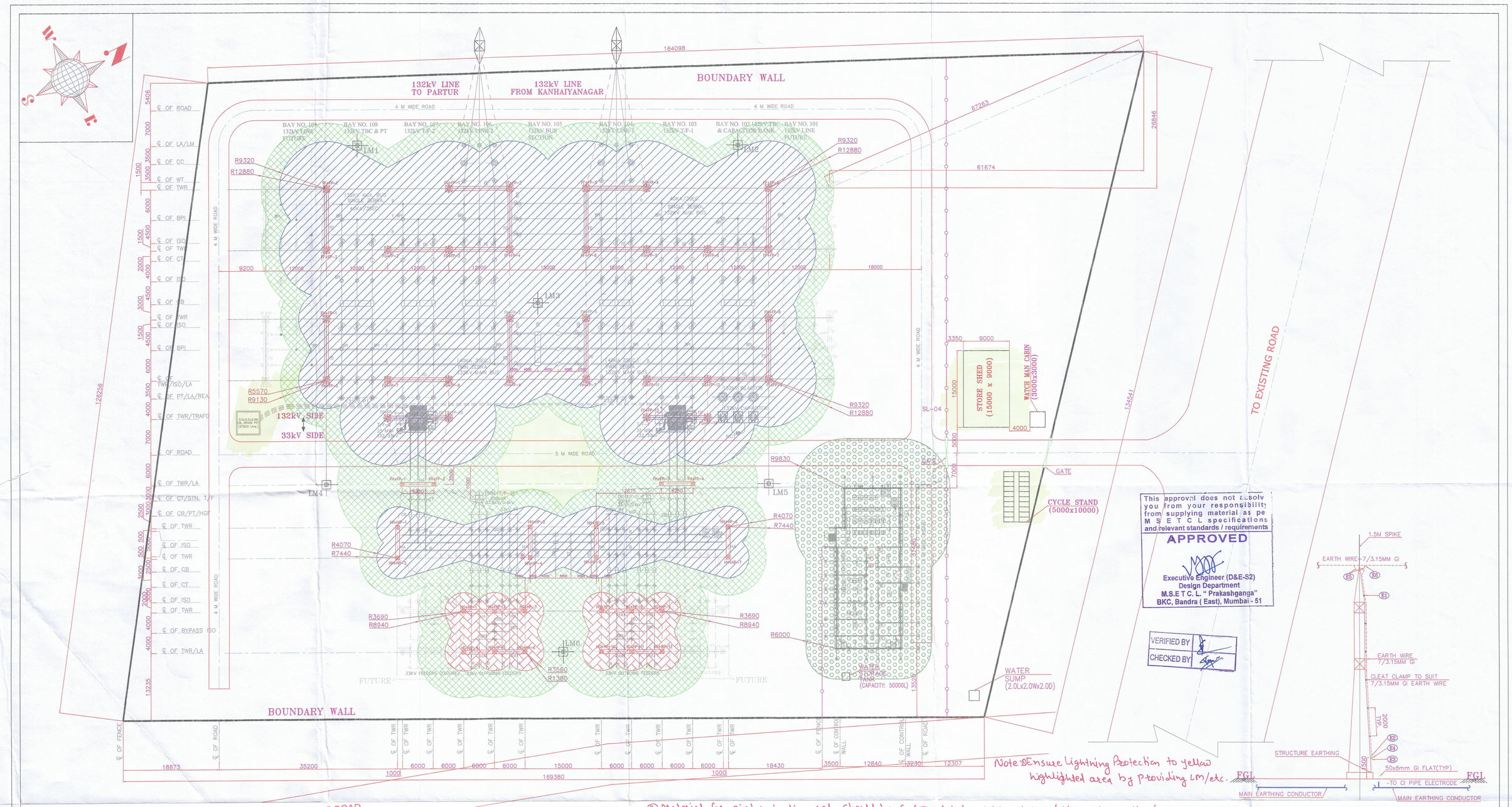
EHV O&M DIVISION, JALNA

132/33kV Substation, Utwad

Date of Commission:
31st March 2023

GPS Coordinates:
19.757072, 76.070638

Rev: 01; **Date:** 15/06/2025



Note: Ensure lightning Protection to yellow highlighted area by Providing LM/etc.

TYPICAL TOWER DETAILS

This approval does not resolv you from your responsibility from supplying material as pe M S E T C L specifications and relevant standards / requirements

APPROVED

Executive Engineer (D&E-S2)
Design Department
M.S.E T C. L. " Prakashganga"
BKC, Bandra (East), Mumbai - 51

VERIFIED BY
CHECKED BY

② Material for airtermination rods should be Cu/ Tinplated Cu/ Alluminium/ Aluminium alloy/ Cu coated Al alloy / Hot dipped galvanized steel / Cu coated steel / Stainless steel having cross-sectional area is 50mm² as per IEC 62305-3 Table No-6

③ Ensure min 4 nos of Earth pits (connected to earth mat) for control room lightning protection.

④ Ensure earthpits (connected to earthmat) for spikes erected on LM & Gantry structures.

⑤ Ensure down conductor (HDGI) from spikes to Earth pit / Earth mesh.

132/33KV SWITCHYARD DSLP PLAN

BILL OF MATERIAL

S.NO:	DESCRIPTION	QTY.	UNITS
E1	CLEAT CLAMP ON STRUCTURE TO SUIT 7/3.15mm GI EARTH WIRE.	400	Nos.
E2	PAD CLAMP ON TEST LINK TO SUIT 7/3.15mm GI EARTH WIRE.	60	Nos.
E3	PAD CLAMP ON TEST LINK TO SUIT 75x10mm G.I EARTH FLAT.	60	Nos.
E4	TEST LINK.	60	Nos.
E5	EARTHWIRE TENSION CLAMP WITH "D" SHAKLE ASSEMBLY TO SUIT 7/3.15mm GI EARTH WIRE.	200	Nos.
E6	T' CLAMP TO SUIT 7/3.15mm GI EARTH WIRE ON BOTH MAIN & BRANCH WAYS.	60	Nos.
--	7/3.15mm GI EARTH WIRE.	2200	Mts.
--	1.5Mtrs SPIKE	23	Nos.
--	3.0Mtrs SPIKE	31	Nos.

REFERENCE DRAWINGS:-

S.No.	DRAWING TITLE	DRAWING NO
01.	DSLP CALCULATION	TSL-MHA-SEOLI-ELE-017
02.	SWITCHYARD ELECTRICAL LAYOUT PLAN & SECTION.	TSL-MHA-SEOLI-ELE-001

LEGEND:

- THE ZONE OF PROTECTION AREA FOR MAIN BUS
- THE ZONE OF PROTECTION AREA FOR EQUIPMENTS AREA
- THE ZONE OF PROTECTION AREA FOR LINE BP AREA
- THE ZONE OF PROTECTION AREA FOR CONTROL ROOM AREA
- 1.5/3Mtrs SPIKE
- 7/3.15mm GI EARTH WIRE.

NOTES:

1. ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE SPECIFIED.
2. THE CLEAT CLAMPS ON THE TOWER ARE PLACED AT A TYPICAL DISTANCE OF 2000mm AS SHOWN.
3. THE EARTH WIRE IS GROUNDED THROUGH A TEST LINK WHICH IS TERMINATED ON TO A PIPE ELECTRODE USING 75X10mm GS FLAT.
4. TOWER SPIKE DETAILS
   - FF+FP TOWER – 1.5Mtrs SPIKE
   - FG+FP TOWER – 1.5Mtrs SPIKE
   - FH+FP TOWER – 3.0Mtrs SPIKE
   - HH+HP TOWER – 3.0Mtrs SPIKE
   - HG+HP TOWER – 3.0Mtrs SPIKE
5. QUANTITY MENTION BOM IS TENTATIVE,ACTUAL QUANTITY WILL AS PER SITE REQUIREMENT.

