LIST OF ENCLOSED DRAWINGS / DOCUMENTS, Rev.0 **Annexure 1**

REMARK - THE ENCLOSED DRAWINGS / DOCUMENTS ARE PROVISIONAL AND SUBJECT TO REVISION DURING CONTRACT STAGE.

1	List of Drawings and Documents	Annexure 1
2	MANDATORY SPARE LIST	Annexure: SPARE_LIST
3	STANDARD SCOPE NOTE FOR E.T.C. WORKS	ETC-BOQ/GIS/NOTE.1
4	PROJECT SPECIFIC SCOPE NOTE FOR E.T.C. WORKS	ETC-BOQ/GIS/NOTE.2
5	Tools for GIS erection (to be arranged by GIS supplier on returnable basis)	ANNEXURE-A
6	Tools for GIS erection (to be arranged by Bidder on returnable basis)	ANNEXURE-B
7	400 kV Single Line Diagram	4540-001-230-PVE-P-001-01
8	400kV Layout Plan & Section	4540-001-230-PVE-F-023
9	400kV Structure Layout	4540-001-230-PVE-F-024
10	400 kV - Equipment Earthing Philosophy & Details	4540-001-230-PVE-W-029-01
11	Switchyard Control Room Building - Architectural Plan and Elevation	4540-001-230-PVC-C-001
12	Structural GA of GIS Building	4540-001-230-PVE-F-****
13	400 kV - CRB Indoor Cable Trench Layout	4540-001-230-PVE-F-001
14	OUTDOOR CABLE TRENCH ARRANGEMENT LAYOUT	4540-001-230-PVE-F-022
15	Gas System Diagram - Gas SLD	4540-001-230-PVE-P-003-01
16	GIS Layout (Plan & Section View)	4540-001-230-PVE-F-026-00
17	GIS Design Memorandum	4540-001-230-PVE-K-001-00
18	Foundation Plan	4540-001-230-PVE-K-001-00
19	GIS Earthing Plan	4540-001-230-PVE-P-003
20	GIS Dimensions	4540-001-230-PVE-Y-021-00
21	PROCEDURE FOR WELDING OF ALUMINIUM BUSES	Annexure-C
22	Technical specification for Hardrware	TB-XXX-618-002a
23	Technical specification for Cable Glands	Annexure-E1
24	N2 filling/ vaccuming/ purging and heating (if required) as per BHEL Bhopal procedure	Annexure-F
25	Electrical Works: TECHNICAL SPECIFICATION	Annexure G
26	OGA of Reactor	4540-001-201-PVE-B-175_1
27	Aux SLD	PE-DG-497-565-E001A
28	Cable Trench Material Scope as per Annexure_CTM.	Annexure_CTM.
29	ETP	Annexure-ETP
30	Illumination Scope as per Annexure_Illumination.	Annexure_Illumination

Sl. No.	Description	Remarks_Detailed_Description	Unit	Quantity
S1	**420 KV GIS Mandatory Spares**			
1	**400 KV GIS (as applicable)**			
1.1	**SF6 gas pressure Relief Devices** **(3 nos of each type)**	SF6 gas pressure Relief Devices (1 Set = 3 nos of each type)	Sets	2
1.2	**SF6 pressure gauge with coupling device cum switch or density monitors and pressure gauge, as applicable** **(1 no. of each type)**	SF6 pressure gauge with coupling device cum switch or density monitors and pressure gauge, as applicable (1 Set = 1 no. of each type)	Set	1
1.3	**Rubber gaskets, ''o'' Rings and seals for SF6 gas, including Circuit Breaker, Disconnector and other GIS equipments** **(6 no. of each type)**	Rubber gaskets, ''o'' Rings and seals for SF6 gas for GIS Enclosure (including Circuit Breaker, Disconnector and other GIS equipments) (1 Set = 6 no. of each type)	Set	1
1.4	**Molecular filter for SF6 gas with filter bags** **(1 set = 20 % of total supply quantity of absorber bags used in GIS)**	Molecular filter for SF6 gas with filter bags (1 set = 20 % of total supply quantity of absorber bags used in GIS)	Set	1
1.5	**SF6 gas in cylinders of 50kg/cylinder**	SF6 gas in cylinders (non-returnable cylinders) of 50kg/cylinder (Total quantity shall be 20% of total gas used in complete GIS system offered)	MT	4
1.6	**Covers with all accessories necessary to close a compartment in case of dismantling of any part of the Enclosure to ensure the sealing of the compartment: For 1 phase enclosures** **(3 nos. of each type)**	Covers with all accessories necessary to close a compartment in case of dismantling of any part of the Enclosure to ensure the sealing of the compartment: For 1 phase enclosures (1 Set = 3 nos. of each type)	Set	1
1.7	**Locking device to keep Dis-connectors and Earthing switches in close or open position in case of removal of the driving mechanism (if applicable)**	Locking device to keep Dis-connectors and Earthing switches in close or open position in case of removal of the driving mechanism (if applicable)	Nos.	3
1.8	**Bus support insulator of each type for single phase enclosure** **(6 nos. of each type)**	Bus support insulator of each type for single phase enclosure (1 Set = 6 nos. of each type)	Set	1
1.9	**SF6 to air bushing for 1 phase enclosure**	SF6 to air bushing for 1 phase enclosure	Nos.	2
1.1	**Spares for Local control cabinet including MCB, fuses, timers, Aux. Relay of each type & rating, terminals of each type**	Spares for Local control cabinet including MCB, fuses, timers, Aux. Relay of each type & rating, terminals of each type	Set	1
1.11	**All types of Corona shield** **(3 Nos. of each type)**	All types of Corona shield (1 Set = 3 Nos. of each type)	Set	1
1.12	**Windowscope/ Observing window, if applicable** **(3 Nos. of each type)**	Windowscope/ Observing window, if applicable (1 Set = 3 Nos. of each type)	Set	1

Sl. No.	Description	Remarks_Detailed_Description	Unit	Quantity
2	**Circuit Breaker**			
2.1	**Complete Circuit Breaker 1 phase pole of each type & rating complete with interrupter, main circuit and enclosure with operating mechanism**	Complete Circuit Breaker 1 phase pole of each type & rating complete with interrupter, main circuit and enclosure, marshalling box with operating mechanism	Sets	3
2.2	**Trip Coil assembly with resistor as applicable.** **(3 nos. of each type)**	Trip Coil assembly with resistor as applicable. (1 Set = 3 nos. of each type)	Sets	2
2.3	**Closing Coil assembly with resistor as applicable.** **(3 nos. of each type)**	Closing Coil assembly with resistor as applicable. (1 set = 3 nos. of each type)	Sets	2
2.4	**Relays, Power contactors, push buttons, timers & MCBs etc of each type & rating, as applicable**	Relays, Power contactors, push buttons, timers & MCBs etc of each type & rating, as applicable	Set	1
2.5	**Closing assembly/ valve (if applicable)** **(3 nos. of each type)**	Closing assembly/ valve (if applicable) (1 Set = 3 nos. of each type)	Sets	2
2.6	**Trip assembly/ valve (if applicable)** **(3 nos. of each type)**	Trip assembly/ valve (if applicable) (1 Set = 3 nos. of each type)	Sets	2
2.7	**Aux. switch assembly** **(3 Nos. of each type)**	Aux. switch assembly (1 set = 3 Nos. of each type)	Set	1
2.8	**Opeartion counter** **(3 nos. of each type)**	Opeartion counter (1 set = 3 nos. of each type)	Set	1
2.9	**Rupture disc (if applicable)** **(3 Nos. of each type)**	Rupture disc (if applicable) (1 Set = 3 Nos. of each type)	Set	1
2.1	**Set of spares for pneumatic/spring/ hydraulic operated mechanism (as applicable as per main supply)** **(1 set for each type of Circuit breaker)**	Set of spares for pneumatic/spring/ hydraulic operated mechanism (as applicable as per main supply) (1 set for each type of Circuit breaker) 1) Spare for pneumatic operated mechanism (complete) a. Motor for compressor - one no. b. Pressure switch and valve etc. - one no. of each type 2) Spare for spring operated mechanism (complete) a. Motor - one no. b. Limit switch etc.- one no. of each type 3) Spare for hydraulic operated mechanism (complete) a. Motor - one no. b. Limit switch - one no. of each type	Lot	1
3	**Disconnector**			
3.1	**Complete set of 3 nos. of single phase disconnector inculding main circuit, enclosure and driving mechanism**	Complete set of 3 nos. of single phase disconnector including main circuit, enclosure and driving mechanism & support insulator	Set	1

Sl. No.	Description	Remarks_Detailed_Description	Unit	Quantity
3.2	**High speed/ fast acting fault making grounding switch, 3 nos. of single phase of each rating, including main circuit, enclosure and driving mechanism**	High speed/ fast acting fault making grounding switch, 3 nos. of single phase of each rating, including main circuit, enclosure and driving mechanism	Set	1
3.3	**3 nos. of single phase Earthing switch including main circuit, and driving mechanism**	3 nos. of single phase Earthing switch including main circuit, enclosure and driving mechanism	Set	1
3.4	**Open/close contactor assembly, timers, key interlock for one complete (3 phase) disconnector and earthing switch of each type & rating, as applicable**	Open/close contactor assembly, timers, key interlock for one complete (3 phase) disconnector and earthing switch of each type & rating, as applicable	Set	1
3.5	**Limit switches and Aux. switches for complete 3-phase equipment: for Disconnector**	Limit switches and Aux. switches for complete 3-phase equipment: for Disconnector	Set	3
3.6	**Limit switches and Aux. switches for complete 3-phase equipment: for Earth switch**	Limit switches and Aux. switches for complete 3-phase equipment: for Earth switch	Set	1
3.7	**Limit switches and Aux. switches for complete 3-phase equipment: for high speed earth switch**	Limit switches and Aux. switches for complete 3-phase equipment: for high speed earth switch	Set	1
3.8	**Relay, Power contactors, resistors, fuses,push buttons, timers & MCBs as applicable (Complete for one 3 phase equipment): for Disconnector**	Relay, Power contactors, resistors, fuses,push buttons, timers & MCBs as applicable (Complete for one 3 phase equipment): for Disconnector	Set	3
3.9	**Relay, Power contactors, resistors, fuses,push buttons, timers & MCBs as applicable (Complete for one 3 phase equipment): for Earth Switch**	Relay, Power contactors, resistors, fuses,push buttons, timers & MCBs as applicable (Complete for one 3 phase equipment): for Earth Switch	Set	1
3.1	**Relay, Power contactors, resistors, fuses,push buttons, timers & MCBs as applicable (Complete for one 3 phase equipment): for high speed earth switch**	Relay, Power contactors, resistors, fuses,push buttons, timers & MCBs as applicable (Complete for one 3 phase equipment): for high speed earth switch	Set	1
4	**Current Transformer**			
4.1	**Complete CT, as applicable, with enclosure, as applicable**	Complete CT, as applicable, with enclosure, as applicable (1 Set = 1 no. of each type & rating for 1x3 phase complete CT, i.e. 3 Nos. Single Phase CTs of each type & rating)	Set	1
5	**Voltage Transformer**			
5.1	**Gas Insulated complete VT with enclosure**	Gas Insulated complete VT with enclosure (1 Set = 1 no. of each type & rating for 1x3 phase complete VT, i.e. 3 Nos. Single Phase VTs of each type & rating)	Set	1
6	**SF6 Gas Insulated Surge Arrester with Enclosure**	SF6 Gas Insulated Single Phase Surge Arrester with Enclosure	No.	3

Sl. No.	Description	Remarks_Detailed_Description	Unit	Quantity
S2	**420 KV GIS Tools and Tackles**			
1	Filling pipe		Nos.	2
2	Hand shank for DS		Nos.	2
3	Hand shank for CB		Nos.	2
4	Herringbone ladder		Nos.	2
5	Spanner（10～100N.m）		Nos.	2
6	Spanner（100～500N.m）		Nos.	2
7	Lifting rope(4T，4m)		Nos.	2
8	Lifting rope(2T，4m)		Nos.	2
9	Trolley for SF6		Nos.	2
10	Density Meter		Nos.	3
11	Hygrometer		Nos.	1
12	Portable dust counter		Nos.	1
13	Special gas mask for GIS maintenance		Nos.	5
14	Vacuum meter		Nos.	1
15	Digital contact resistance meter		Nos.	1
16	Power operated insulation tester		Nos.	1
17	Tong testers of suitable ranges		Nos.	1
18	Contact resistance measuring set for micro ohms		Nos.	1
S3	**420kV, 125MVAr , 3-Ph, Bus Reactor**			
1	HV Bushing with metal parts and gaskets		Nos.	3
2	HV Neutral bushing with metal parts and gaskets (if applicable)		Nos.	1
3	MV Bushing with metal parts and gaskets Nos.		Nos.	-
4	LV bushing with metal parts and gaskets Nos		Nos.	-
5	LV Neutral bushing with metal parts and gaskets (if applicable) Nos.		Nos.	-
6	WTI with contacts		Nos.	1
7	OTI with contacts		Nos.	1
8	Pressure relief device		Nos.	1
9	MOG		Nos.	1
10	Buchholz relay complete		Nos.	1
11	Oil surge relay		Nos.	-
12	Set of gaskets		Set	1
13	Set of valves		Set	2nos. of each type
14	Cooler fan with motor Nos.		Nos.	-
15	Oil Pump with motor Nos.		Nos.	-
16	Oil flow meter Nos.		Nos.	-
17	Set of OLTC/OCTC contacts		Nos.	-
18	Air cell for conservator		Nos.	1
19	Neutral Grounding Resistor w/o supporting structure		Nos.	-

Notes:
1 set consists of quantities required for 1 complete transformer/reactor of each type (as applicable).
2. Each mandatory spare OIP bushing shall be provided with suitable "stand ".

