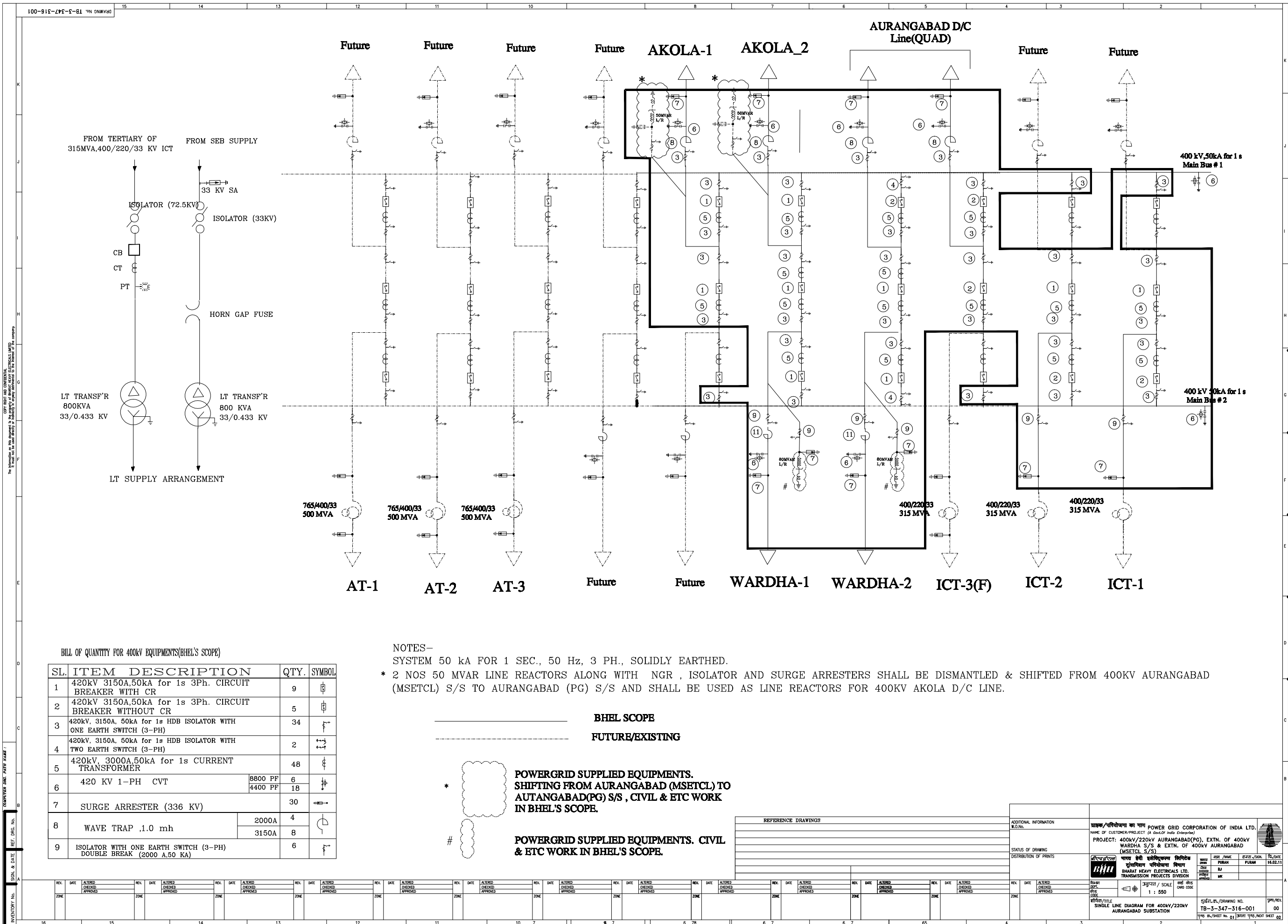
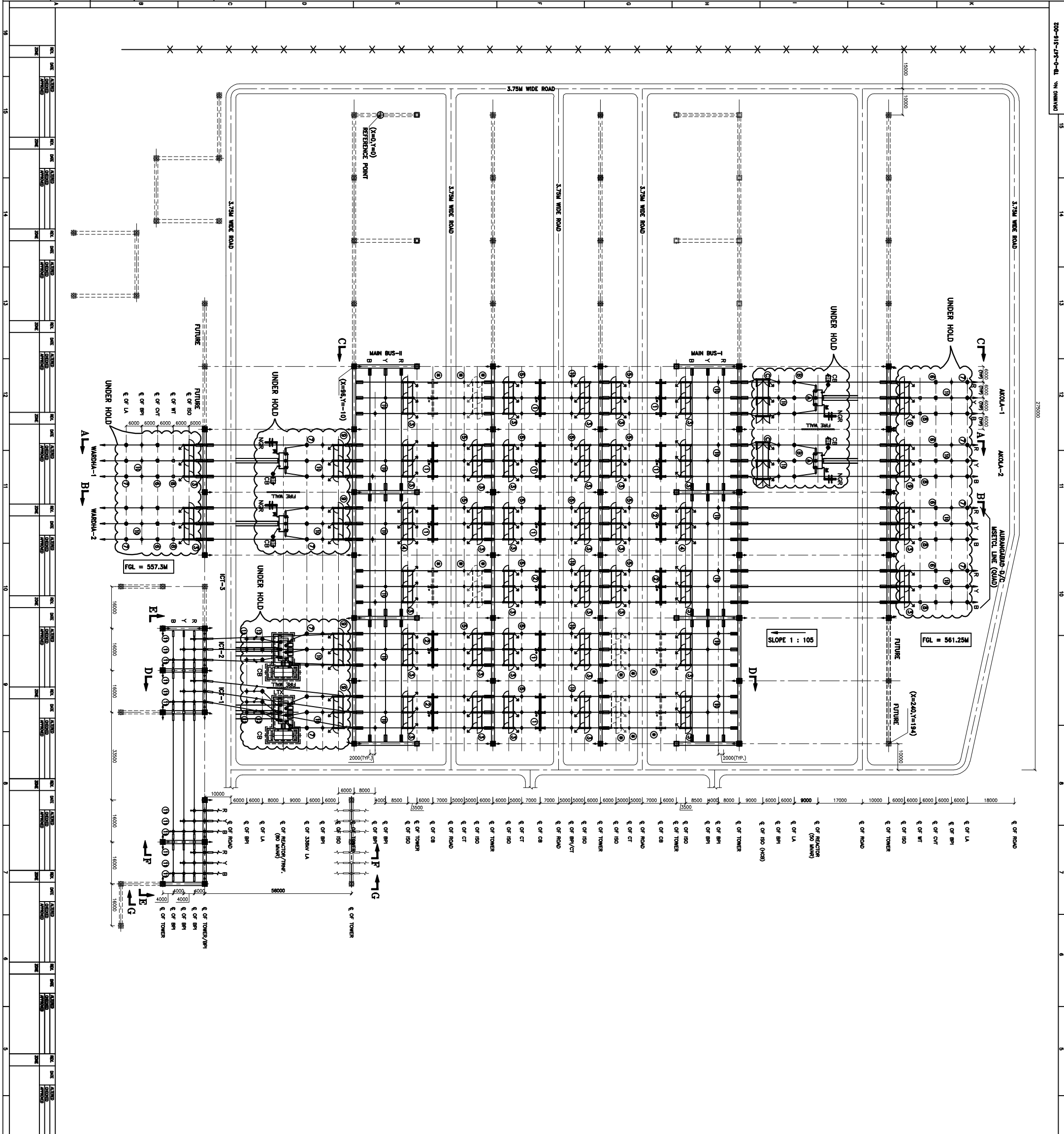