TESLA TRANSFORMERS (INDIA) LTD. Sector "B" Industrial Area Govindpura BHOPAL

REV. NO.	DESCRIPTION	DRAWN	CHKD.	APPD.	DATE
R1	ISSUED FOR APPROVAL	KB	TSS	TEC	05/10/2022
R0	ISSUED FOR APPROVAL	KB	TSS	TEC	02/02/2022

CUSTOMER: MAHATRANSCO — MAHARASHTRA STATE ELECTRICITY TRANSMISSION Co. Ltd., ISO 9001-2000 certified

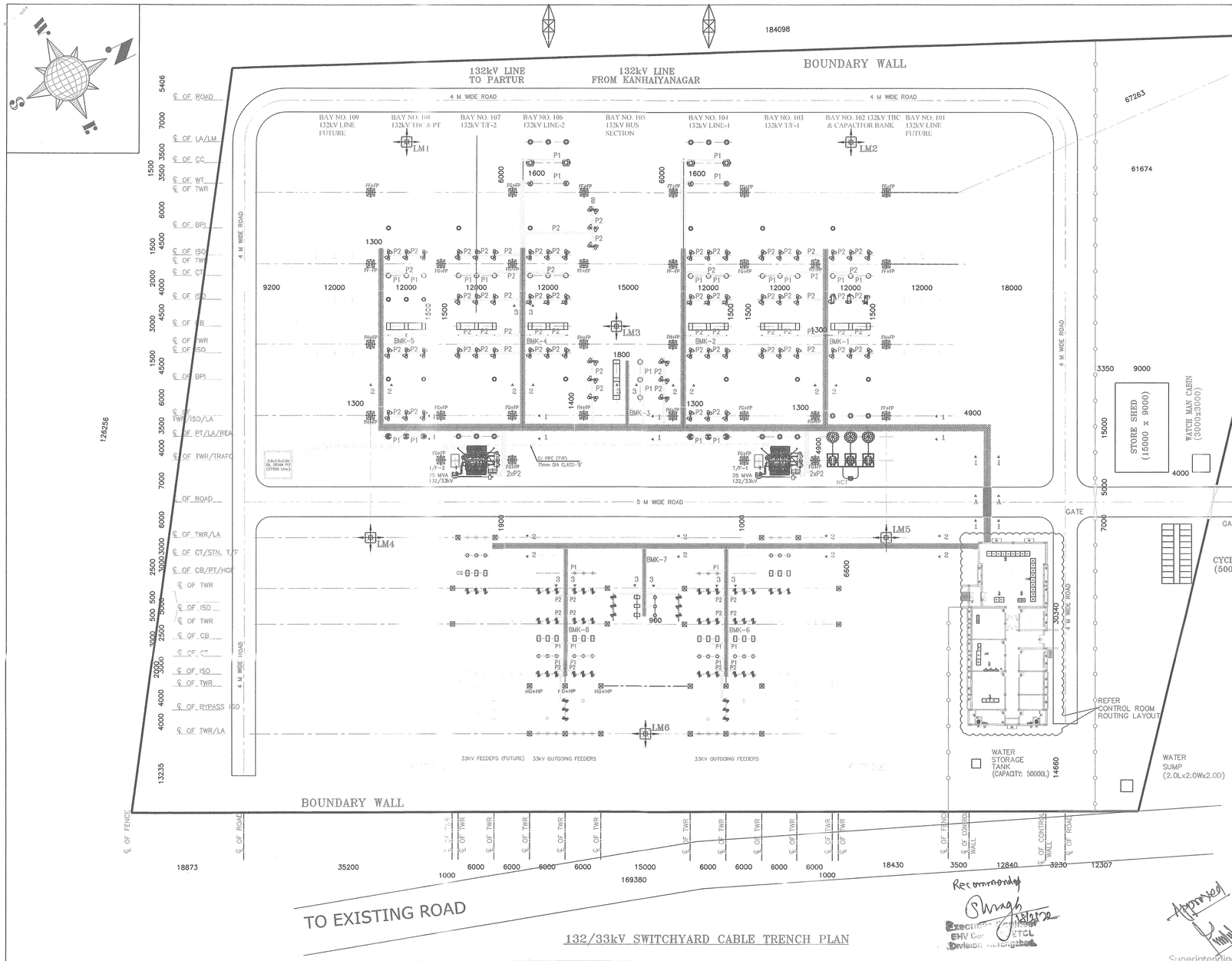
CONTRACTOR: TESLA TRANSFORMERS INDIA LTD, 23A, Sector-B, Industrial Area, Govindpura, Bhopal-462023, MP

PROJECT: ESTABLISHMENT OF 132/33kV NER (SEOLI) RAMNAGAR SUBSTATION AT UTWAD, DIST: JALNA ALONG-WITH ASSOCIATED TRANSMISSION LINES UNDER AURANGABAD ZONE

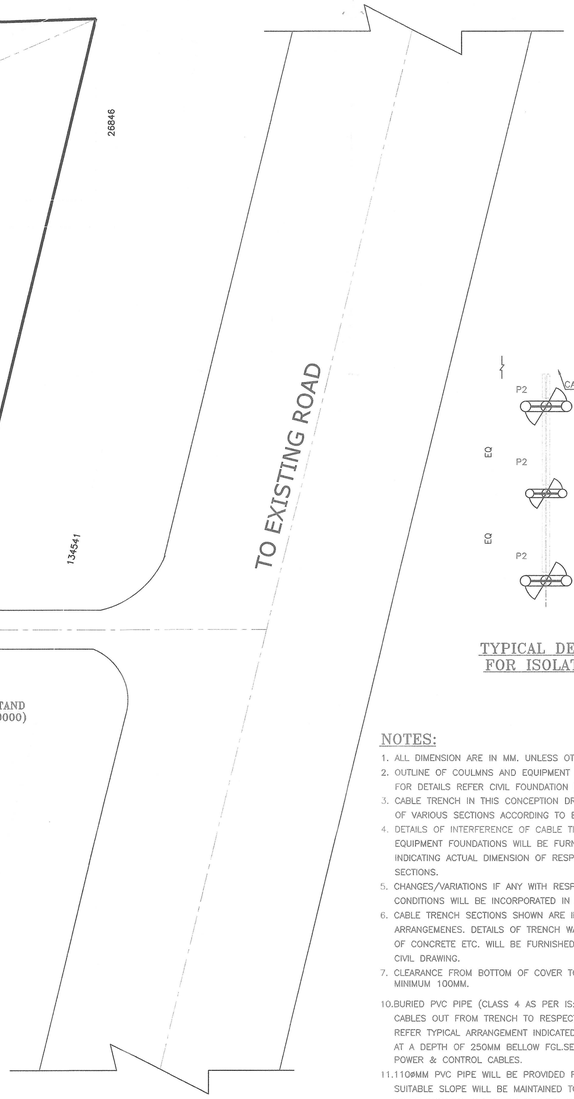
TITLE: 132/33kV SWITCHYARD LIGHTNING PROTECTION LAYOUT

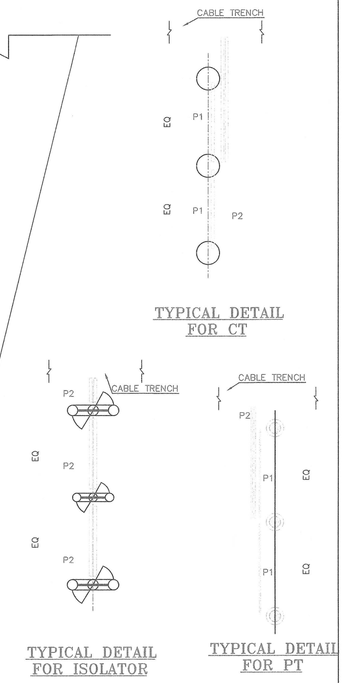
DRAWN	MSB	DATE: 02/02/2022	
CHECKED	TSS	SCALE: 1:325	
APPROVED	TEC	SIZE: A1	SHEET No. 1 OF 1
PASSED	TEC		REV. R1

DRG. No. TSL-MHA-SEOLI-ELE-002



132/33kV SWITCHYARD CABLE TRENCH PLAN





TYPICAL DETAIL FOR CT

TYPICAL DETAIL FOR ISOLATOR

TYPICAL DETAIL FOR PT

NOTES:

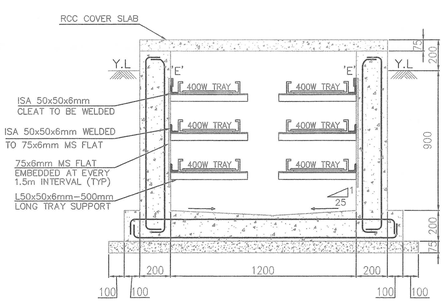
1. ALL DIMENSION ARE IN MM. UNLESS OTHERWISE SPECIFIED.
2. OUTLINE OF COULMNS AND EQUIPMENT FOUNDATIONS ARE INDICATIVE ONLY. FOR DETAILS REFER CIVIL FOUNDATION DRAWING.
3. CABLE TRENCH IN THIS CONCEPTION DRAWING IS TO INDICATE THE BASIC ROUTINGS OF VARIOUS SECTIONS ACCORDING TO ELECTRICAL REQUIREMENT.
4. DETAILS OF INTERFERENCE OF CABLE TRENCHES WITH RESPECT TO COLUMN AND EQUIPMENT FOUNDATIONS WILL BE FURNISHED IN CIVIL CONSTRUCTION DRAWING. INDICATING ACTUAL DIMENSION OF RESPECTIVE FOUNDATIONS AND CABLE TRENCH SECTIONS.
5. CHANGES/VARIATIONS IF ANY WITH RESPECT TO FINAL CIVIL DRAWING AND SITE CONDITIONS WILL BE INCORPORATED IN AS-BUILT DRAWING.
6. CABLE TRENCH SECTIONS SHOWN ARE INDICATIVE-ONLY FOR CABLE RACK ARRANGEMENES. DETAILS OF TRENCH WALL COVER SLAB EXPANSION JOINT TYPE OF CONCRETE ETC. WILL BE FURNISHED FOR EXECUTION SEPARATELY IN CIVIL DRAWING.
7. CLEARANCE FROM BOTTOM OF COVER TO TOP OF FIRST RACK WILL BE KEPT MINIMUM 100MM.
10. BURIED PVC PIPE (CLASS 4 AS PER IS:4985) WILL BE PROVIDED TO TAKE CABLES OUT FROM TRENCH TO RESPECTIVE EQUIPMENT EXCEPT BREAKER. REFER TYPICAL ARRANGEMENT INDICATED HEREWITH. PIPE SHALL BE BURIED AT A DEPTH OF 250MM BELLOW FGL.SEPERATE PIPES ARE USED FOR POWER & CONTROL CABLES.
11. 110ϕMM PVC PIPE WILL BE PROVIDED FOR THE ABOVE PURPOSE AND SUITABLE SLOPE WILL BE MAINTAINED TOWARDS MAIN TRENCH SIDE TO AVOID WATER LOCKING. OPEN END OF PIPE ABOVE GROUND WILL BE SUITABLY SEALED.
12. THE HOT DIP GALVANIZED PERFORATED METAL TRAYS SHALL BE MADE OUT FOR LAYING CONTROL AND POWER CABLES OF SIZES ARE AS GIVEN AS BELOW.

CABLE TRENCH BOQ:-

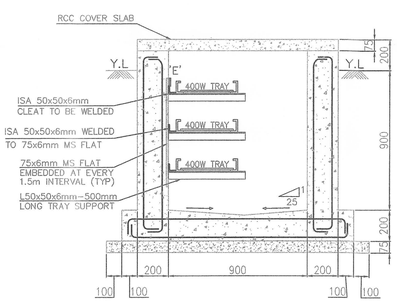
Sl.No.	DESCRIPTION	QTY
01	SECTION 1-1 TYPE CABLE TRENCH	125 Mtrs.
02	SECTION 2-2 TYPE CABLE TRENCH	200 Mtrs.
03	SECTION 3-3 TYPE CABLE TRENCH	75 Mtrs.

Recommended
Executive Engineer
EHV Construction Division
MSETCL, Aurangabad

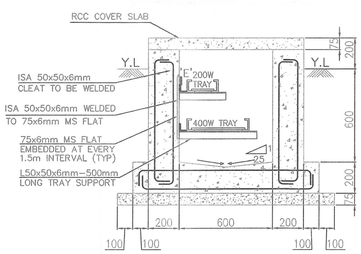
Approved
Superintending Engineer
EHV Projects Circle
MSETCL, Aurangabad



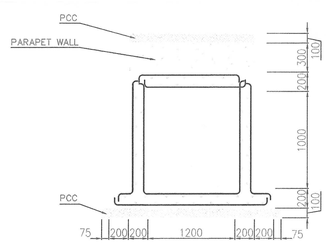
SECTION 1-1
(SCALE 1:20)



SECTION 2-2
(SCALE 1:20)



SECTION 3-3
(SCALE 1:20)



SECTION A-A
(SCALE NTS)

BILL OF MATERIALS
(CABLE TRENCH ACCESSORIES)

Sl.No.	DESCRIPTION	UNIT	QTY
01	200mm WIDE, PERFORATED TYPE CABLE TRAY	Mtrs.	75.
02	400mm WIDE, PERFORATED TYPE CABLE TRAY	Mtrs.	1425
03	L50x50x6mm-500mm LONG	Nos.	950
04	L50x50x6mm-300mm LONG	Nos.	50
05	L50x50x6mm 50mm LONG	Nos.	1115
06	75x10mm MS FLAT	Mts.	300

LEGEND	DESCRIPTION	QTY
	60 TERMINALS, OUTDOOR TYPE MARSHALLING BOX	4 Nos.
	120 TERMINALS, OUTDOOR TYPE MARSHALLING BOX	4 Nos.
	110mm DIA PVC PIPE	1100 Mts
	CABLE TRENCH	--

REFERENCE DRAWINGS/DOCUMENTS:

S.No.	TITLE	DRAWING No.	REV.
01.	132/33kV EQUIPMENT LAYOUT	TSL-MHA-SEOLI-ELE-001	R3

NOTES:

1. P1 - 1No, 110mm DIA PVC PIPE.
2. P2 - 2Nos, 110mm DIA PVC PIPE.

REV. NO.	DESCRIPTION	DRAWN	CHKD.	APPD.	DATE
R1	ISSUED FOR APPROVAL	KB	TSS	TEC	15/02/2022
R0	ISSUED FOR APPROVAL	KB	TSS	TEC	28/01/2022

CUSTOMER: MAHATRANSCO — MAHARASHTRA STATE ELECTRICITY TRANSMISSION Co. Ltd., ISO 9001-2000 certified

CONTRACTOR: TESLA TRANSFORMERS INDIA LTD, 23A,Sector-B, Industrial Area, Govindpura,Bhopal-462023,MP