S4	**LT SWITCHGEAR/MCCs/ DISTRIBUTION BOARDS**			
1	Complete breaker of each rating		Nos.	3
2	Relays of each type		Nos.	10
3	Current transformer of each type & ratio		Nos.	3
4	Voltage transformer of each type & ratio		Nos.	3
5	Control supply transformer of each type & rating		Nos.	3
6	Maintenance tools and accessories for maintenance of LT MCC		Nos.	2
S5	**LT TRANSFORMERS**			
1	HV Bushing with metal parts and gaskets (See Note 1)		Nos.	3
2	HV Neutral bushing with metal parts and gaskets (if applicable)		Nos.	1
3	LV bushing with metal parts and gaskets (See Note 1)		Nos.	3
4	LV Neutral bushing with metal parts and gaskets (if applicable)		Nos.	1
5	WTI with contacts		Nos.	1
6	OTI with contacts		Nos.	1
7	Pressure relief device (as applicable)		Nos.	1
8	MOG		Nos.	1
9	Buchholz relay complete		Nos.	1
10	Set of gaskets (See Note 2)		Set	1
11	Set of valves (Each Set Consisting Of 2 Nos of each type/size)		Set	1
12	Air cell for conservator (as applicable)		Nos.	1

Notes:
1. Each mandatory spare OIP bushing shall be provided with suitable "stand ".
2. 1set consists of gaskets required for 1 No. transformer for the following
(a) protection and monitoring devices
(b) cooler circuit
(c) largest inspection cover, if applicable
(d) HV/LV turret, if applicable
(e) OLTC inspection cover, if applicable

S6	**Clamps and Connectors & String Insulators and Hardware**			
1	Minimum 3 Nos. of each type of clamps and connectors		Lot	1
2	Minimum 3 Nos. of each type of spacers		Lot	1
3	Minimum 3 Nos. of each type of String Insulators and associated hardwares		Lot	1
S7	**BATTERY (Quantity Of spares shall be provided for each set of battery being supplied)**			
1	Complete dry cell	5% or 10 Nos. whichever is more for each set of battery bank	% or Nos.	5% or 10
	Battery Accessories - Quantity (in Nos.) (Per battery bank)			
2	Hydrometer		Nos.	2
3	Set of hydrometer syringes suitable for the vent holes in different cells		Nos.	2
4	Thermometer for measuring electrolyte		Nos.	5
5	Specific gravity correction chart		Nos.	2
6	Wall mounting type holder made of teak wood for hydrometer & thermometer		Nos.	2
7	Cell Testing Voltmeter (3—0-3V) with testing leads		Nos.	2
8	Acid/Alkali Mixing Jar		Nos.	1

Sl. No.	Description	Remarks_Detailed_Description	Unit	Quantity
9	Rubber Aprons		Nos.	2
10	Pair of rubber gloves		Nos.	2
11	Set of Spanners		Nos.	2
12	No Smoking notice for each battery room		Nos.	2
13	Goggles (Industrial)		Nos.	2
14	Instruction Card		Nos.	10
15	Minimum and maximum temperature indicator for each Battery Room		Nos.	1
16	Variable metallic resistor and shunt for each battery rating suitable for carrying out the discharge test on the batteries (Total 2 Sets to be supplied for the 4 Nos.Battery Banks)		Nos.	1
S8	**336 kV, 1 Phase Surge Arrester**			
	336kV Surge Arrester (single phase) having outer insulator of Polymer type complete with all accessories such as Corona ring, Surge Monitor, Insulating Base, Lugs, Terminal pad, Fixing & Earthing Hardware etc. except Terminal connector and Insulated connecting cable.		Nos.	3
S9	**420kV, 1 Phase CVT**			
	Capacitive Voltage Transformer (CVT): 400 kV, 8800pF, 1 Phase, 3 secondary with terminal connector, without support structure		Nos.	1
	Capacitive Voltage Transformer (CVT): 400 kV, 4400pF, 1 Phase, 3 secondary with terminal connector, without support structure		Nos.	1
S10	**Control / Relay / SAS Panel Spare**			
1	Bay Control unit (complete with all components)		Nos.	2
2	Numerical Relays comprising various bay protection units Bus Bar and Islanding Scheme		Nos.	1 No. of each type
3	Numerical Relays comprising GRP		Nos.	1 No. of each type
4	Switchgear control unit		Nos.	2 No. of each type
5	Merging unit		Nos.	2 No. of each type
6	Cards/modules of Generator Disturbance Recorder, Line DR (if stand-alone)		Nos.	1 No. of each type
7	Energy Meter (ABT meter) class :0.2s		Nos.	1 No. of each type
8	Operator work station (OWS) along with software, monitor, mouse, keyboard, printer etc.		Nos.	1
9	Complete Network Controller / Server along with sof		Nos.	1
10	Complete Programming station along with software, monitor etc.		Nos.	1
11	LAN switches (if included in main package)		Nos.	1 No. of each type
12	Fuses		Nos.	10 No. of each type and rating
13	Terminal Blocks		Nos.	5 nos. of each type, make, model and rating
14	Interface cables containing standard length of each type of cable and its connector for each type of peripheral		Sets	2
15	MCBs		Nos.	1no of each type, make and model used in the system
16	RELAYS OTHER THAN NUMERICAL RELAYS			1no of each type of total population (min 1 no.)
17	GATEWAYS			1 No. of each type
18	MODEM (IF APPLICABLE)			1 No. of each type
19	LIU OF OFC INCLUDING NECESSARY CONNECTORS			1 No. of each type
20	TRANSDUCERS			1 No. of each type
21	AUXILIARY CT/PT			1 No. of each type
22	GPS EQUIPMENT			1 set comprises hardware Modules of each type
S11	**TEST EQUIPMENTS**			
1	Portable Leakage current analyzer (forGaplessSurge Arrester)		Nos.	1
2	Off line SF6 dew point meter for 400kV,220kV circuit breakers.		Nos.	1
3	Fully automatic contact resistance measurement kit (DC high current) for upto 400 kV circuit breakers		Nos.	1
4	Fully automatic infrared thermovision scanning system suitable for thermal scanning of switchyard equipments, panels etc. and having facility of data storage on separate card with necessary software for analysis		Nos.	1
5	Fully automatic digital Level oscillator & level measurement meter for PLCC system		Nos.	1
6	Dynamic Relay test Kit Along with necessary Software/Hardware		Sets	2

Annexure- Standard Scope for ETC Works		
		REV00
Sl. No.	Particulars	Remarks
1	Individual item may vary up-to any extend and even may get deleted, however overall contract value may vary +/- 30%. The validity for variations shall be valid up-to contract stage.	
2	Loading/ unloading, handling, preservation & upkeeping, shifting to & from stores, proper storage, assembly, installation, pre-commissioning test and commissioning tests (as per BHEL / Customer FQP/ OEM recommendations) are included in the scope. Shifting of the material from store to site shall be done with truck/ trailor.The scope of work includes loading of material with hydra on truck/ trailor at store, unloading of the material from truck/ trailor at site with Hydra/ crane etc. complete in all respect. Standard/ General tools & tackles mentioned in tender document is included in the scope of contractor.	
3	Bidder Supplied Material - Bidder (ETC contractor) to supply material of proven design and make, which have already been extensively used and type tested (as applicable). Bidder to obtain approval from BHEL Engineer incharge / Customer prior to supply.	
7	The ETC works shall be carried out in line with engineering drawing/ other technical details mentioned elsewhere, however, instruction of engineer in charge shall be final and binding for execution of work.	
8	Minor Civil works including modification of civil foundations, making holes in the trenches/ control room building, GIS building, grouting, fixing of trench material, sealing of GI Pipe/ conduits shall be in the scope of ETC contractor.	
9	Removal of gravel, if gravelling is already done, for connection of Equipment earthing strip to the existing mat (wherever earthing mat is already laid), and after completion of earthing, ETC contractor shall be make it good to bring it in original shape.	
12	All painting materials & other consumable as per contractual requirements shall be part of ETC works. All the supply materilals under scope of ETC contractor shall subject to customer approval.	
13	All the phases are to be identified by painting the structures Red, Yellow and Blue by reflecting colour as per as built condition. Phase identification colour is to be provided around the top of the structure with colour band of 100 mm width at a height of approximately 2000mm from the finished ground level.	
15	Equipment erection (per say Surge Arrestor) means complete erection, metallics, connectors (expansion/rigid tubular for aluminium Tube/ single/ double/ quadraple conductor), connection to the next in line (if connected to overhead busbar or droppers) including PG clamps/ Tee connectors etc in line with electrical layout drawings.	
16	Equipment and tower erection would include supply and erection of miscellanneous items , viz Phase colour discs, labels painting of equipments, phase colour painting, phase marking, bay identification board, danger plates, rubber mats, device number marking on the equipment, keyboard etc as per site requirements. Supply & Mounting of phase color discs & Danger plates shall be as per IS 3864.	
17	Welding of Aluminium tubes (supply of welding sleeve excluded) is in ETC contractor's scope and joints shall be tested by radiography & dye penetration test. Welding and Bending machines and any other equipment shall be in ETC Contractor scope.	
18	Completete ETC package is under the scope of bidder. All T&P including oil filterating machine, cranes etc. required to complete the job shall be provided by bidder only.	
19	Quantities identified for supply items are provisional and shall be confirmed during detailed engineering stage/ execution of work at site.	
20	MS Welding - The M.S. flat/ angle/ channel shall be finally painted with two coats of Red oxide primer and two coats of Zinc riched enamel paint.	
21	In cable tray/ ladder if minor fabrication is required the same shall be applied with one coat of red lead primer, one coat of oil primer followed by two finishing coats of aluminium paint. Supporting steel shall be painted before laying of cables. The painting shall be done with one coat of red lead paint and two coats of approved bituminous aluminium paint	
22	In adition to erection tools & tackles, testing instruments mentioned in tender documents, following tools & tackles and testing instruments(duly calibrated) shall be arranged by ETC Contractor at it's own cost on returnable basis. Please note that this is only indicative list and hence, any other instrument not mentioned below but required for sucessful completion of ETC work shall be in ETC contractor's scope.	
	OMICRON or equivalent kit for Numerical relay testing	
	DCRM (Dynamic Contact Resistance Measurement kit) OPERATIONAL ANALYZER	
	CRM (Contact Resistance Measurement kit)	
	Relay test kit	
	Capacitance and Tan delta measurement Kit	
	Dew Point Measurement kit	
	5kV/1kV Megger	
	Primary current Injection Kit	
	Secondary current/Voltgae Injection kit	
	1Ph Variac	
	Multimeters	
	Clamp on meter	
	Gas leak detector	
	14/16 ton Hydra with lifting tools (Shackle, slings etc) for GIS Bay & accessories shifting from store to GIS room	
	Necessary numbers of fire extinguisher	