INVENTORY No.	SIGN. & DATE	REF. DRG. No.
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BILL OF QUANTITY – 4000KV			
ITEM CODE	DESCRIPTION	SYMBOL	QTY.
1	420KV, 3150A, 500kV/s CIRCUIT BREAKER WITH CLOSE RESISTOR (3-PH)		08
2	420KV, 3150A, 500kV/s CIRCUIT BREAKER WITHOUT CLOSE RESISTOR (3-PH)		03
3	420KV, 3150A, 500kV/s HDB ISOLATOR WITH 1 E/S (3-PH)		34
4	420KV, 3150A, 500kV/s HDB ISOLATOR WITH 2 E/S (3-PH)		02
5	420KV, 3000A, 500kV/s CURRENT TRANSFORMER (1-PH)		48
6	420KV CAPACITIVE VOLTAGE TRANSFORMER (1-PH) (800 P.F) (MAGNDA LINE CVT)		05
7	420KV CAPACITIVE VOLTAGE TRANSFORMER (1-PH) (400 P.F) (BUS & LINE CVT)		18
8	330KV SURGE ARRESTER (1-PH)		30
9	WAVE TAPER 1.0 MH (2000A) (MOLA-142) (1-PH)		04
10	WAVE TAPER 1.0 MH (3150A) (MAGNDA-142; MARGNDA-142) (1-PH)		08
11	420KV, 2000A, 500kV/s HDB ISOLATOR WITH 1 E/S (3-PH)		05
12	218KV POST INSULATOR		72
13	218KV SURGE ARRESTER (1-PH)		42
14	218KV SURGE ARRESTER (1-PH)		06