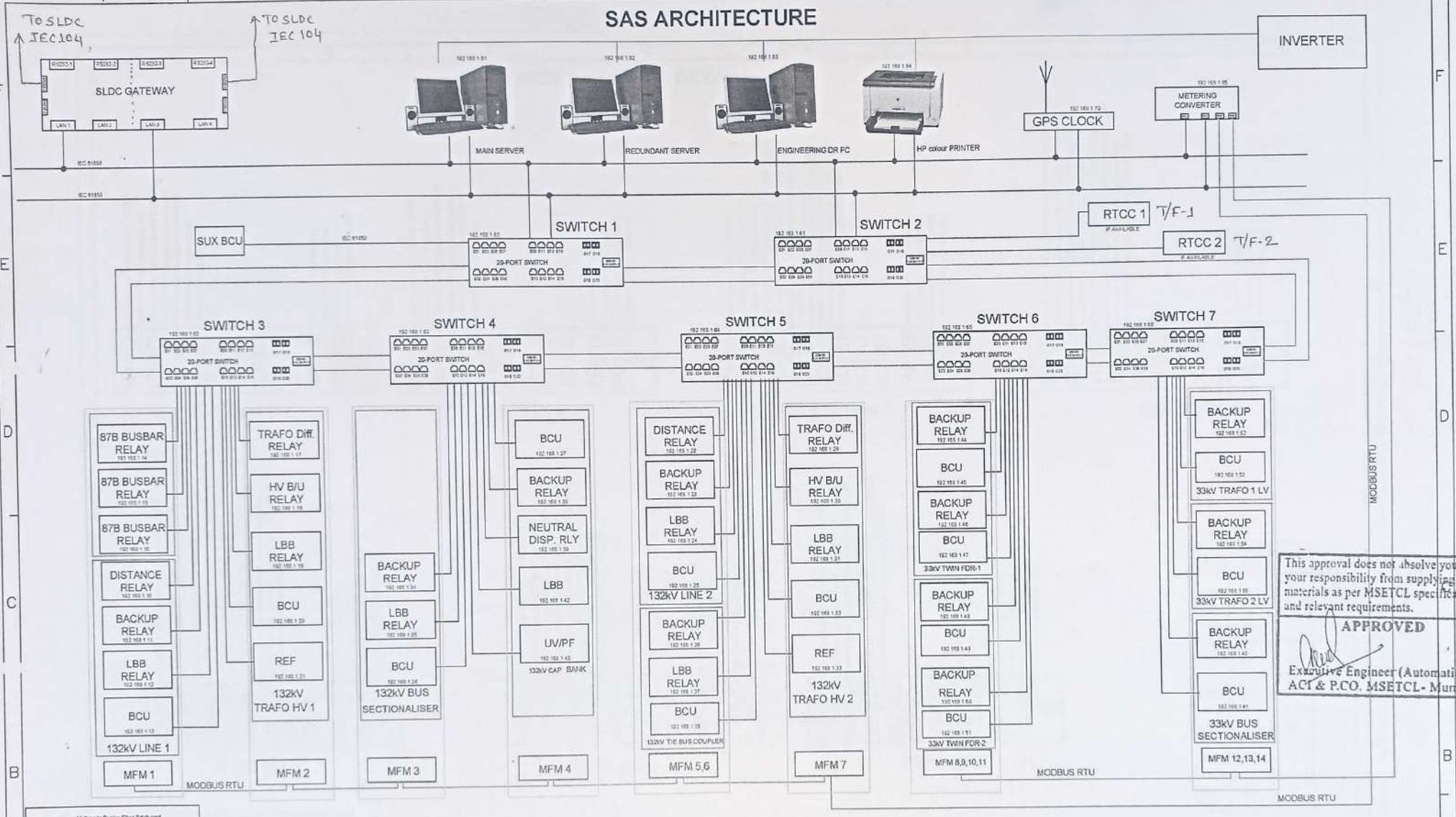
PROJECT: ESTABLISHMENT OF 132/33kV NER (SEOLI) RAMNAGAR SUBSTATION AT UTWAD, DIST: JALNA ALONG-WITH ASSOCIATED TRANSMISSION LINES UNDER AURANGABAD ZONE

TITLE: 132/33kV SWITCHYARD CABLE TRENCH LAYOUT

DRAWN	MSB	DATE: 28/01/2022	
CHECKED	TSS	SCALE: 1:375	
APPROVED	TEC	SIZE: A1	SHEET No. 1 OF 1
PASSED	TEC		REV. R1

DRG. No. TSL-MHA-SEOLI-ELE-010

SAS ARCHITECTURE



This approval does not absolve you from your responsibility from supplying materials as per MSETCL specification and relevant requirements.

APPROVED

Executive Engineer (Automation), ACT & P.CO. MSETCL- Mumbai

Multimode Duplex Fiber Patch cord
IEC 61850 COMMUNICATION BUS /LAN CABLE
MODBUS RTU COMMUNICATION BUS
DI/DO FOR STATUS / CONTROL
IEC 101 COMMUNICATION BUS
IEC 104 COMMUNICATION BUS

- Circuit Breaker
- Isolator
- Current Transformer
- Potential Transformer

NOTE: SUPPLY OF RTCC UNIT IS NOT IN SCOPE OF ASHIDA

ALL DIMENSIONS ARE IN MM Tolerance: +/-10MM

PROJECT: SUBSTATION AUTOMATION SYSTEM(Local SCADA) AT PROPOSED 132KV/33KV (SEOLI)-RAMNAGAR SUBSTATION.

TITLE : SAS ARCHITECTURE

SCALE N.T.S.

REV.NO.	DESCRIPTION	Date	DRAWN	SIGN	CHECKED	SIGN	APPROVED	SIGN	STATUS
01	AS PER MSTECL COMMENTS	07.12.22	Name RSM		Name SRP		Name SRP		
0	ORIGINAL ISSUE		Date 19.07.22		Date 20.07.22		Date 20.07.22		

ASHIDA ELECTRONICS PVT. LTD.

DRAWING NO.	SHEET NO.	TOTAL SH.	REV.
AE22GSP05	24	42	01

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Details of Existing Substations

Details of existing substation required for bay extension

Sl. No.	Description	Parameters	Name of Substation			
1		220kV Jalna SS	220 Kv Partur (MIDC) SS	132Kv Utwad Substation	132 kV Ghansawangi SS	132kV MIDC Jalna
2.	GPS Co-ordinate of the substation		19.608524;76.243733	19° 45' 25.459" N, 76° 4'14.295 " E	**19.51692 , 75.98938**	19.851221N,75.860636E
3.	Type of Substation	220kV AIS Bay 9Nos. 220kV Hybrid GIS 1Nos. 220kV Bus-Section Hybrid GIS 1No. 132kV AIS Bay 10Nos. 132kV GIS Bay 4Nos. 132kV Hybrid Bus Section 1No.	AIS	AIS	AIS	AIS
a.	Make & Model of GIS (if applicable)	220kV Bus-Section Hybrid GIS Make : CGL Model : GAI3s 220kV TF-2 Hybrid GIS Make : ABB Model : PASS MO S SBB 132kV GIS Bay 4Nos. Make : SIEMENS Model : 8DN8 132kV Hybrid Bus Section 1No Make : SIEMENS Model : 8DN8 132kV Hybrid TBEA ICT 1No Make : T&R Jinke Model : ZHW-145	NA	NA	NA	NA
4.	Voltage Level of the substation	220/132/33kV	220/132/33kV	132/33kV	132/33 kV	132/33/11kV

5.	Bus Scheme	One Main & One Transfer	One Main & One Transfer Bus	Others- Main and Transfer bus	Single Bus	Double Main & Transfer (DMT)
6.	Bus Bar Rating & Conductor Configuration	2400A Twin 0.4 (Zebra)	1450 A Twin 0.4 (ACSR)	1600A,Twin Zebra Main	800A, 0.4 ACSR Single Conductor	Twin 0.4 Zebra
8.	Bays allotted for present scope	NO New Bay for allocation.	No New Bay for Allocation	Bay No.102:- 132kV Capacitor bank Bay No.103:- 132kV T/F-1 Bay No.104:- 132kV Kanhaiyanagar Bay No.105:- 132kV Bus section Bay No.106:- 132kV Partur Bay No.107:- 132kV T/F-2 Bay No.108:- 132kV TBC	132 kV Partur Bay, 132 kV Tirthpuri Bay. 132 kV SSK Bay, 132 kV Solenco Bay, 132/33 kV TF I and TF II HV Bay, 132 kV Cap Bank Bay, 132 kV PT-I Bay, 132 kV PT-2 (Proposed) Bay	No spare bay
10.	Whether location for bay(s) under present scope is marked up in the General Layout drawing	Yes	No	YES	NO	NO
11	Whether availability of space for construction of line end bays.	NO	AIS- 1 nos	AIS	Space Not Available	GIS
12	Availability of space in existing cable trench for extension of work	NO	Yes	YES	Yes	No
13.	Control & Relay Panels (CRP)			YES		ER, Vensana, Avana, GE, ABB, CTR, Popular
a1)	Make and Model of Bus Bar Protection Scheme	220kV Bus-Bar ABB make (RADASS) 132kV Bus-Bar CTR (Dragon)	220KV ABB (RADSS Sheme) 132KV CTR Panel (Dragon Make Control and Local Unit)	Make Schneider, Type: P746 with 3 box model, 40 Digital input, 24 Digital output Aux.supply 220 V DC with IEC61850 communication protocol, single port.	Not Provoded	NA
a2)	Whether existing Central Module of BB protection has adequate provision for	NO	NO	YES	Not Provided	NO