Annexure- Project Scope for ETC Works

REV00

Sl. No.	Particulars	Remarks
1	**Cable fire sealing Works:** Cable fire sealing - Shall be as per NTPC specification attached in Annexure G(TECHNICAL SPECIFICATION SECTION – VI, PART-B BID DOC NO. : CS-4540-001A-2). Cable/cable tray openings in walls and floors or through pipe sleeves from one area to another or from one elevation to another within the unit shall be seated by a fire proof sealing system (FPSS). The FPSS shall effectively prevent the spread of fire from the flaming to non-flaming side of a fire. Wherever the cables/cable trays pass through walls/floors, fire proof cable penetration seals rated for one hour shall be provided. This shall be by suitable block system using individual blocks with suitable framework or by silicon RTV foaming system. In case foaming system is offered, damming board, if used, shall not be considered for fire rating criteria. Any of the system offered shall be of proven type as per BS: 476 (Part-20) or equivalent standard. In order to prevent fire propagation through cable penetrations, after laying, dressing & clamping of cables, all the openings shall be properly sealed by using Fire Stop Mortar Seal and Fire Retardant Cable coating compound. Also the cable runs both before and after the fire scale shall be suitably sprayed with anti-fire propagation liquid.	
2	**Supply of Insulating mats:** The scope covers supply and laying of insulating mats conforming to Internation standards. These insulating mats shall be laid in front of all floor mounted AC and DC switchboards and control & relay panels located in control room building/ Switchyard panel room / GIS LCC Panel e.t.c. The insulating mats shall be made of elastomer material free from any insertions leading to deterioration of insulating properties. It shall be resistant to acid, oil and low temperature. Upper surface of the insulating mats shall have small aberration (rough surface without edges) to avoid slippery effects while the lower surface shall be plain or could be finished slip resistant without affecting adversely the dielectric property of the mat. Insulating mat (wherever applicable) shall be of pastable type, to be fixed permanently on the front and rear side of the panels except for the chequered plate area which shall not be pasted as per requirement. The insulating mats shall generally be fixed and joints shall be welded as per recommendations in International standards. Width of insulating mats shall generally be of 1.5 meters or as per site requirements. Length shall be supplied as per site requirements.	
3	**Supply of Cable Tags & Markers** Cable tags & markers - Shall be as per NTPC specification attached in Annexure G(TECHNICAL SPECIFICATION SECTION – VI, PART-B BID DOC NO. : CS-4540-001A-2). Each cable and conduit run shall be tagged with numbers that appear in the cable and conduit schedule. The tag shall be of aluminium with the number punched on it and securely attached to the cable conduit by not less than two turns of 20 SWG GI wire conforming to International standards. Cable tags shall be of rectangular shape for power cables and of circular shape for control cables. Location of cables laid directly underground shall be clearly indicated with cable route marker made of galvanised iron plate. Location of underground cable joints shall be indicated with cable route marker with an additional inscription "Cable joints". The cable route marker shall project 150 mm above ground and shall be spaced at an interval of 30 meters and at every change in direction. They shall be located on both sides of road and drain crossings as per relevant standard. Cable tags shall be provided on all cables at each end (just before entering the equipment enclosure), on both sides of a wall or floor crossing, on each duct/conduit entry and at each end & turning point in cable tray/trench runs. Cable tags shall be provided inside the switchgear, motor control centres, control and relay panels etc., wherever required for cable identification, where a number of cables enter together through a gland plate.	
4	All ETC works shall be done as per BHEL/NTPC Specification. Miscellaneous works pertaining to 400kV GIS and Pothyard are deemed inclusive. (enclosed).	
5	Equipment bolted connection after being checked and tested shall be painted with anticorrosive paint/ compound be welded. For rust protection, the welds shall be treated with zinc chromate primer and coated with zinc rich paint.	
6	All the drawing/ documents including Single Line Diagram, Layout drawing, Erection Key Diagram etc.are tentative and subject for revision during detailed engineering / contract stage. Bidder to quote accordingly.	
7	Quntity for individual item are indicative and may change as per final engineering and site requirement.	
8	Rating & type of Battery & Battery Charger are tentative and subject for revision during detailed engineering / contract stage. Bidder to quote accordingly.	
9	Prices quoted for items are deemed to be inclusive of miscellaneous works including erection of clamps & connectors, earthing work etc.	

1.22	**Testing instruments (duly calibrated) have to be arranged by ETC Contractor at it's own cost on returnable basis (List is only provided for information , if any other instrument not mentioned below but required for sucessful completion of ETC work shall be in ETC contractor's scope)**
1.22.01	**OMICRON or equivalent kit for Numerical relay testing**
1.22.02	DCRM (Dynamic Contact Resistance Measurement kit) OPERATIONAL ANALYZER
1.22.03	CRM (Contact Resistance Measurement kit)
1.22.04	Relay test kit
1.22.05	Capacitance and Tan delta measurement Kit
1.22.06	Dew Point Measurement kit
1.22.07	5kV/1kV Megger
1.22.08	Primary current Injection Kit
1.22.09	Secondary current/Voltgae Injection kit
1.22.10	1Ph Variac
1.22.11	Multimeters
1.22.12	Clamp on meter
1.22.13	Gas leak detector
1.23	General Tools and Tackles to be arranged by ETC Contractor on returnable basis. (based on general requirement for erection, testing and commissioning of GIS under scope): The following is the list of Items which may be extended further depending upon the site timely requirements
1.23.01	Tools for GIS erection (to be arranged by Bidder on returnable basis) as per ANNEXURE-B
1.23.02	14/16 ton Hydra with lifting tools (Shackle, slings etc) for GIS Bay & accessories shifting from store to GIS room
1.23.03	Hand Pallet Trolley Qty-2 for GIS modules & accessories boxes shifting
1.23.04	Power supply sockets with extension board inside GIS room Qty-2 nos.
1.23.05	Vacuum cleaner machine for GIS room cleaning Qty-2 nos.
1.23.06	Necessary numbers of fire extinguisher

एन टी पी सी लिमिटेड
(भारत सरकार का उद्यम)
NTPC Limited
(A Govt. of India Enterprise)
(Formerly National Thermal Power Corporation Ltd.)
(केंद्रीय कार्यालय नोएडा)
Corporate Center NOIDA

Reference : CC-ENGG-4540-001-230-PVE-P-001 **Date :** 19/09/2023

From : Subodh Pandit ADDL. GENERAL MANAGER	**To :** BHARAT HEAVY ELECTRICALS LTD NEW DELHI 110049 IN **Cc :** singhjp@bhel.in

Subject : EPC TTPP3 (2x660MW)

Please find enclosed following drawings/ documents for necessary action at your end.

Vendor Drg. No.	:	4540-001-230-PVE-P-001
Orgn. Drg. No.	:	4540-001-230-PVE-P-001
Revision No.	:	01
Drg. Title	:	400 KV SINGLE LINE DIAGRAM
App. Category	:	CAT-I
Release Date	:	19/09/2023

Scan to verfiy

Comments : Minor comments marked on the drawing

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN MM.)

DRAWING No.

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INDEX

DESCRIPTION	SHEET
AC YARD OVERVIEW	2
SLD	3
400kV OUTDOOR EQUIPMENT	4
400kV INDOOR GIS	4
400KV CT DETAILS	5
400KV VT DETAILS	5

REFERENCE DRAWING: 4540-999-POE-J-001 REV A - TENDER DRAWING.
400kV GIS SWYD SINGLE LINE DIAGRAM (STATION TRANSFORMER SCHEME)

COMPUTER DRG. PATH NAME :

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

REV.	DATE	ALTERED / CHECKED / APPROVED	ZONE
02	12.09.23	PC / RD / VK	SLD REVISED TO INCORPORATE SPACE PROVISION OF TARIFF METERING CT & EMVT AS PER CUSTOMER COMMENTS.
01	12.12.22	PC / RD / VK	SLD REVISED TO INCORPORATE ADDITIONAL CT & CSD AS PER CUSTOMER COMMENTS.

CA NO.

ADDITIONAL INFORMATION
W.O.No.

STATUS OF DRAWING

DISTRIBUTION OF PRINTS

NAME OF CUSTOMER/PROJECT: NTPC TALCHER SUPER THERMAL POWER PROJECT PHASE-III (2x660 MW)

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP

	NAME	SIGN.	DATE
DRAWN	PC	-SGD-	15.10.22
CHECKED	RD	-SGD-	15.10.22
APPROVED	VK	-SGD-	15.10.22

DEPT. | SCALE | CARD CODE | CODE

TITLE
400kV GIS SWITCHYARD SINGLE LINE DIAGRAM

DRAWING NO.
NTPC DRG NO. 4540-001-230-PVE-P-001
BHEL DRG NO.

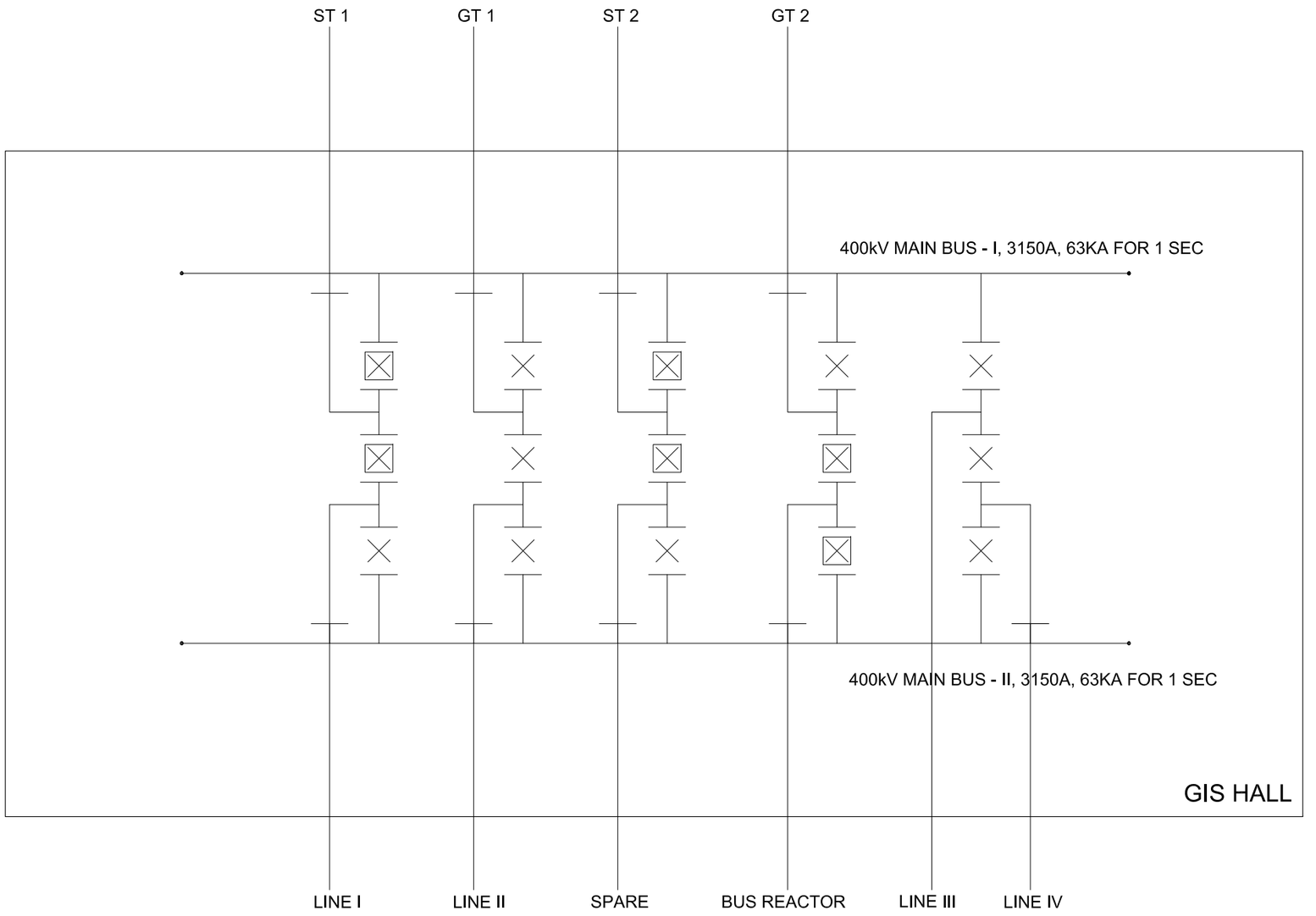
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BREAKER WITH CONTROLLED SWITCHING

BREAKER WITHOUT CONTROLLED SWITCHING

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APPROVED	VK	-SGD-	15.10.22

DEPT. / CODE / SCALE / CARD CODE

TITLE: 400kV GIS SWITCHYARD SINGLE LINE DIAGRAM

DRAWING NO.: NTPC DRG NO. 4540-001-230-PVE-P-001; BHEL DRG NO.

REV. 02

SHEET No. 02 NEXT SHEET 03

COMPUTER DRG. PATH NAME :

REF. DRG. No.

SIGN. & DATE

INVENTORY No.

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DRAWING No.