—	PRESENT SCOPE
---	FUTURE/NOT IN BRFL SCOPE
⇔	SHIELD WIRE
**	FENCE
— —	TENSION STRING INSULATOR (400kV)
— —	TENSION STRING INSULATOR (220kV)
— —	SUPERSTENSION STRING INSULATOR
○	ISO. AND E/S BOX; CT/PT/CYBUB
□	COLUMN WITHOUT PEAK
▣	COLUMN WITH PEAK

SYSTEM PARAMETERS :-	
1. NOMINAL SYSTEM VOLTAGE	400V
2. HIGHEST SYSTEM VOLTAGE	420V
3. RATED FREQUENCY	50Hz
4. RATED SHORT TIME CURRENT FOR 1 SEC	50kA
5. RATED FULL WAVE WITHSTANDING VOLTAGE	1500kVp
6. PIERCE MODULE WITHSTANDING VOLTAGE	$630kV_{max} (+ve \text{ \& } -ve)$
7. MINIMUM CREEPAGE (25MM/IN)	10000MM
8. SYSTEM NEUTRAL EARTHING	EFFECTIVELY EARTHED

MINIMUM CLEARANCE TABLE
400V
400V/230Vmm
3500mm
6500mm
8000mm

	CONDUCTOR	INS. STRING
MAIN BUS I & II	QUAD BERSAMS	DOUBLE TENSION
JACK BUS & JUMPING	QUAD/TWIN BERSAMS	DOUBLE TENSION
ALL EQUIPMENT INTERCONNECTION	4.5" PPS AL./QUAD/TWIN BERSAMS	
SUB CONDUCTOR SPACING FOR QUAD	450 mm	—
SUB CONDUCTOR SPACING FOR TWIN	450 mm	—
DATE/TIME		10.09AM DA CS WHE.

- NOTES:-**
1. ALL DIMENSIONS ARE IN MM UNLESS SPECIFIED OTHERWISE.
 2. LIGHTNING PROTECTION SHALL BE WITH SHIELD WIRE FOR 400KV SWITCHYARD.
 3. PLINTH LEVEL 300MM ABOVE FFL.
 4. GRAVEL 100MM ABOVE 75MM THICK LAYER OF CEMENT CONCRETE.
 5. WAVE TRAPS (PRESTRESS) SHALL BE PROVIDED IN TWO PHASES ARE INDICATIVE ONLY (HOWEVER FOUNDATIONS FOR ALL THREE PHASES SHALL BE CASTED)
 6. a) LINE ENTRY 200KV/SUB CONDUCTOR
b) MAIN BUS 100KV/SUB CONDUCTOR
 7. THE REQUIRED CLEARANCES AS PER CLEARANCE TABLE ABOVE AND AS PER IS: 8826 SHALL BE MAINTAINED AND OTHER STANDARD REGULATION ETC SHALL BE MAINTAINED BY THE CLIENT.
 8. LINE SIDE INSULATOR STRING FOR LINE TERMINATION & TENSION CLAMP FOR EARTH WIRE TERMINATION IS IN BELT SCOPE.
 9. SWITCHYARD LIGHTING SHALL BE PROVIDED ON GANTRIES.
10. DISMANTLING, SHIFTING & ETC OF FOLLOWING EXISTING EXPANS (OF ACOLA LINES) FROM 400KV MARGAHOAD (WEST) S/S TO MARGAHOAD (W) S/S IS IN BELT SCOPE.