	expansion under present scope					
b)	i. Make and Model of Substation Automation System (SAS) ii. Integration with RLDC/SLDC and typical I/O list.	NO	GE ALSTOM	i. SAS Make:- ASHIDA BCU Model no. :- Make :- ASHIDA,ADR245B_BCLCompliance with IEC60255,IEC6100,IEC60068,EN-50178,IEC6185C-3. ii. SLDC Gateway cum Data Concentrator(Compliance to IEC61850-2) :- Total unit ports :- RS232 ports-4 nos, RS85 ports- 4 nos, RJ45 ports-4 nos. Protocol, Masster :- IEC 61850, MOCBJS RTU Slave :- IEC 104, IEC 1J1	Not Provided	NA
c)	Space for Control and Relay Panels under present scope is available in the existing control room/Switchyard Panel Room	NO	NO	YES	Yes	NO
d)	i) Details of existing FOTE (if any) ii) Space for FOTE panel under present scope is available in the existing control room/Switchyard Panel Room	SRJ FOTE Panel/Startronics YES	I)FOTE Panel ALSTOM, ABB &TEJAS MAKE. TJ1400 model for TEJAS Ii) NO	i. No FOTE Panel provided ii. YES	FOTE Not provided, PLCC Panel of Partur , SSK and Solenco line available .	a) Make b) Model c) Capacity NO
e)	Whether new building is to be constructed for accommodating the panels under present scope	YES	Yes (Civil Related Point)	YES	No	YES
f)	Existing Drawing of panel layout	NO	NA	Drg. No TSL-MHA-SEOL-ELE-012 Rev. R3	Not Available	Available with testing wing

14.	Existing Earthmat drawing	YES	NA	Drg. No D&E –S2/252.797 Rev. R0	Not Available	NA
15.	Whether Earthmat extension required for bay extension works under present scope	YES	YES	NO	Yes	YES
16.	Whether Visual Monitoring System exists in the substation	YES	NO	NO	No	NO
17.	If Yes, the Make & Model of the existing Visual Monitoring System	Axis Camera Station Pro (PTZ)		NA	Not Applicable	Make : …….. Model: ……..
18	Whether the existing VMS system has sufficient capacity to augmentation of cameras to be supplied under present scope	YES	NA	NA	Not Applicable	No
19	Whether land is fairly levelled for bays under present scope	NO	NO	YES	Land not available	NO
20	DC supply system	220V DC	220V	220V	110 V	110V
21	No. of DC feeders which can be provided from existing 220V DCDB for the extension under present scope	2Nos. from DCDB-II	18 Nos. DCDB-I	Separate DCDB required.	No spare feeders in 110 V DCDB	Not available spare feeders
22	No. of DC feeders which can be provided from existing 48V DCDB for the extension under present scope	NO	12 Nos. DCDB-I	Separate DCDB required.	No spare feeders in 48 V DCDB	Not available spare feeders
23	No. of AC feeders which can be provided from existing ACDB for the extension under present scope	NO	9 Nos. from ACDB(Section-I) 9 Nos. from ACDB(Section-II)	Separate ACDB required.	No spare feeders in ACDB	Not available spare feeders
24	Whether additional MCB/MCCBs are required to be fixed in	2No. (10A) DCDB	Yes 4 nos of MCCB	No	MCB's can not be accomodated .	Separate ACDB/ DCDB to be require.

	the existing ACDB/DCDB, If yes, please provide nos. & rating of the MCB/MCCBs				New ACDB and DCDB to be provided.	
25	Whether existing Battery & Battery Charger can also cater the load under present extension scope	Yes	NO	YES	Yes	NO
26	Max. Fault current of existing s/s	10.33kA	NA (Testing Related)			
27	Whether adjacent gantry is suitable for bay extension	NO	Yes	YES	Yes	No
28	Whether capacity augmentation of LT Transformer and DG set is required for extension under present scope	YES	Yes	NO	Yes	No
29	Make and Model of PLCC/DTPC	1) 220kV Thapti Tanda Ckt-I Make : ABB Model : ETL42 2) 220kV Thapti Tanda Ckt-II Make : ABB Model : ETL42 3) 220kV Nagewadi Ckt Make : GE/ALSTOM Model : T390 4) 220kV Chikhali Ckt. Make : ABB	Nagewadi-I, Nagewadi-II, Partur-II, TATA Solar line PLCC:- Make-ABB, ZIV& PUN COM	For 132kV Partur line:- 1. Make: ABB 2. Model:ETL-41 3. Capacity:ABB-344U/340U KHz 4. Spare optical port availability: Not available. For 132kV Kanhyanagar line:- 1. Make: ZIV 2. Model:OPL-1T40P 3. Capacity:388Hz/3850Hz 4. Spare optical port availability: Not available.	PLCC 1. 132 kV Partur – Puncom make 2. 132 kV Solenco Solar – ZIV Make 132 kV SSK – ABB make	Name of the existing line: …… PLCC: Make & Model: ……. DTPC: Make & Model: …….

		Model : ETL42 5) 132kV Rajur Make : ABB Model : ETL42 6) 132kV Nagewadi Make : GE/ALSTOM Model : T390 7) 132kV Badnapur Make : ABB Model : ETL42				
30	OPGW Availability/Fibers nos	NO	Yes / 48	NO	No	No
31	Whether the main header of the firefighting system shall be suitable for extension to bays covered under the future scope	NO	No	NO	Not Provided	No
32	Whether existing fire protection panels shall have sufficient spare modules for integration of bays to be extended under present scope	NO	No	NO	Not Provided	No
33	a) PMU details b) Whether the PMU connectivity to PDC is available(Yes/No)	PMU Not Available	PMU not available		Not Aplicable	NO
34	Details on how SLDC Connectivity is achieved at Remote Station	Through RTU	Through RTU	Through VSAT	AMR Meters for TF LV and Solar .	

35	a) Details (make, model, version) of existing SCADA and RTUs. b) Whether the SCADA system already exists have sufficient hardware, software & tag capacity to integrate the new Bays(Yes/No)	Yes (RTU SIEMENS) NO	A) Make-ALSTOM B) Yes	Make ASHIDA, SCADA V3 includes SCADAV3(4000tags) AxIEC61850 client b) YES	Not Proivided	NA

Availability of space for line end bays at remote end substaions for TBCB Projects						
Sr.No	Scheme Name	Line name	Voltage Level	No of bays	Space for Bays(AIS/GIS)	Remark
1	400/220/132 kV AIS Latur(Proposed)	220 kV D/C line from 400 kV AIS Latur to 220 kV Harangul (Existing)	220 kV	2		
2		220 kV D/C line from 400 kV AIS Latur to 220 kV Murud (Existing)	220 kV	2		
3		220 kV D/C line from 400 kV AIS Latur to 220 kV Narangwadi (Existing)	220 kV	2		
4		132 kV D/C line from 400 kV AIS Latur to 220 kV Tuljapur(Existing) (250 MW Each)	132 kV	2		
5		132 kV D/C line from 400 kV AIS Latur to 132 kV Ausa(Existing) (250 MW Each)	132 kV	2		
6	400/132 kV AIS Jalna	132 kV D/C Line on M/C Towers from 400 kV AIS Jalna to 132 kV Jalna MIDC (existing)	132 kV	2	NIL	NO Space available in switchyard
7		132kV D/C line from 400 kVAIS Jalna -220 kV Partur (with capacity of 250 MW approx)	132 kV	2	GIS	GIS May be fitted
8		132kV D/C line from 400 kV AIS Jalna -132 kV Ghansawangi (with capacity of 250 MW approx,)	132 kV	2	NIL	No space in switchyard for extention of bays
9		132 kV D/C line from 400 kV AIS Jalna to 132 kVAIS Utwad (Existing)	132 kV	2	AIS	