=W1

ST 1 | GT 1 | ST 2 | GT 2

401 LA | 404 LA | 407 LA | 410 LA
404 CVT | 410 CVT
401 X | 404 X | 407 X | 410 X

400kV MAIN BUS - I

4BUSI LA | 4BUSI 89E1 | 4BUSI 89 | 4BUSI 89E2 | 4BUSI VT

401 CTM | 401 89A | 401 89AE | 401 CTA | 401 89TE | 401 89T | 401-52* | 401 CTB | 401 89BE | 401 89B
404 CTM | 404 89A | 404 89AE | 404 CTA | 404 89TE | 404 89T | 404-52 | 404 CTB | 404 89BE | 404 89B
407 CTM | 407 89A | 407 89AE | 407 CTA | 407 89TE | 407 89T | 407-52* | 407 CTB | 407 89BE | 407 89B
410 CTM | 410 89A | 410 89AE | 410 CTA | 410 89TE | 410 89T | 410-52 | 410 CTB | 410 89BE | 410 89B
413 89A | 413 89AE | 413 CTA | 413-52 | 413 CTB | 413 89BE | 413 89B

402 89AE1 | 402 89A | 402 89AE2 | 402 CTA1 | 402-52* | 402 CTA2 | 402 89BE2 | 402 89B | 402 89BE1
405 89AE1 | 405 89A | 405 89AE2 | 405 CTA1 | 405-52 | 405 CTA2 | 405 89BE2 | 405 89B | 405 89BE1
408 89AE1 | 408 89A | 408 89AE2 | 408 CTA1 | 408-52* | 408 CTA2 | 408 89BE2 | 408 89B | 408 89BE1
411 89AE1 | 411 89A | 411 89AE2 | 411 CTA1 | 411-52* | 411 CTA2 | 411 89BE2 | 411 89B | 411 89BE1
414 89AE1 | 414 89A | 414 89AE2 | 414 CTA1 | 414-52 | 414 CTA2 | 414 89BE2 | 414 89B | 414 89BE1

403 89L | 403 89B | 403 89BE | 403 CTB | 403 89LE | 403 CTL | 403-52 | 403 CTA | 403 89AE | 403 89A
406 89L | 406 89B | 406 89BE | 406 CTB | 406 89LE | 406 CTL | 406-52 | 406 CTA | 406 89AE | 406 89A
409 89L | 409 89B | 409 89BE | 409 CTB | 409 89LE | 409 CTL | 409-52 | 409 CTA | 409 89AE | 409 89A
412 89BR | 2 412 89BRE | 412 CTBR | 412 89B | 412 89BE | 412 CTB | 412-52* | 412 CTA | 412 89AE | 412 89A
413 89L | 415 89B | 415 89BE | 415 CTB | 413 89LE | 413 CTL | 415-52 | 415 CTA | 415 89AE | 415 89A
415 89L | 415 89LE | 415 CTL

4BUSII VT | 4BUSII LA | 4BUSII 89E2 | 4BUSII 89 | 4BUSII 89E1

400kV MAIN BUS - II

GIS HALL

403 X | 406 X | 409 X | 412 X | 413 X | 415 X

403 CT-TM | 403 WT | 403 EMVT-TM | 403 CVT | 403 LA
406 CT-TM | 406 WT | 406 EMVT-TM | 406 CVT | 406 LA
412 LA
413 CT-TM | 413 WT | 413 EMVT-TM | 413 CVT | 413 LA
415 CT-TM | 415 WT | 415 EMVT-TM | 415 CVT | 415 LA

LINE 1 | LINE 2 | SPARE | BUS REACTOR | LINE 3 | LINE 4

EQUIPMENT DESIGNATION FOR SLD

4	01	89	52	A/B/L/T/BR	E	X
VOLTAGE LEVEL = 400kV	BAY NO. - 01, 02, N	EQUIPMENT ID - (ISO)	EQUIPMENT ID - (CB)	A-EQPT CONNECTED TOWARDS BUS B-EQPT CONNECTED TOWARDS TIE L-EQPT CONNECTED TO LINE T/BR-EQPT CONNECTED TO TRANSFORMER/REACTOR SIDE	EARTH-SWITCH	SF-6 TO AIR BUSHING

NOTES:
1. EARTHING SWITCHES WITH # ARE HIGH SPEED EARTHING SWITCHES.
2. CIRCUIT BREAKERS WITH * ARE BREAKERS HAVING CONTROLLED SWITCHING FACILITY.
3. GT STANDS FOR GENERATOR TRANSFORMER.
4. ST STANDS FOR STATION TRANSFORMER.

5. FOR **CT-TM & EMVT-TM, ONLY SPACE PROVISION SHALL BE CONSIDERED IN LAYOUT; ACTUAL EQUIPMENT SUPPLIES ARE SUBJECT TO COMMERCIAL SETTLEMENT OF TARIFF METERING CT & EMVT.**

REV.	DATE	ALTERED	ZONE
02	12.09.23	PC CHECKED RD APPROVED VK	SLD REVISED TO INCORPORATE SPACE PROVISION OF TARIFF METERING CT & EMVT AS PER CUSTOMER COMMENTS.
01	12.12.22	PC CHECKED RD APPROVED VK	SLD REVISED TO INCORPORATE ADDITIONAL CT & CSD AS PER CUSTOMER COMMENTS.

CA NO.
ADDITIONAL INFORMATION W.O.No.
STATUS OF DRAWING
DISTRIBUTION OF PRINTS

NAME OF CUSTOMER/PROJECT: NTPC TALCHER SUPER THERMAL POWER PROJECT PHASE-III (2x660 MW)

BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION BUSINESS GROUP

	NAME	SIGN.	DATE
DRAWN	PC	-SGD-	15.10.22
CHECKED	RD	-SGD-	15.10.22
APPROVED	VK	-SGD-	15.10.22

DEPT. | CODE | SCALE | CARD CODE

TITLE: 400kV GIS SWITCHYARD SINGLE LINE DIAGRAM

DRAWING NO.: NTPC DRG NO. 4540-001-230-PVE-P-001 | BHEL DRG NO.
REV.: 02
SHEET No. 03 | NEXT SHEET 04

COMPUTER DRG. PATH NAME :
REF. DRG. No.
SIGN. & DATE
INVENTORY No.

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DRAWING No.

400kV OUTDOOR EQUIPMENT

S.NO.	DESCRIPTION	SYMBOL	BAY NO./LOCATION	UNIT	QUANTITY
1	3X1PH, 3X265 MVA, 420/SQRT(3)/21kV GENERATOR TRANSFORMER		404, 410	NOS.	2
2	130 MVA, 400/11.5/11.5 kV STATION TRANSFORMER		401, 407	NOS.	2
3	125 MVAR, 400kV SHUNT REACTOR - 3PH		412 BR	NOS.	1
4	336 kV LIGHTNING ARRESTER - 1PH		401 LA, 403 LA, 404 LA, 406 LA, 407 LA, 410 LA, 412LA, 413 LA, 415 LA	NOS.	27
5	400kV, 8800pF LINE CAPACITIVE VOLTAGE TRANSFORMER - 1PH.		403 CVT, 406 CVT, 413 CVT, 415 CVT	NOS.	12
6	400kV, 4400pF CAPACITIVE VOLTAGE TRANSFORMER FOR GT BAYS - 1PH		404 CVT, 410 CVT	NOS.	6
7	400kV, 3150A 0.5mH PEDESTAL MOUNTED WAVE TRAP - 1PH		403 WT, 406 WT, 413 WT, 415 WT	NOS.	8
8 #	400kV, 3000A, 63kA FOR 1 SEC, 2 CORE (0.2s/0.2s), TARIFF METERING CURRENT TRANSFORMER- 1PH		403 CT-TM, 406 CT-TM, 413 CT-TM, 415 CT-TM	NOS.	--
9 #	400kV, 2 WDG (0.2/0.2), TARIFF METERING EMVT - 1PH.		403 EMVT-TM, 406 EMVT-TM, 413 EMVT-TM, 415 EMVT-TM	NOS.	--

△2

NOTES:
1. WAVETRAPS SHALL BE PROVIDED IN TWO PHASES.
2. RATING OF GIS LA SHALL BE DECIDED BASED ON INSULATION COORDINATION AND TOV RESULTS.
3. ST RATING IS SUBJECT TO APPROVED SIZING CALCULATION
4. EARTHING SWITCHES MARKED WITH # ARE HIGH SPEED EARTHING SWITCHES.
4. CIRCUIT BREAKERS WITH * ARE BREAKERS HAVING CONTROLLED SWITCHING FACILITY.
5. GT STANDS FOR GENERATOR TRANSFORMER.
7. ST STANDS FOR STATION TRANSFORMER.
8. NOMENCLATURE MAY CHANGE AFTER FINALIZATION OF VENDOR.
9. BOQ indicated are indicative only.

400kV INDOOR GIS

S.NO.	DESCRIPTION	SYMBOL	BAY NO./LOCATION	UNIT	QUANTITY
1	400kV, 3150 A, 63kA FOR 1 SEC, CIRCUIT BREAKER WITH CONTROLLED SWITCHING - 3PH		401-52, 402-52, 407-52, 408-52, 411-52, 412-52	SETS	6
2	400kV, 3150 A, 63kA FOR 1 SEC, CIRCUIT BREAKER WITHOUT CONTROLLED SWITCHING - 3PH		403-52, 404-52, 405-52, 406-52, 409-52, 410-52, 413-52, 414-52, 415-52	SETS	9
3	400kV, 3150 A, 63kA FOR 1 SEC, DISCONNECTOR WITH ONE EARTH SWITCH - 3PH		401-89A, 401-89B, 401-89T, 403-89A, 403-89B, 404-89A, 404-89B, 404-89T, 406-89A, 406-89B, 407-89A, 407-89B, 407-89T, 409-89A, 409-89B, 410-89A, 410-89B, 410-89T, 412-89A, 412-89B, 412-89BR, 413-89A, 413-89B, 415-89A 415-89B	SETS	25
4	400kV, 3150 A, 63kA FOR 1 SEC, DISCONNECTOR WITH TWO EARTH SWITCHES - 3PH		402-89A, 402-89B, 405-89A, 405-89B, 408-89A, 408-89B, 411-89A, 411-89B, 414-89A, 414-89B	SETS	10
5	400kV, 3150 A, 63kA FOR 1 SEC, DISCONNECTOR WITH ONE HIGH SPEED EARTH SWITCHES -3PH		403-89L, 406-89L, 409-89L, 413-89L, 415-89L	SETS	5
6	400kV, 3000A, 63kA FOR 1 SEC, CURRENT TRANSFORMER - 1PH		401-CTA, 401-CTB, 402-CTA1, 402-CTA2, 403-CTA, 403-CTB, 403-CTL, 404-CTA, 404-CTB, 405-CTA1, 405-CTA2, 406-CTA, 406-CTB, 406-CTL, 407-CTA, 407-CTB, 408-CTA1, 408-CTA2, 409-CTA, 409-CTB, 409-CTL, 410-CTA, 410-CTB, 411-CTA1, 411-CTA2, 412-CTA, 412-CTB, 413-CTA, 413-CTB, 413-CTL, 414-CTA1, 414-CTA2, 415-CTA, 415-CTB, 415-CTL	NOS.	105
7	400kV, 3000A, 63kA FOR 1 SEC, METERING CURRENT TRANSFORMER - 1PH		401-CTM, 404-CTM, 407-CTM, 410-CTM, 412-CTBR	NOS.	15
8	400kV BUS VOLTAGE TRANSFORMER - 1PH		4BUSI VT, 4BUSII VT	NOS.	6
9	400kV, 3150 A, 63kA FOR 1 SEC, DISCONNECTOR FOR BUS VT WITH TWO EARTH SWITCHES - 3PH		4BUSI 89, 4BUSII 89	SETS	2
10	BUS SURGE ARRESTER - 1PH		4BUSI LA, 4BUSII LA	NOS.	6
11	400kV SF6 TO AIR BUSHING - 1PH		401-X, 403-X, 404-X, 406-X, 407-X, 409-X 410-X, 412-X, 413-X, 415-X	NOS.	30

△2

MAIN SYSTEM PARAMETERS

1. NOMINAL VOLTAGE	-	400kV
2. HIGHEST SYSTEM VOLTAGE	-	420kV
3. RATED FREQUENCY	-	50 HZ
4. RATED SHORT TIME CURRENT	-	63kA FOR 1 SEC
5. POWER FREQUENCY WITHSTAND VOLTAGE	-	650 kVrms
6. LIGHTNING IMPULSE WITHSTAND VOLTAGE	-	± 1425 kVpeak
7. SWITCHING IMPULSE WITHSTAND VOLTAGE	-	± 1050 kVpeak
8. CREEPAGE	-	31mm/kV (13020 MM)

COMPUTER DRG. PATH NAME :

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

REV.	DATE	ALTERED / CHECKED / APPROVED	ZONE
02	12.09.23	ALTERED PC / CHECKED RD / APPROVED VK	SLD REVISED TO INCORPORATE SPACE PROVISION OF TARIFF METERING CT & EMVT AS PER CUSTOMER COMMENTS.
01	12.12.22	ALTERED PC / CHECKED RD / APPROVED VK	SLD REVISED TO INCORPORATE ADDITIONAL CT & CSD AS PER CUSTOMER COMMENTS.

CA NO.	
ADDITIONAL INFORMATION W.O.No.	
STATUS OF DRAWING	
DISTRIBUTION OF PRINTS	
NAME OF CUSTOMER/PROJECT	NTPC TALCHER SUPER THERMAL POWER PROJECT PHASE-III (2x660 MW)

BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION BUSINESS GROUP

	NAME	SIGN.	DATE
DRAWN	PC	-SGD-	15.10.22
CHECKED	RD	-SGD-	15.10.22
APPROVED	VK	-SGD-	15.10.22

DEPT. | CODE | SCALE | CARD CODE

TITLE: 400kV GIS SWITCHYARD SINGLE LINE DIAGRAM

DRAWING NO.: NTPC DRG NO. 4540-001-230-PVE-P-001 | BHEL DRG NO.

REV. 02

SHEET No. 04 | NEXT SHEET 05

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DRAWING No.