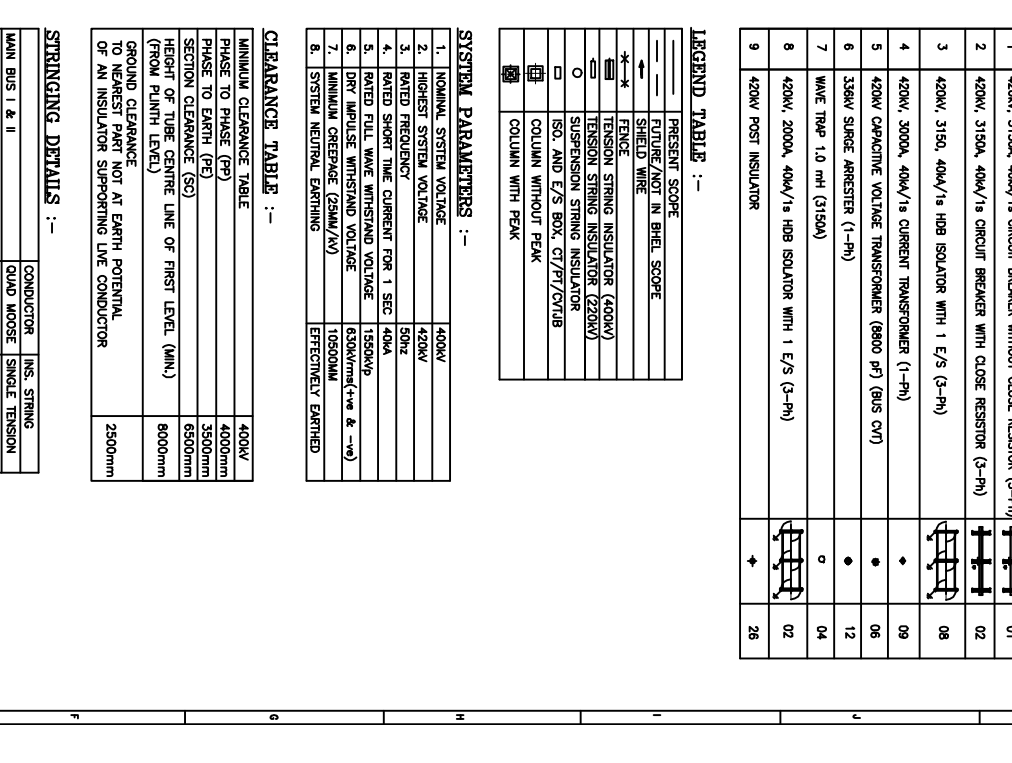
A	420W, 50 AMP SHUNT REACTOR ALONG WITH ASSOCIATED NGR, 120KV SURGE ARRESTERS		02
B	300W SURGE ARRESTER FOR 50AMP SHUNT REACTOR OF KOLDA LINES (1-1P)		06
C	420W, 2000A, ICBG ISO. WITH 1 E/S (3-PH)		02