Details of existing substation required for bay extension

Sl. No.	Description	Parameters	Details
1.	Name of Substation	……..	765KV RS Ektuni
2.	GPS Co-ordinate of the substation	….° ….' ….'' N, …. ° ….' ….'' E	19°42'21.6" N,75°37'33.6" E
3.	Type of Substation	AIS/GIS/Hybrid GIS *(strike out which is not applicable)*	AIS
a.	Make & Model of GIS (if applicable)	Make: …….. Model: ……..	Not Applicable
4.	Voltage Level of the substation	765kV/400kV/220/132kV *(strike out which is not applicable)*	765/400 KV
5.	Bus Scheme	One and Half/Double Main & Transfer (DMT)/ Double Main (DM)/Others …. *(pl specify)* *(strike out which is not applicable)*	One and Half Bus Scheme
6.	Bus Bar Rating & Conductor Configuration	…… A (*e.g 2000A*), …… (*e.g Twin Moose*)	4000 A-765KV-Quad AAAC Bull 3760 A-400KV- Quad AAAC Morculla
8.	Bays allotted for present scope	Bay No. …… for Line feeder ….. *(Please indicate bay nos. and name for various feeders)*	706- 765KV Akola-1 703- 765KV Akola-2 404- 400KV Thaptitanda-1 401-400KV Thaptitanda-2 411-400KV Babhaleshwar-1 408-400KV Babhaleshwar-2
kv	Whether location for bay(s) under present scope is marked up in the General Layout drawing	YES/NO	YES
11	Whether availability of space for construction of line end bays.	AIS/GIS	AIS
12	Availability of space in existing cable trench for extension of work	Yes/No	YES
13.	Control & Relay Panels (CRP)		NO
a1)	Make and Model of Bus Bar Protection Scheme	Make: ……..	Make- ALSTOM

Sl. No.	Description	Parameters	Details
		Model: ……..	MODEL: CU- P741, PU-P7432
a2)	Whether existing Central Module of BB protection has adequate provision for expansion under present scope	YES/NO *(strike out which is not applicable)*	NO
b)	i. Make and Model of Substation Automation System (SAS) ii. Integration with RLDC/SLDC and typical I/O list.	Make : …….. Model: ……..	Make : ALSTOM Model:
c)	Space for Control and Relay Panels under present scope is available in the existing control room/Switchyard Panel Room	YES/NO *(strike out which is not applicable)*	NO
d)	i) Details of existing FOTE (if any) ii) Space for FOTE panel under present scope is available in the existing control room/Switchyard Panel Room	a) Make b) Model c) Capacity YES/NO *(strike out which is not applicable)*	
e)	Whether new building is to be constructed for accommodating the panels under present scope	YES/NO *(strike out which is not applicable)*	NO
f)	Existing Drawing of panel layout	Drg. No……Rev…..	
14.	Existing Earthmat drawing	Drg. No……Rev…..	Drg. No 5427PW043-ABD-E-SYD-SYS-0202-EW Rev 1
15.	Whether Earthmat extension required for bay extension works under present scope	YES/NO *(strike out which is not applicable)*	New Earthmat required
16.	Whether Visual Monitoring System exists in the substation	YES/NO *(strike out which is not applicable)*	NO
17.	If Yes, the Make & Model of the existing Visual Monitoring System	Make : ……..	Not Applicable

Sl. No.	Description	Parameters	Details
		Model: ……..	
18	Whether the existing VMS system has sufficient capacity to augmentation of cameras to be supplied under present scope	Yes/No	YES
19	Whether land is fairly levelled for bays under present scope	YES/NO *(strike out which is not applicable)*	YES
20	DC supply system	220V/110V *(strike out which is not applicable)*	220V
21	No. of DC feeders which can be provided from existing 220V DCDB for the extension under present scope	….. Nos. from DCDB-I & ….. Nos. from DCDB-II.	
22	No. of DC feeders which can be provided from existing 48V DCDB for the extension under present scope	….. Nos. from DCDB-I & ….. Nos. from DCDB-II.	
23	No. of AC feeders which can be provided from existing ACDB for the extension under present scope	….. Nos. from ACDB(Section-I) & ….. Nos. from ACDB(Section-II)	
24	Whether additional MCB/MCCBs are required to be fixed in the existing ACDB/DCDB, If yes, please provide nos. & rating of the MCB/MCCBs		Additional MCB/MCCBs are required to be fixed in the existing ACDB/DCDB
25	Whether existing Battery & Battery Charger can also cater the load under present extension scope	YES/NO *(strike out which is not applicable)*	YES
26	Max. Fault current of existing s/s		24kA
27	Whether adjacent gantry is suitable for bay extension	Yes/No	YES
248	Whether capacity augmentation of LT Transformer and DG set is required for extension under present scope	Yes/No	NO
29	Make and Model of PLCC/DTPC	Name of the existing line: ……. PLCC: Make & Model: …….	All LINE PANELS MAKE –ABB MODEL-ETL41/ETL42

Sl. No.	Description	Parameters	Details
		DTPC: Make & Model: …….	Not Applicable
30	OPGW Availability/Fibers nos	Yes/No/Nos.	Not Available
31	Whether the main header of the firefighting system shall be suitable for extension to bays covered under the future scope	Yes/No	NO (Fire hydrant proposal tendering at C.O.)
32	Whether existing fire protection panels shall have sufficient spare modules for integration of bays to be extended under present scope	Yes/No	NO
33	a) PMU details b) Whether the PMU connectivity to PDC is available(Yes/No)		Not Available
34	Details on how SLDC Connectivity is achieved at Remote Station		SCADA Connectivity
35	a) Details (make, model, version) of existing SCADA and RTUs. b) Whether the SCADA system already exists have sufficient hardware, software & tag capacity to integrate the new Bays(Yes/No)		a) SCADA Make ALSTOM b) NO

Availability of space for line end bays at remote end substaions for TBCB Projects						
Sr.No	Scheme Name	Line name	Voltage Level	No of bays	Space for Bays(AIS/GIS)	Remark
1	400/220/132 kV AIS Latur(Proposed)	220 kV D/C line from 400 kV AIS Latur to 220 kV Harangul (Existing)	220 kV	2		
2		220 kV D/C line from 400 kV AIS Latur to 220 kV Murud (Existing)	220 kV	2		
3		220 kV D/C line from 400 kV AIS Latur to 220 kV Narangwadi (Existing)	220 kV	2		
4		132 kV D/C line from 400 kV AIS Latur to 220 kV Tuljapur(Existing) (250 MW Each)	132 kV	2		
5		132 kV D/C line from 400 kV AIS Latur to 132 kV Ausa(Existing) (250 MW Each)	132 kV	2		
6	400/132 kV AIS Jalna	132 kV D/C Line on M/C Towers from 400 kV AIS Jalna to 132 kV Jalna MIDC (existing)	132 kV	2		
7		132kV D/C line from 400 kVAIS Jalna -220 kV Partur (with capacity of 250 MW approx)	132 kV	2		
8		132kV D/C line from 400 kV AIS Jalna -132 kV Ghansawangi (with capacity of 250 MW approx,)	132 kV	2		
9		132 kV D/C line from 400 kV AIS Jalna to 132 kVAIS Utwad (Existing)	132 kV	2		
10		400 kV line from 400 kV AIS Jalna to 765 kV R S Ektuni	400 kV	Space Not Available in existing switchyard.	AIS	At 765 KV RS Ektuni no space are available for New 400kV Line Bay in existing switchyard. For extension of 400kV switchyard space is available.