400kV GIS CT DETAILS

400kV GIS CT-A/ CT-A1/ CT-A2

Core No.	Current Ratio	Output Burden (VA) at lowest Tap	Minimum KPV (Volts)	Max Ie (mA) at KPV	Maximum Rct (Ohms)	Accuracy Class	Purpose
1	3000-2000-1000/1 A	-	6000-4000-2000	20-30-60	15-10-5	PS	Protection
2	3000-2000-1000/1 A	-	6000-4000-2000	20-30-60	15-10-5	PS	Protection

400kV GIS CT-B

Core No.	Current Ratio	Output Burden (VA) at lowest Tap	Minimum KPV (Volts)	Max Ie (mA) at KPV	Maximum Rct (Ohms)	Accuracy Class	Purpose
1	3000-2000-1000/1 A	-	6000-4000-2000	20-30-60	15-10-5	PS	Protection
2	3000-2000-1000/1 A	-	6000-4000-2000	20-30-60	15-10-5	PS	Protection

400kV GIS CT-C CTM/ CTBR (GT/ ST/ BUS REACTOR SIDE)

Core No.	Current Ratio	Output Burden (VA) at lowest Tap	Minimum KPV (Volts)	Max Ie (mA) at KPV	Maximum Rct (Ohms)	Accuracy Class	Purpose
1	3000-2000-1000-500/1 A	20	-	-	-	0.2s, ISF≤5	Metering

400kV GIS CT-C CTL (400KV LINE SIDE)

Core No.	Current Ratio	Output Burden (VA) at lowest Tap	Minimum KPV (Volts)	Max Ie (mA) at KPV	Maximum Rct (Ohms)	Accuracy Class	Purpose
1	3000-2000-1000/1 A	-	6000-4000-2000	20-30-60	15-10-5	PS	Protection
2	3000-2000-1000/1 A	-	6000-4000-2000	20-30-60	15-10-5	PS	Protection
3	3000-2000-1000-500/1 A	20	-	-	-	0.2s, ISF≤5	Metering
4	3000-2000-1000-500/1 A	20	-	-	-	0.2s, ISF≤5	Metering

400KV VT DETAILS

CORE DETAILS OF 400kV VTs (GIS)

SECONDARY WINDING	APPLICATION	RATED SECONDARY VOLTAGE (V)	ACCURACY	RATED SECONDARY. BURDEN (VA) MINIMUM
I	PROTECTION	110/√3	3P	50
II	PROTECTION	110/√3	3P	50
III	METERING	110/√3	0.2	50

CORE DETAILS OF 400kV CVTs (AIS) - OUTDOOR
Capacitance(Nominal) = 8800pF / 4400pF

SECONDARY WINDING	APPLICATION	RATED SECONDARY VOLTAGE (V)	ACCURACY	RATED SECONDARY. BURDEN (VA) MINIMUM
I	PROTECTION	110/√3	3P	50
II	PROTECTION	110/√3	3P	50
III	METERING	110/√3	0.2	50
IV	METERING	110/√3	0.2	50

NOTES

1. RATED EXTENDED PRIMARY CURRENT OF THE CURRENT TRANSFORMERS SHALL BE 120% CONTINUOUS OF 3000A.
2. FOR VTs THE ACCURACY OF 0.2 ON SECONDARY III SHOULD BE MAINTAINED THROUGHOUT THE ENTIRE BURDEN RANGE UP TO TOTAL SIMULTANEOUS BURDEN 100 VA ON ALL THE THREE WINDINGS WITHOUT ANY ADJUSTMENTS DURING OPERATION.
3. PHYSICAL ARRANGEMENT OF CURRENT TRANSFORMERS SHALL BE AS PER PROTECTION SLD/ GIS MANUFACTURER'S RECOMMENDATION

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ADDITIONAL INFORMATION W.O.No.

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BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION BUSINESS GROUP

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DEPT. / CODE / SCALE / CARD CODE

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DRAWING NO.: NTPC DRG NO. 4540-001-230-PVE-P-001; BHEL DRG NO.

REV. 02

SHEET No. 05 NEXT SHEET –

COMPUTER DRG. PATH NAME :

REF. DRG. No.

SIGN. & DATE

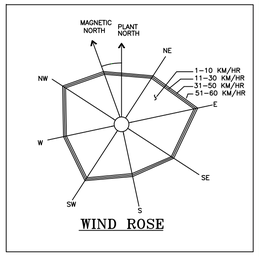
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D:\PROJECT FOLDER\P_R_O_J_E_C_T_S\NTPC TALCHER\LAYOUT\SWITCH YARD PLAN AND SECTION_R03_2024-02-07-DRAFT

400kV SYSTEM PARAMETERS

Sl.No.	DESCRIPTION OF PARAMETER	
1	SYSTEM OPERATING VOLTAGE	400kV
2	MAX. OPERATING VOLTAGE OF THE SYSTEM (rms)	420kV
3	RATED FREQUENCY	50Hz
4	NO. OF PHASES	3
5	RATED INSULATION LEVELS i) FULL WAVE IMPULSE WITHSTAND VOLTAGE (1.2/50microsec.) ii) SWITCHING IMPULSE WITHSTAND VOLTAGE (250/2500microsec.) iii) ONE MINUTE POWER FREQUENCY WITHSTAND VOLTAGE (rms)	 ± 1425kVp ± 1050kVp 630kV (rms)
6	CORONA EXTINCTION VOLTAGE (MIN)	320kV (rms)
7	MAX. RADIO INTERFERENCE VOLTAGE FOR FREQUENCY BETWEEN 0.5MHz & 2MHz AT 266KV rms	1000 microV
8	MIN. CREEPAGE DISTANCE	31 mm/kV (13020 mm)
9	MIN. CLEARANCE i) PHASE TO PHASE ii) PHASE TO EARTH iii) SECTIONAL CLEARANCE	 4000MM 3500MM 6500MM
10	RATED SHORT CIRCUIT CURRENT FOR 1SEC DURATION	63kA
11	SYSTEM NEUTRAL EARTHING	EFFECTIVELY EARTHED
12	SUB CONDUCTOR SPACING	450MM
13	CONDUCTOR STATIC TENSION 400kV TWIN 400kV QUAD	 7T PER PHASE 6T PER PHASE



WIND ROSE

CONDUCTOR & STRINGING DETAILS :-

SL.NO.	DESCRIPTION	400kV CONDUCTOR DETAIL	CONNECTION HEIGHT (ABOVE PLINTH LEVEL)
1.	EQUIPMENT INTERCONNECTION	4.0" IPS (EH) AL. TUBE/ MOOSE CONDUCTOR	10mtr.
2.	JACK BUS ON GT/ST - IN GT YARD	TWIN ACSR MOOSE CONDUCTOR	22 mtr. FROM GT YARD FGL
3.	JACK BUS TOWARDS GT/ST - IN SWYD	TWIN ACSR MOOSE CONDUCTOR	22 mtr.
4.	LINE SIDE DEAD-END STRINGING	*QUAD ACSR MOOSE CONDUCTOR	22 mtr.
5.	EARTHWIRE	7/3.66mm SHIELD WIRE	30.5 mtr
6.	DROPPER ON CVT, LA	TWIN ACSR MOOSE CONDUCTOR	-

LEGEND:

FUTURE/ NOT IN BHEL SCOPE.

PRESENT/ BHEL SCOPE

NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. ALL STRUCTURE/CONDUCTOR HEIGHTS ARE ABOVE PLINTH LEVEL. PLINTH LEVEL IS 300 MM ABOVE F.G.L.
3. WAVE TRAP FOUNDATION SHALL BE PROVIDED FOR ALL THREE PHASE OF THE LINE AND SHALL BE SUITABLE FOR BPI ALSO. HOWEVER WAVE TRAP SHALL BE INSTALLED ON TWO PHASES ONLY. STRING INSULATR SHALL BE PROVIDED FOR ONE PHASE WHEREVER WAVETRAP IS NOT INSTALLED.
4. TYPE OF GANTRY STRUCTURES SHALL BE AS PER APPROVED STRUCTURAL LAYOUT DRAWING.
5. SWITCHYARD LIGHTNING PROTECTION SHALL BE ACHIEVED THROUGH SHIELD WIRES OR WITH 50M HIGH LM & SHIELD WIRES AS PER APPROVED DSLP.
6. SA PRESSURE RELIEF VALVE SHALL NOT BE TOWARDS TRANSFORMER SIDE / ANY EQUIPMENT KEPT NEAR LIGHTING ARRESTER AND BHEL SHALL ENSURE THE SAME DURING ERECTION AT SITE.
7. FOR SECTION DETAILS, REFER SHEET No. 02.
8. SIZE OF GIS AND CONTROL ROOM BUILDING IS AS PER RESPECTIVE APPROVED LAYOUTS.
9. DEAD END TOWERS LOCATION SHALL BE CONFIRMED BY NTPC AS PER THIS LAYOUT.
10. SUPPLY AND STRINGING OF 400kV LINE CONDUCTOR, SHIELD WIRE, INSULATOR AND HARDWARE BETWEEN 400kV DEAD END TOWER AND SWITCHYARD TERMINAL GANTRY ARE NOT IN BHEL SCOPE. HOWEVER, JUMPERING FOR THE RESPECTIVE EQUIPMENT, JUMPERS & HARDWARE REQUIRED FOR JUMPERS ARE IN SCOPE OF BHEL.
11. TARIFF METERING CT-TM & EMVT-TM SHOWN FOR SPACE PROVISION ONLY; ACTUAL SUPPLY OF THESE EQUIPMENTS SHALL BE SUBJECT TO COMMERCIAL SETTLEMENT.

REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD
					03	07.02.24	PC	RD	VK	02	06.09.23	PC	RD	VK
					DOCUMENT REVISED TO INCLUDE UPDATED ROAD, GIS & 33kV SW GR BUILDING LAYOUTS					DOCUMENT REVISED IN LINE WITH NTPC COMMENTS DT 07.02.23 & UPDATED TRAFO YARD LAYOUT				

ग्राहक ड्राइंग संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-023
ग्राहक/CUSTOMER	एन टी पी सी लिमिटेड N T P C LIMITED
परियोजना PROJECT	TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)
कार्य संख्या/ JOB NO.	419
स्थिति/ STATUS	CONTRACT
मुद्रित स्केल मीटर में PRINT SCALE IN METRE	0 2 4 6 8 10 20 30 40 50
भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD	TRANSMISSION BUSINESS GROUP नोएडा (उ॰प्र॰)/NOIDA (U.P.)
DEPT CODE	M

	नाम NAME	हस्ताक्षर SIGNATURE	दिनांक DATE
तैयारकर्ता/DSN	PC	Sd/-	12.01.2023
डिजाइनकर्ता/DESN	PC	Sd/-	12.01.2023
जांचकर्ता/CHD	RD	Sd/-	12.01.2023
अनुमोदनकर्ता/APPD	VK	Sd/-	12.01.2023

शीर्षक/TITLE
400kV GIS SWITCHYARD LAYOUT PLAN AND SECTION

विभाग DEPT.	स्केल SCALE	ड्राइंग संख्या / DRAWING NO.
हस्ताक्षर SIGN	—	4540-001-230-PVE-F-023
दिनांक DATE		शीट SHEET 1 OF 2 पुनरीक्षण REV. 03

फॉर्मेट साइज़ A0
FORMAT SIZE A0

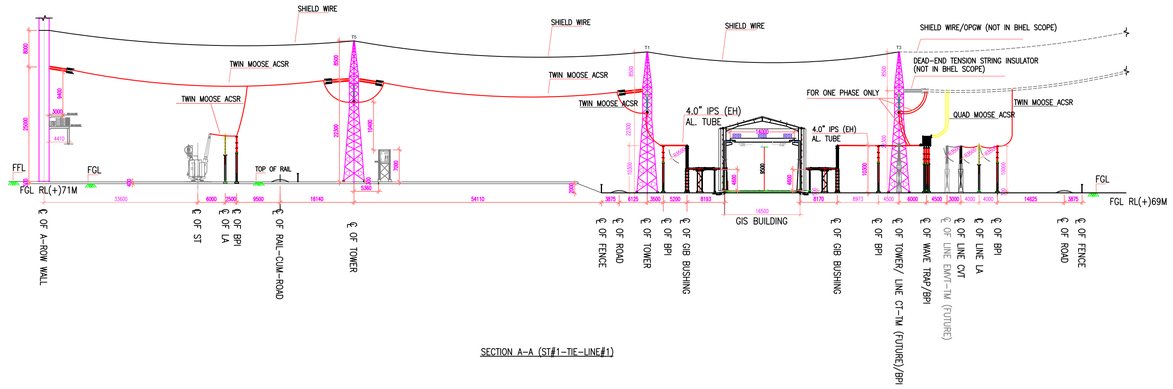
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The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED it must not be used directly or indirectly in any way detrimental to the interest of the company/इस दस्तावेज़ पर अंकित सूचना एवं जानकारी भारत हैवी इलेक्ट्रिकल्स लिमिटेड की संपत्ति है इसे किसी भी तरह से कंपनी के हित के विरुद्ध सीधे या अप्रत्यक्ष रूप से उपयोग नहीं किया जाना चाहिये

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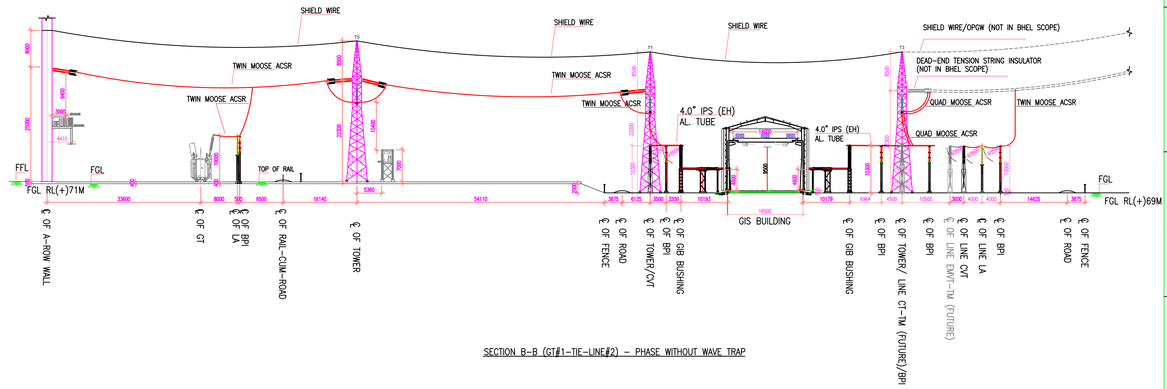
फर्स्ट एंगल प्रोजेक्शन/FIRST ANGLE PROJECTION | सभी माप मि॰ मी॰ में है/ALL DIMENSIONS ARE IN MM

ड्राइंग संख्या/DRAWING NO.