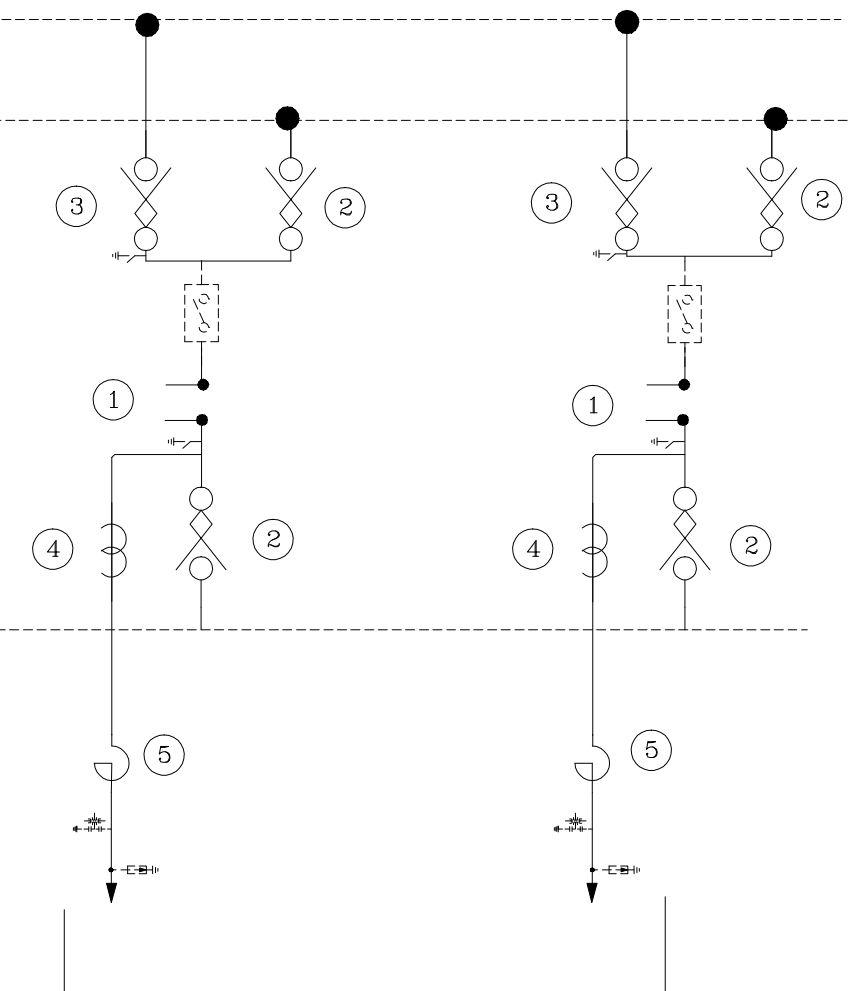
11. IF REQUIRED CLEARANCES AS PER TECH.SPEC. ARE NOT ACHIEVED AT SITE DURING ERECTION, SAME SHALL BE OBTAINED BY INCORPORATING NECESSARY MODIFICATIONS, WITHOUT ANY ADDITIONAL PRICE IMPLICATION TO POWERGRID.

⊛ EQUIPMENT SUPPLY NOT IN BHEL SCOPE.

DRG. NO.	TITLE
C/ENRG/MR/AURANGABAD/LAY/01	LAYOUT PLAN 400 KV AURANGABAD SUBSTATION
C/ENRG/MR/AURANGABAD/SEC./01	LAYOUT SECTION 400 KV AURANGABAD SUBSTATION
TB-3-347-318-001	SINGLE LINE DIAGRAM 400/220KV AURANGABAD S/S

[illegible]





BHEL'S SCOPE

BILL OF QUANTITY — 400 kV

SL.	ITEM DESCRIPTION	QTY.	SYMBOL
1	420kV, 3Ph. 3150A, 40kA for 1s HCB ISOLATOR(3Ph.) WITH ONE E/S	2	
2	420kV. 3150A, 40kA for 1s PENTOGRAPH ISOLATOR(3Ph.) WITHOUT E/S	4	
3	420kV. 3150A, 40kA for 1s PENTOGRAPH (3Ph.) WITH ONE E/S	2	
4	420kV,3150A 40kA for 1s CURRENT TRANSFORMER	6	
5	3150A, 1.0 mH, WAVE TRAP	4	