400 kV R S Thapti Tanda		
Sr No	**Particulars**	**Details**
1	Availability of space for C&R Panels in existing Control room(Yes/No)	No
2	Availability of spare feeders in ACDB and DCDB(Yes/No)	NO
3	Availability of space in existing cable trench for extension work(Yes/No)	NO
4	Make and model of Busbar protection scheme	M/s NR make Bus bar protection
5	Make and model of SAS and VMS with drawing if any	M/s NR make SCADA, yes extension is possible
	Whether the existing VMS System has sufficient capacity for augmentation of cameras to be supplied under present scope(Yes/No)	For VMS, Yes extension is possible
6	Availability of CU and PU for the bays under present scope of extension work.(Yes/No)	No
7	Sufficiency of existing battery, DG set, battery charger and LT transformer capacity for extension work(Yes/No)	Yes
8	Space in existing cable trench(Yes/No)	No, new cable trench required
9	Whether the adjacent gantry is suitable for Bay extension or not.(Yes/No)	Yes
10	At existing busbar protection provision for future bays and also PUs for future bays(Yes/No)	No
11	i) Details regarding existing FOTE:	spare provision for future bays is not available
	1. Make:	
	2. Model:	
	3. Capacity:	
	4. Spare optical port availability:	
	ii) Availability of PLCC if yes provide the details	
	1. Make:	
	2. Model:	
	3. Capacity:	
	4. Spare optical port availability:	
12	OPGW availability (Yes/No) / OPGW-fibre Nos	No
13	Whether The main header of the firefighting system shall be suitable for extension to bays covered under the future scope.(Yes/No)	NA
14	Whether the existing Fire Protection panels shall have sufficient spare modules for integration of bays to be extended under present scope(Yes/No).	NA
15	Spacing of existing Earthmat.(Yes/No)	Earth mat will have to be extended.

Information of 765 KV Ektuni Station		
It is to inform that at 765 KV RS Ektuni, no space are available for New 400kV Line Bay. Hence extension/establishment of new 400kV Switchyard to be done with new BCR, new ACDB/DCDB, Earthing Mat etc.		
For extension of 400kV switchyard space is available.		
Sr No	**Particulars**	**Details**
1	Availability of space for C&R Panels in existing Control room(Yes/No)	NO
2	Availability of spare feeders in ACDB and DCDB(Yes/No)	ACDB-YES DCDB-YES (MCB and some External Wiring require.
3	Availability of space in existing cable trench for extension work(Yes/No)	Yes
4	Make and model of Busbar protection scheme	CU -Alstom P741 , PU -Alstom 743
5	Make and model of SAS and VMS with drawing if any	SAS-Alstom Make
	Whether the existing VMS System has sufficient capacity for augmentation of cameras to be supplied under present scope(Yes/No)	Capcity-ok, (ethernet switch require)
6	Availability of CU and PU for the bays under present scope of extension work.(Yes/No)	NO
7	Sufficiency of existing battery, DG set, battery charger and LT transformer capacity for extension work(Yes/No)	Yes
8	Space in existing cable trench(Yes/No)	Yes
9	Whether the adjacent gantry is suitable for Bay extension or not.(Yes/No)	Yes
10	At existing busbar protection provision for future bays and also PUs for future bays(Yes/No)	NO
	i) Details regarding existing FOTE:	

11	*1. Make:*	
	2. Model:	
	3. Capacity:	
	4. Spare optical port availability:	
	ii) Availability of PLCC if yes provide the details	
	1. Make:	ABB
	2. Model:	ETL41,ETL42
	3. Capacity:	40W,80W
	4. Spare optical port availability:	
12	OPGW availability (Yes/No) / OPGW-fibre Nos	NO (400KV)
13	Whether The main header of the firefighting system shall be suitable for extension to bays covered under the future scope.(Yes/No)	NO(Fire hydrant proposal tendering at C.O.)
14	Whether the existing Fire Protection panels shall have sufficient spare modules for integration of bays to be extended under present scope(Yes/No).	NO
15	Spacing of existing Earthmat.(Yes/No)	New Earthmat required for bay extention require
16	**Require Drawings/Documents of Following**	
17	GA , SLD and Layout of the existing Substation with scope of work clearly marked on it.	NA
18	Earthmat layout,	Yes
19	General arrangement diagram, SAS Architecture, DSLP, Layout, EKD, Cable trench, structure, for existing substations.	No

Information of Establishment of 400/132kV Jalna S/sn						
Sr No	**Particulars**	**Details**				
		220kV Jalna S/sn	**220Kv Partur(MIDC) S/sn**	**132KV Jalna MIDC s/sn**	**132KV Ghansawangi S/sn**	**132KV Utwad S/sn**
1	Availability of space for C&R Panels in existing Control room(Yes/No)	NO	No	No	Yes, but no space in switchyard for extention of bays	Yes
2	Availability of spare feeders in ACDB and DCDB(Yes/No)	NO	Yes	No	No	No
3	Availability of space in existing cable trench for extension work(Yes/No)	NO	Yes	No	Yes	Yes
4	Make and model of Busbar protection scheme	220KV ABB (RADSS Sheme) 132KV CTR Panel (Dragon Make Control and Local Unit)	Make- Alstom T&D India Limited, Type-2TB2,Aux.supply-220V DC	No	Busbar Protection scheme not provided	Make Schneider, Type: P746 with 3 box model, 40 Digital input, 24 Digital output Aux.supply 220 V DC with IEC61850 communication protocol, single port.
5	Make and model of SAS and VMS with drawing if any	VMS Axis camera station				
	Whether the existing VMS System has sufficient capacity for augmentation of cameras to be supplied under present scope(Yes/No)	Yes	No	No	Not Provided	Not Provided
6	Availability of CU and PU for the bays under present scope of extension work.(Yes/No)	No	Yes	No	Not Provided	Yes
7	Sufficiency of existing battery, DG set, battery charger and LT transformer capacity for extension work(Yes/No)	Yes	Yes	No	Yes, existing set 200 AH .	Yes
8	Space in existing cable trench(Yes/No)	No	Yes	No	Yes	Yes
9	Whether the adjacent gantry is suitable for Bay extension or not.(Yes/No)	No	Yes	No	Yes , but no space in switchyard for extention of bays	Yes
10	At existing busbar protection provision for future bays and also PUs for future bays(Yes/No)	No	Yes	No	No	Yes
	i) Details regarding existing FOTE:					
			FOTE Panel			

11	1. Make:	SRJ FOTE Panel/Startronics	ALSTOM, ABB & TEJAS make.	No FOTE Panel provided.	No FOTE Panel provided . PLCC Panels of Existing line available except 132 kV Ghansawangi Tirthpuri Line .	No FOTE Panel provided .Spare PLCC not available, details of existing panel are as follows. For 132kV Partur line:- 1. Make: ABB 2. Model:ETL-41 3. Capacity:ABB-344U/340U KHz 4. Spare optical port availability: Not available. For 132kV Jalna old line:- 1. Make: ZIV 2. Model:OPL-1T40P 3. Capacity:388Hz/3850Hz 4. Spare optical port availability: Not available.
	2. Model:		TJ1400 model for Tejas.			
	3. Capacity:					
	4. Spare optical port availability:					
	ii) Availability of PLCC if yes provide the details		Yes			
	1. Make:	GE/ALSTOM				
	2. Model:	T390	PLCC Panel			
	3. Capacity:		ABB, ZIV & PUN COM make.			
	4. Spare optical port availability:					
12	OPGW availability (Yes/No) / OPGW-fibre Nos	Yes(48+48=96)	Yes / 48.	No	No	No
13	Whether The main header of the firefighting system shall be suitable for extension to bays covered under the future scope.(Yes/No)	No	Yes	No	Not Provided	No
14	Whether the existing Fire Protection panels shall have sufficient spare modules for integration of bays to be extended under present scope(Yes/No).	No	Yes	No	Fire Protection panels not Provided	Fire Protection panels not Provided
15	Spacing of existing Earthmat.(Yes/No)	Yes	 Yes	No	Yes	Yes
16	**Require Drawings/Documents of Following**					
17	GA , SLD and Layout of the existing Substation with scope of work clearly marked on it.	YES, SLD is attached	SLD is attached and No space for AIS Bay	SLD is attached and No space for AIS Bay	SLD and Layout is attached and No space for AIS Bay	SLD and Layout is attached and No space for AIS Bay
18	Earthmat layout,	Not available.	Not available.	Not available.	Not Available	Earthmat layout, DSLP layout and cable trench layoyt attached.
	General arrangement diagram, SAS Architecture, DSLP, Layout, EKD, Cable trench, structure, for existing substations.					