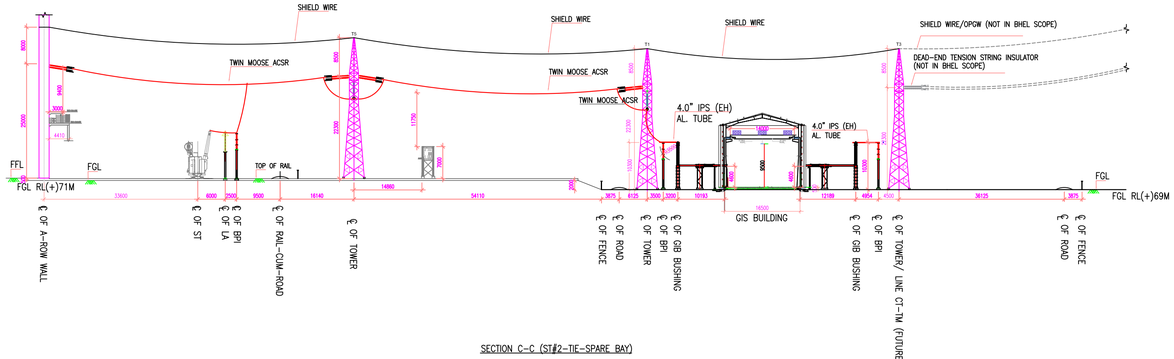
400kV SWITCHYARD ELEVATION VIEW



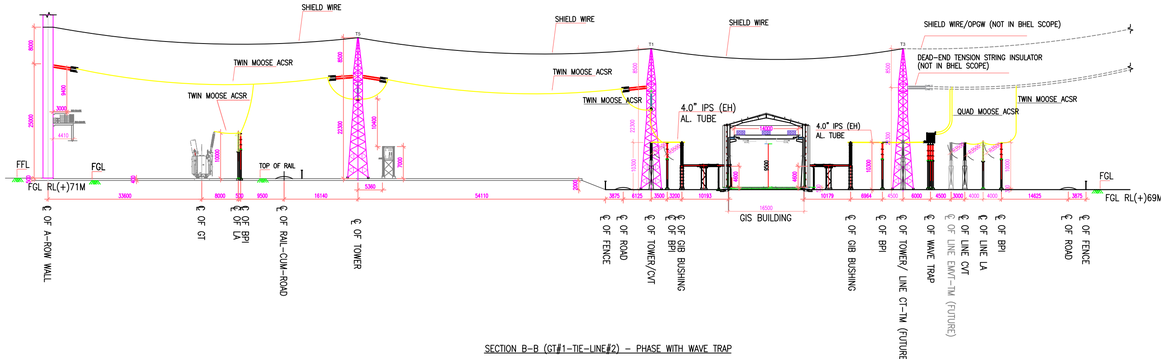
SECTION A-A (ST#1-TIE-LINE#1)



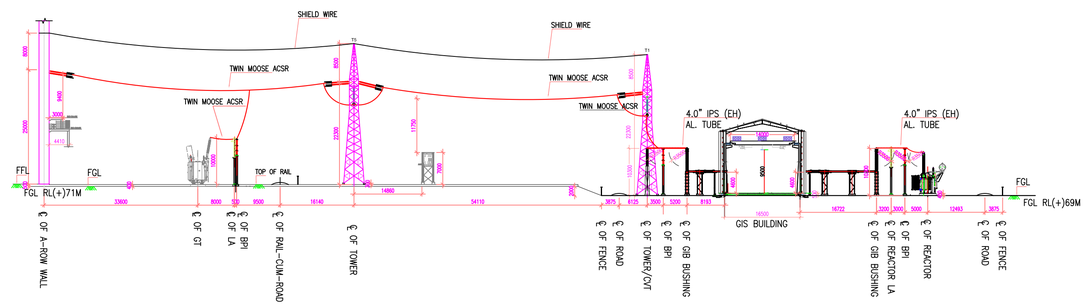
SECTION B-B (GT#1-TIE-LINE#2) - PHASE WITHOUT WAVE TRAP



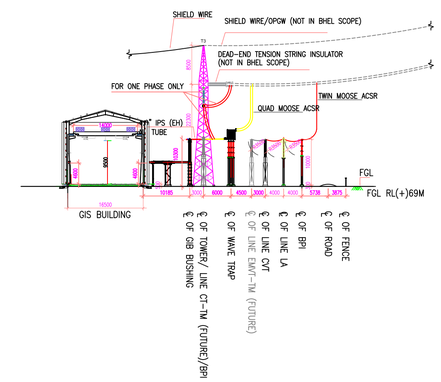
SECTION C-C (ST#2-TIE-SPARE BAY)



SECTION B-B (GT#1-TIE-LINE#2) - PHASE WITH WAVE TRAP



SECTION D-D (GT#2-TIE-BUS REACTOR)



SECTION E-E (LINE#3)

ग्राहक ड्राइंग संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-023
NTPC	ग्राहक/CUSTOMER: एन टी पी सी लिमिटेड N T P C LIMITED
कार्य संख्या- JOB NO. 419	परियोजना PROJECT: TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)
स्थिति STATUS: CONTRACT	
ड्राइंग स्केल मीटर में PRINT SCALE IN METRE: 0 2 4 6 8 10 20 30 40 50	भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD; TRANSMISSION BUSINESS GROUP; नोएडा (उ॰प्र॰)/NOIDA (U.P.)
DEPT CODE: M	

	नाम NAME	हस्ताक्षर SIGNATURE	दिनांक DATE
तैयारकर्ता/DRN	PC	Sd/-	12.01.2023
डिजाइनकर्ता/DESN	PC	Sd/-	12.01.2023
जांचकर्ता/CHD	RD	Sd/-	12.01.2023
अनुमोदनकर्ता/APPD	VK	Sd/-	12.01.2023

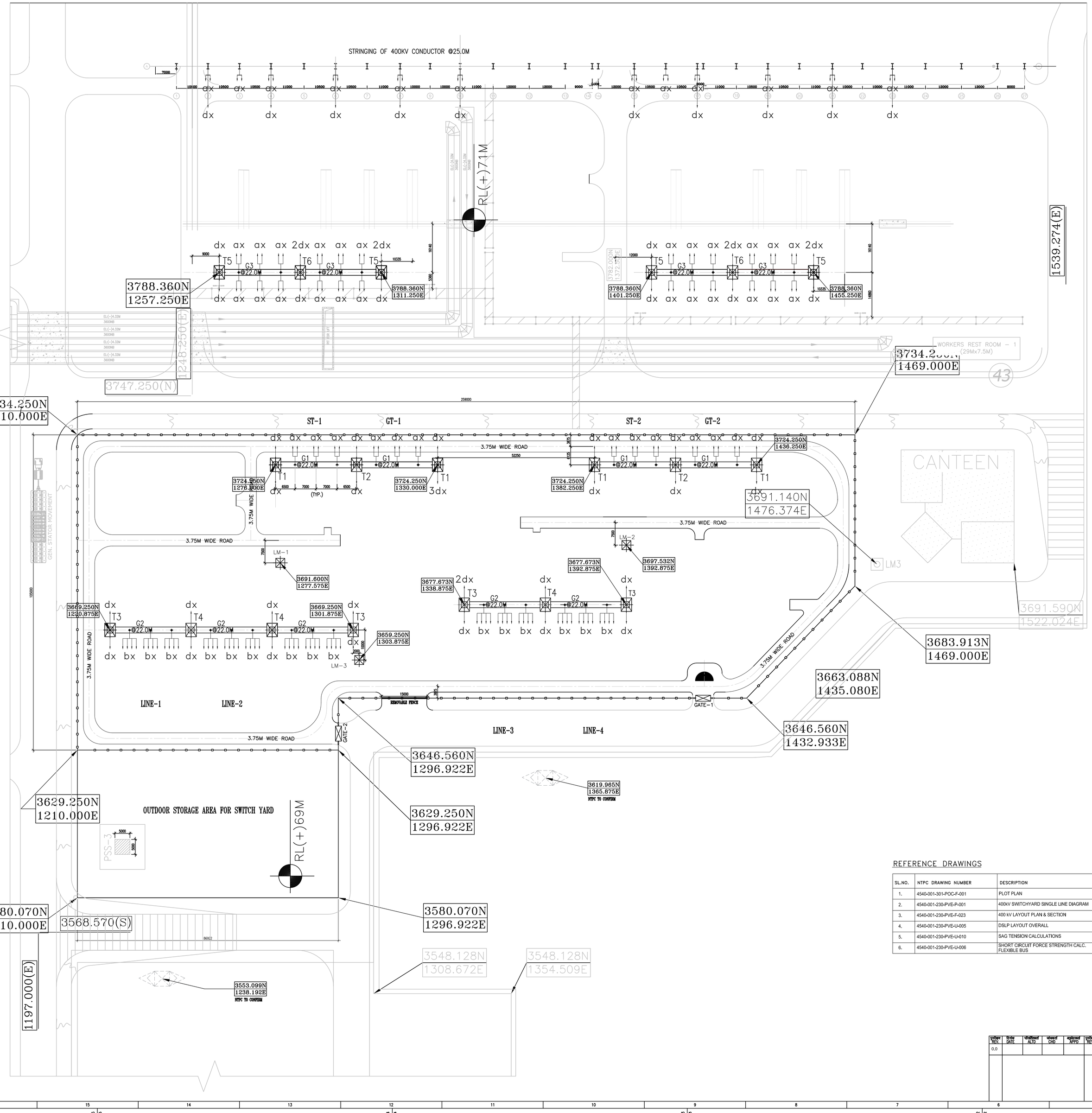
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03	07.02.24	PC	RD	VK
DOCUMENT REVISED TO INCLUDE UPDATED ROAD, GIS & 33kV SW GR BUILDING LAYOUTS				
02	06.09.23	PC	RD	VK
DOCUMENT REVISED IN LINE WITH NTPC COMMENTS DT 07.02.23 & UPDATED TRAFO YARD LAYOUT				

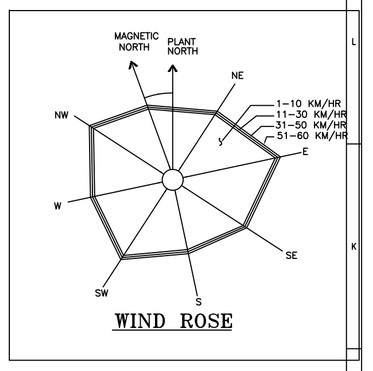
शीर्षक/TITLE: 400kV GIS SWITCHYARD LAYOUT PLAN AND SECTION

विभाग DEPT.	स्केल – SCALE–	ड्राइंग संख्या / DRAWING NO.
हस्ताक्षर SIGN		4540-001-230-PVE-F-023
दिनांक DATE		शीट SHEET 2 OF 2 · पुनरीक्षण REV. 03

फॉर्मेट साइज़ A0
FORMAT SIZE A0

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It must not be used directly or indirectly in any way detrimental to the interest of the company/इसका उपयोग प्रत्यक्ष या अप्रत्यक्ष रूप से कंपनी के हितों के प्रति हानिकारक नहीं होना चाहिये