NOTES—

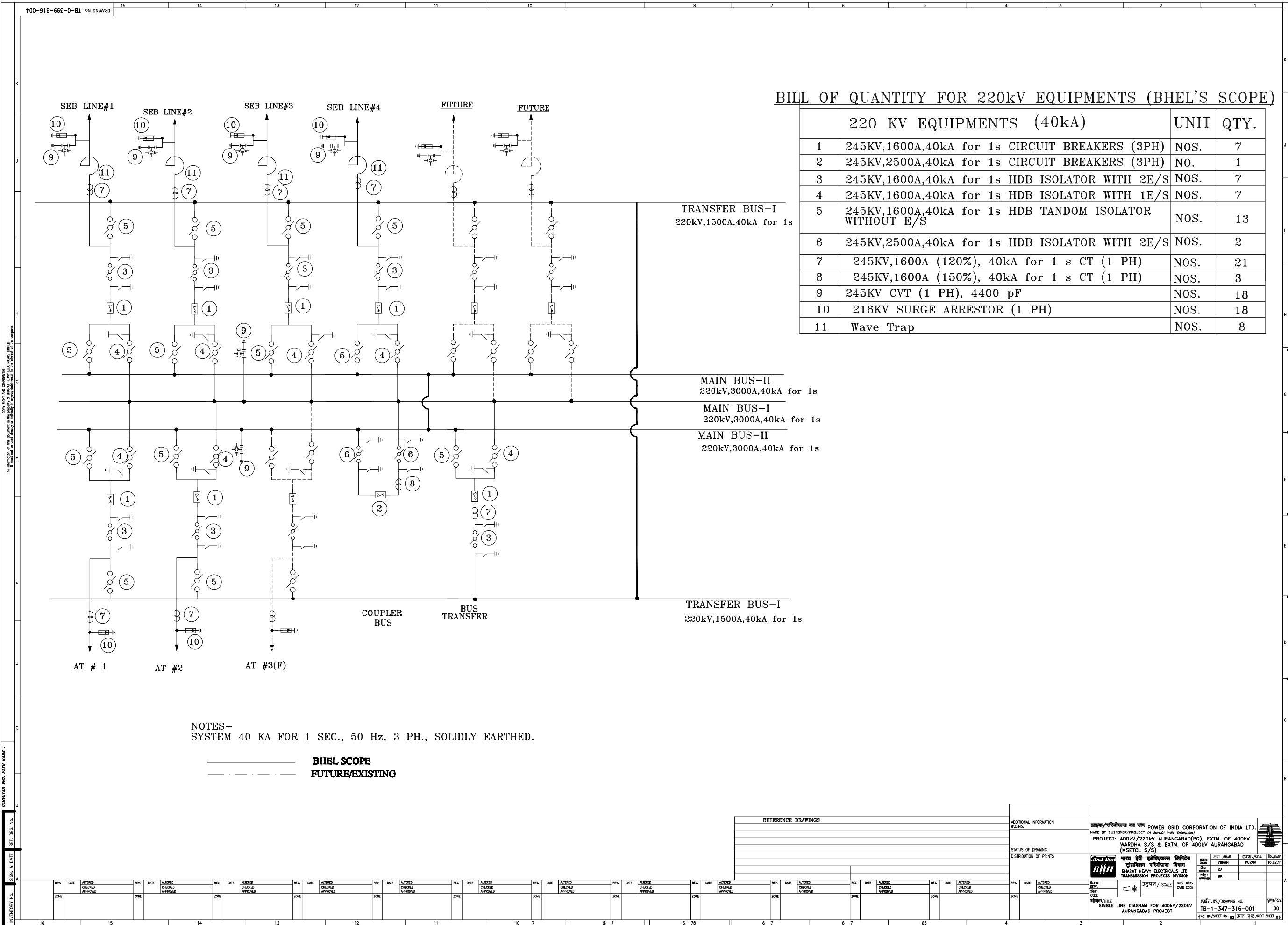
-SYSTEM 40 KA FOR 1 SEC., 50 Hz, 3 PH., SOLIDLY EARTHED.

–ABOVE EXISTING EQUIPMENTS OF 2000A RATING SHALL BE DISMANTLED, SHIFTED & SHALL BE HANDED OVER TO POWERGRID AT AURANGABAD S/S.

BHEL SCOPE

FUTURE/EXISTING

[illegible]



BILL OF QUANTITY FOR 220KV EQUIPMENTS (BHEL'S SCOPE)

	220 KV EQUIPMENTS (40kA)	UNIT	QTY.
1	245KV,1600A,40kA for 1s CIRCUIT BREAKERS (3PH)	NOS.	7
2	245KV,2500A,40kA for 1s CIRCUIT BREAKERS (3PH)	NO.	1
3	245KV,1600A,40kA for 1s HDB ISOLATOR WITH 2E/S	NOS.	7
4	245KV,1600A,40kA for 1s HDB ISOLATOR WITH 1E/S	NOS.	7
5	245KV,1600A,40kA for 1s HDB TANDOM ISOLATOR WITHOUT E/S	NOS.	13
6	245KV,2500A,40kA for 1s HDB ISOLATOR WITH 2E/S	NOS.	2
7	245KV,1600A (120%), 40kA for 1 s CT (1 PH)	NOS.	21
8	245KV,1600A (150%), 40kA for 1 s CT (1 PH)	NOS.	3
9	245KV CVT (1 PH), 4400 pF	NOS.	18
10	216KV SURGE ARRESTOR (1 PH)	NOS.	18
11	Wave Trap	NOS.	8