Format for details of existing substation required for bay extension

Sl. No.	Description	Parameters	Details
1.	Name of Substation	400kV R S Thaptitanda	
2.	GPS Co-ordinate of the substation	19.71154°N, 75.58818°E	
3.	Type of Substation	AIS/GIS/Hybrid GIS *(strike out which is not applicable)*	AIS
a.	Make & Model of GIS (if applicable)	Make: …….. Model: ……..	NA
4.	Voltage Level of the substation	765kV/400kV/220/132kV *(strike out which is not applicable)*	400kV & 220 kV
5.	Bus Scheme	One and Half/Double Main & Transfer (DMT)/ Double Main (DM)/Others …. *(pl specify)* *(strike out which is not applicable)*	For 400kV One and Half. For 220kV Double Main &Transfer (DMT).
6.	Bus Bar Rating & Conductor Configuration	…… A (*e.g 2000A*), …… (*e.g Twin Moose*)	For 400kV at 3000A (quad moose). For 220kV 1600
8.	Bays allotted for present scope	Bay No. …… for Line feeder ….. *(Please indicate bay nos. and name for various feeders)*	NIL
10.	Whether location for bay(s) under present scope is marked up in the General Layout drawing	YES/NO	Yes
11	Whether availability of space for construction of line end bays.	AIS/GIS	AIS
12	Availability of space in existing cable trench for extension of work	Yes/No	No
13.	Control & Relay Panels (CRP)		No
a1)	Make and Model of Bus Bar Protection Scheme	Make : …….. Model: ……..	MAKE NR TYPE: PCS 915

Sl. No.	Description	Parameters	Details
a2)	Whether existing Central Module of BB protection has adequate provision for expansion under present scope	YES/NO *(strike out which is not applicable)*	NO
b)	i. Make and Model of Substation Automation System (SAS) ii. Integration with RLDC/SLDC and typical I/O list.	Make : …….. Model: ……..	NR
c)	Space for Control and Relay Panels under present scope is available in the existing control room/Switchyard Panel Room	YES/NO *(strike out which is not applicable)*	NO
d)	i) Details of existing FOTE (if any) ii) Space for FOTE panel under present scope is available in the existing control room/Switchyard Panel Room	a) Make b) Model c) Capacity YES/NO *(strike out which is not applicable)*	NIL
e)	Whether new building is to be constructed for accommodating the panels under present scope	YES/NO *(strike out which is not applicable)*	NO
f)	Existing Drawing of panel layout	Drg. No……Rev…..	
14.	Existing Earthmat drawing	Drg. No……Rev…..	Attached
15.	Whether Earthmat extension required for bay extension works under present scope	YES/NO *(strike out which is not applicable)*	YES
16.	Whether Visual Monitoring System exists in the substation	YES/NO *(strike out which is not applicable)*	YES
17.	If Yes, the Make & Model of the existing Visual Monitoring System	Make : …….. Model: ……..	AXIS COMMUNICATION SYSTEMS

Sl. No.	Description	Parameters	Details
18	Whether the existing VMS system has sufficient capacity to augmentation of cameras to be supplied under present scope	Yes/No	YES
19	Whether land is fairly levelled for bays under present scope	YES/NO *(strike out which is not applicable)*	YES
20	DC supply system	220V/110V *(strike out which is not applicable)*	220VDC
21	No. of DC feeders which can be provided from existing 220V DCDB for the extension under present scope	….. Nos. from DCDB-I & ….. Nos. from DCDB-II.	NONE
22	No. of DC feeders which can be provided from existing 48V DCDB for the extension under present scope	….. Nos. from DCDB-I & ….. Nos. from DCDB-II.	2
23	No. of AC feeders which can be provided from existing ACDB for the extension under present scope	….. Nos. from ACDB(Section-I) & ….. Nos. from ACDB(Section-II)	NO
24	Whether additional MCB/MCCBs are required to be fixed in the existing ACDB/DCDB, If yes, please provide nos. & rating of the MCB/MCCBs		NEW ACDB &DCDB REQUIRED
25	Whether existing Battery & Battery Charger can also cater the load under present extension scope	YES/NO *(strike out which is not applicable)*	YES
26	Max. Fault current of existing s/s		25426 A
27	Whether adjacent gantry is suitable for bay extension	Yes/No	FOR 400KV YES FOR 220 NO
248	Whether capacity augmentation of LT Transformer and DG set is required for extension under present scope	Yes/No	ONLY ONE STATION TF AVAILABLE ADDITIONAL ONE NOS. REQUIRED
29	Make and Model of PLCC/DTPC	Name of the existing line: ……. PLCC: Make & Model: …….	BAY NO. 401 (400kV SPARE) ABB ETL BAY NO. 403, 400kV WALUJ ABB ETL

Sl. No.	Description	Parameters	Details
		DTPC: Make & Model: …….	BAY NO.404, 400kV SPARE ABB ETL
			BAY NO.406, 400kV DEEPAKNAGAR ABB ETL
			BAY NO.409, 400kV EKTUNI I, ABB ETL
			BAY NO.412, 400kV EKTUNI II, ABB ETL
			BAY NO.201, 220kV AMRAPUR I, ZIV OPL-1T
			BAY NO.202, 220kV AMRAPUR II, ZIV OPL-1T
			BAY NO.204, 220kV GEORAI, ABB ETL
			BAY NO.205, 220kV JAMKHED SOLAR,VCL, TP-4
			BAY NO.206, 220kV NAGEWADI-I, GE, DIP
			BAY NO.212, 220kV WALUJ, ABB ETL
			BAY NO.213, 220kV JALNA II, ABB ETL
30	OPGW Availability/Fibers nos	Yes/No/Nos.	NO
31	Whether the main header of the firefighting system shall be suitable for extension to bays covered under the future scope	Yes/No	NA
32	Whether existing fire protection panels shall have sufficient spare modules for integration of bays to be extended under present scope	Yes/No	NA
33	a) PMU details b) Whether the PMU connectivity to PDC is available(Yes/No)		NA

Sl. No.	Description	Parameters	Details
34	Details on how SLDC Connectivity is achieved at Remote Station		
35	a) Details (make, model, version) of existing SCADA and RTUs. b) Whether the SCADA system already exists have sufficient hardware, software & tag capacity to integrate the new Bays(Yes/No)		A. NR MAKE B. YES

Required Information of LILO lines remote end Substaions for TBCB Project							
Sr.No	**Procect Name**	**LILO Line Name**	**Require Details**				
			Line	***400kv Ektuni- Babhaleshwar line 1***	***400kv Ektuni- Babhaleshwar line 2***	***400kv Ektuni-Thaptitanda line 1***	***400kv Ektuni-Thaptitanda line 2***
1	400 kV AIS Jalna	LILO of (Existing) – 765 kV Aurangabad–III (Ektuni) (Existing) 400 kV D/C line at 400 kV AIS Jalna (New)	***1. Type of Conductor,***	640 sqmm Quad AAAC Morculla		640 sqmm Quad AAAC Morculla	
			2.1 PLCC Panels	MAKE-ABB: MODEL-ETL41/ETL42		MAKE-ABB: MODEL-ETL41/ETL42	
			2.2 FOTE Panels	NOT AVAILABLE		NOT AVAILABLE	
			3. OPGW,	NOT AVAILABLE		NOT AVAILABLE	
			4.CVT,	Alstom Make, 400KV/110V, 4400pF sr.no - R Phase = 37992001494; Y Phase = 37992001495; B Phase = 37992001496.	Alstom Make, 400KV/110V, 4400pF sr.no - R Phase = 37992001491; Y Phase = 37992001492; B Phase = 37992001493.	Alstom Make, 400KV/110V, 4400pF sr.no - R Phase = 37992001488; Y Phase = 37992001489; B Phase = 37992001490.	Alstom Make, 400KV/110V, 4400pF sr.no - R Phase = 37992001459; Y Phase = 37992001486; B Phase = 37992001487.
			5.WT	Make- Alstom ;WT Connected at two phase out of three phase	Make- Alstom ;WT Connected at two phase out of three phase	Make- Alstom ;WT Connected at two phase out of three phase	Make- Alstom ;WT Connected at two phase out of three phase
2		LILO on Both circuits of 132 kV D/C line from 220 kV Jalna (Existing) to 220 kV AIS Nagewadi (Existing) at 400 kV AIS Jalna (New)					