WIND ROSE

STRUCTURE LOADING 400kV

NOTATION	NO. AND TYPE OF CONDUCTOR & SHIELD WIRE PER PHASE	NORMAL TENSION PER PHASE (kg)	S/C TENSION PER PHASE (kg)	SPACER SPAN (m)
ax	TWIN ACSR MOOSE	6000 (VERT DEVIATION – IN VERT. DIRECTION) (LONG DEVIATION – IN HORZ. DIRECTION)	9700	3.5
bx	QUAD ACSR MOOSE	6000* (VERT DEVIATION – IN VERT. DIRECTION) (LONG DEVIATION – IN HORZ. DIRECTION)	--	--
dx	SHIELD WIRE	800 (±50° DEVIATION)	NA	NA

* LINE SIDE CONDUCTOR DETAILS CONSIDERED FOR TAKE-OFF BEAM DESIGN ARE AS FOLLOWS :
- CONDUCTOR : QUAD ACSR MOOSE
- NORMAL TENSION : 1.5T PER SUB-CONDUCTOR
  CUSTOMER TO CONFIRM THE LINE CONDUCTOR TYPE

DETAILS OF SWITCHYARD STRUCTURES

TOWER/GANTRY TYPE DESIGNATION	DESCRIPTION	HEIGHT OF TOWER FROM PLINTH/ LENGTH OF BEAM (MM)	QTY (NOS.)
T1	30.5M HEIGHT END TOWER WITH PEAK 8.5M SUPPORTING ONE GIRDER G1 AT 22.0M HEIGHT	30500(22000 + 8500)	4
T2	30.5M HEIGHT MIDDLE TOWER WITH PEAK 8.5M SUPPORTING GIRDER G1 ON EACH SIDE AT 22.0M HEIGHT	30500(22000 + 8500)	2
T3	30.5M HEIGHT END TOWER WITH PEAK 8.5M SUPPORTING ONE GIRDER G2 AT 22.0M HEIGHT	30500(22000 + 8500)	4
T4	30.5M HEIGHT MIDDLE TOWER WITH PEAK 8.5M SUPPORTING GIRDER G2 ON EACH SIDE AT 22.0M HEIGHT	30500(22000 + 8500)	3
T5	30.5M HEIGHT END TOWER WITH PEAK 8.5M SUPPORTING ONE GIRDER G3 AT 22.0M HEIGHT	30500(22000 + 8500)	4
T6	30.5M HEIGHT MIDDLE TOWER WITH PEAK 8.5M SUPPORTING GIRDER G3 ON EACH SIDE AT 22.0M HEIGHT	30500(22000 + 8500)	2
G1	GIRDER OF SPAN 27.0M SUPPORTING THREE PHASES WITH CONDUCTOR TENSION OF 6T EACH UNER NORMAL CONDITION & 9.7T EACH UNDER SHORT CIRCUIT, ±30° DEVIATION – IN HORZ. DIRECTION ±20° DEVIATION – IN VERT. DIRECTION	27000	4
G2	GIRDER OF SPAN 27.0M SUPPORTING THREE PHASES WITH CONDUCTOR TENSION OF 6T EACH UNER NORMAL CONDITION SUITABLE FOR 200.0 M SLACK SPAN, ±30° DEVIATION – IN HORZ. DIRECTION ±20° DEVIATION – IN VERT. DIRECTION	27000	5
G3	GIRDER OF SPAN 27.0M SUPPORTING THREE PHASES WITH CONDUCTOR TENSION OF 6T EACH UNER NORMAL CONDITION & 9.7T EACH UNDER SHORT CIRCUIT, ±30° DEVIATION – IN HORZ. DIRECTION ±20° DEVIATION – IN VERT. DIRECTION	27000	4

CONDUCTOR & STRINGING DETAILS :-

		400kV	
SL.NO.	DESCRIPTION	CONDUCTOR DETAIL	CONNECTION HEIGHT (ABOVE PLINTH LEVEL)
1.	EQUIPMENT INTERCONNECTION	4.0" IPS (EHI) AL. TUBE/ MOOSE CONDUCTOR	10 mtr. in Switchyard
2.	JACK BUS ON GT/ST SIDE	TWIN ACSR MOOSE CONDUCTOR	22 mtr.
3.	JACK BUS ON INTERCONN/LINE SIDE	TWIN/QUAD ACSR MOOSE CONDUCTOR	22 mtr.
4.	EARTHWIRE	7/3.66mm SHIELD WIRE	30.5 mtr
5.	DROPPER ON CVT, LA	TWIN ACSR MOOSE CONDUCTOR	-

NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. ALL STRUCTURE/CONDUCTOR HEIGHTS ARE ABOVE PLINTH LEVEL. PLINTH LEVEL IS 300 MM ABOVE F.G.L.
3. DEAD END TOWERS LOCATION TO BE CONFIRMED BY NTPC. NORTHING COORDINATE AS SHOWN SHOULD BE FIXED.
4. SUPPLY AND STRINGING OF 400kV LINE CONDUCTOR, SHIELD WIRE, INSULATOR AND HARDWARE BETWEEN 400kV DEAD END TOWER AND SWITCHYARD TERMINAL GANTRY ARE NOT IN BHEL SCOPE. HOWEVER, JUMPERING FOR THE RESPECTIVE EQUIPMENT, JUMPERS & HARDWARE REQUIRED FOR JUMPERS ARE IN SCOPE OF BHEL.
5. FOR ALL INCOMING AND OUTGOING TRANSMISSION LINES, CONDUCTOR SPAN SHALL BE TAKEN AS 200 M SLACK SPAN FOR DESIGN.
6. ROADS SHALL BE AS PER APPROVED LAYOUT PLAN.
7. FIXING ARRANGEMENT WOULD BE DOUBLE TENSION HARDWARE WITH DOUBLE ANCHORING POINTS.
8. ANCHORING POINT SPACING IN EACH PHASE SHALL BE 450 MM.
9. DRAWING SHALL BE READ ONLY FOR TOWER AND GANTRY INPUTS. FOR LOCATION OF TOWERS, ROADS, FENCE ETC. LAYOUT SHALL BE REFERRED.

LEGEND:

———	FUTURE/ NOT IN BHEL SCOPE.
———	PRESENT/ BHEL SCOPE
·	TO BE CONFIRMED BY CUSTOMER

REFERENCE DRAWINGS

SL.NO.	NTPC DRAWING NUMBER	DESCRIPTION
1.	4540-001-301-POC-F-001	PLOT PLAN
2.	4540-001-230-PVE/P-001	400kV SWITCHYARD SINGLE LINE DIAGRAM
3.	4540-001-230-PVE/F-023	400 kV LAYOUT PLAN & SECTION
4.	4540-001-230-PVE/U-005	DSLP LAYOUT OVERALL
5.	4540-001-230-PVE/U-010	SAG TENSION CALCULATIONS
6.	4540-001-230-PVE/U-006	SHORT CIRCUIT FORCE STRENGTH CALC. FLEXIBLE BUS

ग्राहक ड्राइंग संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-024
एन टी पी सी NTPC	ग्राहक/CUSTOMER: एन टी पी सी लिमिटेड N T P C LIMITED
	परियोजना PROJECT: TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)
Designed by	भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP नोएडा (उ॰प्र॰)/NOIDA (U.P.)

कार्य संख्या-JOB NO. 419
स्थिति STATUS CONTRACT
मुद्रण स्केल मीटर में PRINT SCALE IN METRE 0.2 0.4 0.6 1.0 2.0 3.0 4.0 5.0

DEPT CODE		नाम NAME	हस्ताक्षर SIGNATURE	दिनांक DATE
M	तैयारकर्ता/DRN	PC		05.04.2023
	डिजाइनकर्ता/DESN	PC		05.04.2023
	परीक्षकर्ता/CHD	RD		05.04.2023
	अनुमोदनकर्ता/APPD	LK		05.04.2023

शीर्षक/TITLE
400kV GIS SWITCHYARD STRUCTURE LAYOUT

विभाग DEPT.	स्केल – SCALE–
हस्ताक्षर SIGN	
दिनांक DATE	

ड्राइंग संख्या/ DRAWING NO.: 4540-001-230-PVE-F-024
शीट SHEET 1 OF 1
पुनरीक्षण REV. 00

पुनरीक्षण REV.	दिनांक DATE	परीक्षकर्ता CHD	अनुमोदनकर्ता APPD	पुनरीक्षण REV.	दिनांक DATE	परीक्षकर्ता CHD	अनुमोदनकर्ता APPD	पुनरीक्षण REV.	दिनांक DATE	परीक्षकर्ता CHD	अनुमोदनकर्ता APPD
0.0											

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FORMAT SIZE A0

एन टी पी सी लिमिटेड
(भारत सरकार का उद्यम)
NTPC Limited
(A Govt. of India Enterprise)
(Formerly National Thermal Power Corporation Ltd.)
(केंद्रीय कार्यालय नोएडा)
Corporate Center NOIDA

Reference : CC-ENGG-4540-001-230-PVE-W-029 **Date :** 18/03/2023

From : Subodh Pandit ADDL. GENERAL MANAGER	**To :** BHARAT HEAVY ELECTRICALS LTD NEW DELHI 110049 IN **Cc :** sisodia@bhel.in

Subject : EPC TTPP3 (2x660MW)

Please find enclosed following drawings/ documents for necessary action at your end.

Vendor Drg. No.	:	TB-419-316-006
Orgn. Drg. No.	:	4540-001-230-PVE-W-029
Revision No.	:	01
Drg. Title	:	EQUIPMENT EARTHING PHILOSOPHY & DETAILS
App. Category	:	CAT-I
Release Date	:	18/03/2023

Scan to verfiy

Comments : No Comments

COMMENT RESOLUTION SHEET			
DRG / DOC TITLE	**Equipment Earthing Philosophy & Details**		
NTPC DRG / DOC NO.	**4540-001-230-PVE-W-029**		
400kV GIS SWITCHYARD			
SN	**Page No.**	**NTPC Observations / Comments**	**BHEL Reply**
1	01	Earthing Details/Philosophy for GIS Hall & its equipment, Control building & its equipment to be furnished	Earthing Details/Philosophy for GIS Hall & its equipment shall be furnished separately along with GIS vendor drawings. Earthing Details/Philosophy for Control Building & its equipment shall be furnished in Earthmat layout
2	01	The earthing of the lighting fixtures shall be carried out by 16 SWG wire	Confirmed; Shall be shown in illumination drawings.
3	01	Earthing conductor along their run-on cable trench ladder columns, beams, walls, etc. shall be supported by suitable welding/cleating at intervals of 750mm	Confirmed.
4	1A	Wherever Earthing Conductor passes through walls, floors etc. galvanized iron sleeves shall be provided for the passage of the conductor. Both ends of the sleeves shall be sealed to prevent the passage of water through the sleeves.	Confirmed.
5	1A	Earthing conductors embedded in the concrete fibre shall have approximately 50mm concrete cover	Confirmed.
6	2A	Also BHEL to consider clamping type bolted to earthing flat	Confirmed; Cleat Clamps shall be bolted to earthing flat.
7	2A	Shall be clamped at interval of 750mm	Confirmed.
8	2B	Shall be clamped at interval of 750mm	Confirmed.
9	03	Shall be clamped at interval of 750mm	Confirmed.
10	04	Cable Cross-section	70 sq mm updated in revised document.
11	04	Shall be clamped at interval of 750mm	Confirmed.
12	05	We understand that the tower represents 50Mtr Direct Stroke Lightening Protection Mast used for Lightening protection. Pls clarify	Confirmed.
13	07	Transformer neutral shall be grounded through copper flats	Updated in revised drawing.
14	07	Indicate holes in GI pipe	Updated in revised drawing.
15	07	Indicate the dimension	Updated in revised drawing.
16	07	Pipe Earthing shall conform to IS 3043	Confirmed.
17	07	GI Pipe shall conform to IS 1239	Confirmed.
18	07	What shall be resistance of earth pit to be achieved without connection to main earth mat.	Resistance with earth pit Indicated in Earthing sizing calculations.

COMMENT RESOLUTION SHEET			
DRG / DOC TITLE	**Equipment Earthing Philosophy & Details**		
NTPC DRG / DOC NO.	**4540-001-230-PVE-W-029**		
400kV GIS SWITCHYARD			
SN	**Page No.**	**NTPC Observations / Comments**	**BHEL Reply**
19	10A	Neutral of Transforme/ Reactor shall be brought through insulated support from tank to the ground level with copper flat for connection to ground network	Shall be shown in the Transformer/ Reactor drawing
20	10A	Copper flat	Updated in revised drawing.
21	10B	Copper flat	Updated in revised drawing.
22	12	Shall be clamped at interval of 750mm	Confirmed.
23	13	Mention cross section of flexible	300 sq mm updated in revised document.
24	13	Span of cleat clamp shall be 0.75cm	Confirmed.
25	15	Shall be 150mm as per spec	Confirmed.
26	16	Auxiliary conductor shall be 200mm long for supporting the riser conductor & shall be 40 mm dia.	Confirmed; Already indicated in plan view above.
27	16	Conductor overlapping shall be 150mm minimum.	Confirmed.

FIRST ANGLE PROJECTION ALL DIMENSIONS ARE IN MM

DRAWING NO. TB-397-316-021

LEGEND

⟶	CONNECTION TO GROUND MAT THROUGH RISER
⟶⊗ RE	CONNECTION TO ROD ELECTRODE WITH NON- TREATED PIT.
⟶⊗ PE	CONNECTION TO PIPE ELECTRODE WITH TREATED EARTH PIT
———	75x12mm GS FLAT
- - - -	50x6mm GS FLAT
▬▬▬	40mm DIA MS ROD

GENERAL NOTES:

1. EARTH STRIP CLEATED TO LATTICE /PIPE TYPE STRUCTURE AT AN INTERVAL OF 0.75M SUITABLE PROVISION SHALL BE MADE WITH SUPPORT STRUCTURE.
2. ALL EARTH STRIPS SHALL BE TAKEN ALONG EDGE OF STRUCTURE. ALL DRAWING SHOWS TYPICAL ARRANGEMENT ONLY.
3. ALL STRUCTURES/EQUIPMENTS SHALL BE EARTHED AS SHOWN IN THE FOLLOWING SHEETS.
4. BOLT SIZE FOR CONNECTING EARTHING FLAT TO THE EQPT/STRUCTURE SHALL BE TO SUIT RESPECTIVE HOLE SIZE.
5. ALL EARTHING SHALL BE DONE IN ACCORDANCE WITH IS:3043 UNLESS OTHERWISE STATED IN TECHNICAL SPECIFICATION
6. EACH RISER OF A PARTICULAR EQUIPMENT SHALL BE CONNECTED TO A DIFFERENT EARTHROD (EITHER HORIZONTAL OR VERTICAL CONDUCTORS OF MAIN EARTHMAT).
7. FOR WELDING DETAILS REFER SHEET #15 & 16.
8. E/WIRE DOWN CONDUCTOR SHALL BE CLEATED AT AN INTERVAL OF 2.0 M ALONG WITH STRUCTURE .

SHEET NO.	DESCRIPTION
01.	TITLE
1A.	NOTES
2A.	400kV LINE CVT (WITH LMU)
2B.	400kV CVT (WITHOUT LMU)
03.	400kV POST INSULATOR (SOLID CORE TYPE)
04.	336kV LIGHTNING ARRESTER
05.	TOWER WITH PEAK
06.	CABLE TRENCH
07	PIPE EARTH ELECTRODE WITH TREATED PIT
08.	ROD ELECTRODE WITH TEST PIT
09.	RAIL BONDING
10A.	BUS REACTOR
10B.	SWITCHYARD SERVICE TRANSFORMER
11.	CONTROL AND RELAY PANELS/BATTERY CHARGER/ AC DC BOARDS/MLDB
12.	400KV WAVE TRAP
13.	GATE/FENCE POST
14.	TYPICAL ARRANGEMENT OF BOLTED JOINTS
15.	WELDING DETAILS
16.	WELDING DETAILS

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FILE NAME : 100_M03R0

NTPC DRG. No. 4540-001-230-PVE-W-029

PROJECT: TALCHER THERMAL POWER PROJECT STAGE- III (2X660MW)

OWNER: NTPC LTD.

JOB NO. 419
STATUS CONTRACT
DISTRIBUTION
TD
No. OF

QBTGM: BHARAT HEAVY ELECTRICALS LTD, TRANSMISSION BUSINESS GROUP, NOIDA

DEPT CODE		NAME	SIGN	DATE
M	DESN	PC		06.12.22
	CHD	RD		06.12.22
	APPD	VK		06.12.22

REV.	DATE	ALTD	CHD	APPD
01	06.03.23	PC	RD	VK

UPDATED AS PER NTPC COMMENTS

TITLE: 400 kV – AIS EQUIPMENT EARTHING PHILOSOPHY & DETAILS

DEPT. SIGN DATE | SCALE

DRAWING NO. TB-419-316-006

SHEET 01 OF 19 REV. 01

FORMAT SIZE A4

1. RISER FROM THE EARTH GRID SHALL BE 40MM DIAMETER MILD STEEL ROD. RISER SHALL RISE FROM THE GROUND ALONG THE NEAREST EQUIPMENT FOUNDATION/BUILDING COLUMN/WALL TO AVOID ANY OBSTRUCTION TO MOVEMENT OF PERSONNEL.

2. CONNECTION TO ALL EQUIPMENT AND TOWERS SHALL BE BY BOLTED JOINTS. CONTACT SURFACES SHALL BE THOROUGHLY CLEANED BEFORE CONNECTIONS. EQUIPMENT BOLTED CONNECTIONS AFTER BEING TESTED AND CHECKED SHALL BE PAINTED WITH ANTI CORROSIVE PAINT/COMPOUND.

3. CONNECTIONS BETWEEN EQUIPMENT EARTHING LEADS AND BETWEEN MAIN EARTHING CONDUCTORS SHALL BE OF WELDED TYPE. FOR RUST PROTECTION THE WELDS SHOULD BE TREATED WITH RED LEAD COMPOUND AND AFTERWARDS THICKLY COATED WITH BITUMEN COMPOUND.
   THE SURFACES TO BE WELDED SHALL BE CLEANED OF DIRT, OIL, GREASE AND OXIDES BEFORE WELDING.
   ANY OXIDE FILMS THAT MAY HAVE FORMED DURING WELDING MUST BE REMOVED FROM THE WELDED JOINT.

4. EARTHING CONDUCTOR FOR EQUIPMENT SHALL BE OF GALVANISED M.S. OF SIZE 75x12/50x6 mm.
   THE CONDUCTOR BELOW THE GROUND LEVEL SHALL BE 40 mm DIA BLACK MS ROD.

5. IN THE ATTACHED DRAWINGS GL REPRESENTS GROUND LEVEL.

6. ALL EQUIPMENT STRUCTURES, CABLE TRENCHES & TOWERS SHALL BE EARTHED AT TWO POINTS WITH 75x12 mm. G.S. FLAT EVEN THOUGH THEY ARE SHOWN OR NOT IN THE DRAWING DUE TO CLARITY.

7. ALL JUNCTION BOXES, MECHANISM BOXES, GROUND MOUNTED CONTROL CABINETS, CUBICLES, PANELS, MBs ETC. SHALL BE EARTHEDAT TWO POINTS WITH 50x6mm G.S. FLAT BY TWO SEPARATE AND DISTINCT EARTH CONNECTERS.

8. EARTHING CONDUCTORS FROM EQUIPMEMT STRUCTURES SHALL BE CONNECTED TO THE NEAREST POSSIBLE EARTH MAT RISER. EQUIPMENT EARTHING SHALL BE AS PER IS 3043.

9. ALL JOINTS BETWEEN 40 DIA M.S. ROD AND 75x12 mm. G.S. FLAT SHALL BE BELOW GROUND LEVEL.

10. FOR WELDED JOINTS LOW HYDROGEN CONTENT ELECTRODES SHALL BE USED.

11. METTALIC SHEATHS/SCREENS, AND ARMOUR OF MULTI CORE CABLES SHALL BE EARTHED AT BOTH ENDS.
    METTALIC SHEATHS AND ARMOUR OF SINGLE CORE CABLES SHALL BE EARTHED AT SWITCHGEAR END ONLY UNLESS OTHERWISE INSTRUCTED BY THE EMPLOYER.

12. EQUIPMENT BOLTED CONNECTIONS AFTER BEING TESTED AND CHECKED SHALL BE PAINTED WITH ANTI CORROSIVE PAINT/COMPOUND.

13. LOCATION OF EARTHING CONDUCTORS/RISERS SHOWN IN THE EARTHING DRAWING MAY CHANGE TO SUIT THE SITE CONDITION.

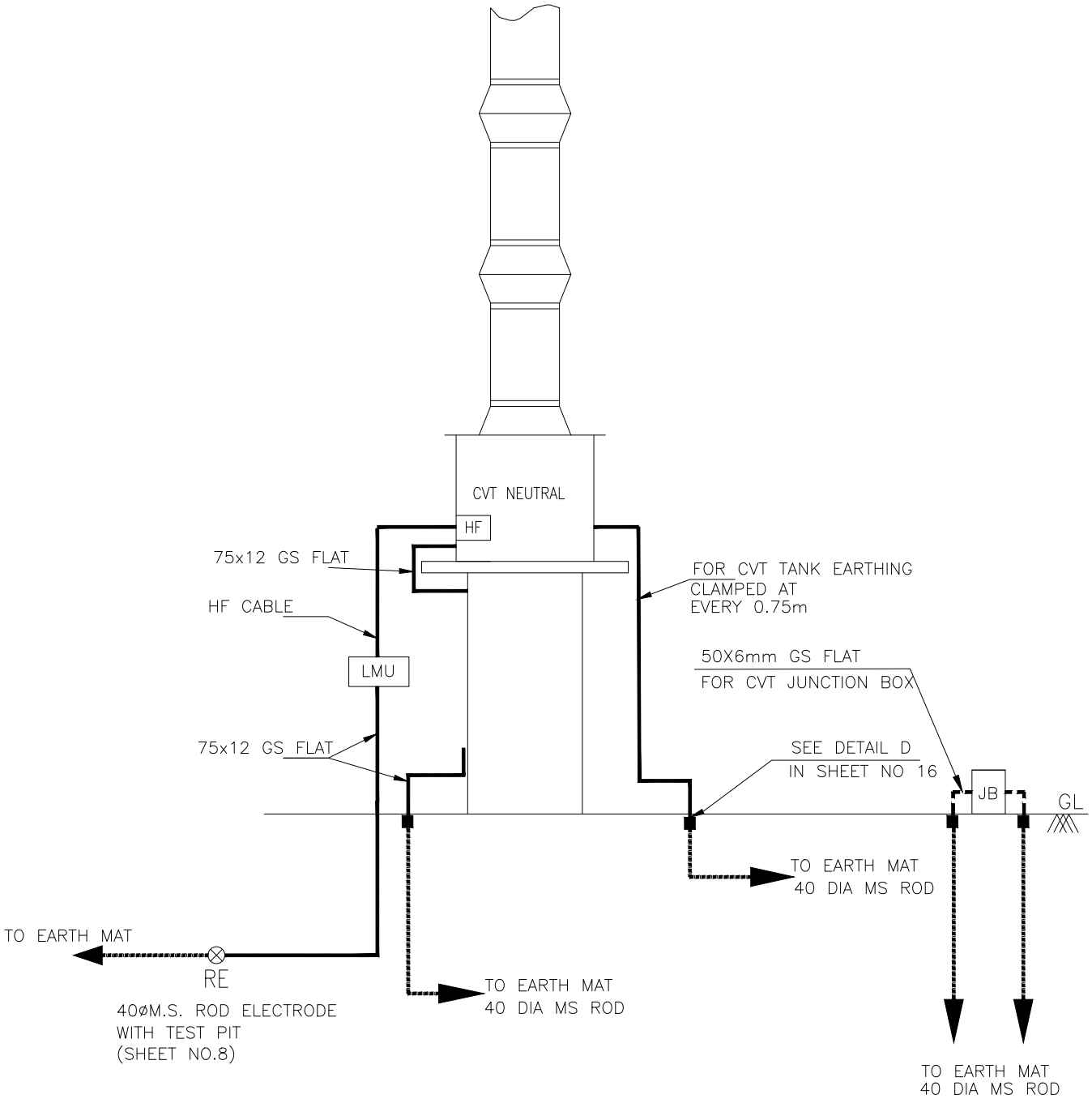
14. FOR SURGE ARRESTER, EARTHING LEAD FROM SURGE COUNTER TO MAIN EARTHMAT SHALL BE SHORTEST IN LENGTH AS PRACTICALLY AS POSSIBLE.

15. ALL NON CURRENT CARRYING METALIC PARTS SHALL BE EARTHED AT TWO DIFFERENT PLACES.
16. ALL EQUIPMENT DRAWINGS SHOWN ARE INDICATIVE ONLY.
17. WELDING OF EARTHING CONDUCTOR SHALL BE CONNECTED IN VERTICAL PLANE WHEREVER POSSIBLE.
18. ALL GROUND CONNECTIONS SHALL BE MADE BY ELECTRIC ARC WELDING.
19. BENDING OF LARGE DIAMETER CONDUCTORS SHALL BE DONE PREFERABLY BY GAS HEATING.

20. WHEREVER EARTHING CONDUCTOR PASSES THROUGH WALLS, FLOORS ETC. GALVANIZED IRON SLEEVES SHALL PROVIDED FOR THE PASSAGE OF THE CONDUCTOR. BOTH ENDS OF THE SLEEVES SHALL BE SEALED TO PREVENT THE PASSAGE OF WATER THROUGH THE SLEEVES.

21. EARTHING CONDUCTORS EMBEDDED IN THE CONCRETE FIBRE SHALL HAVE APPROXIMATELY 50MM CONCRETE COVER

BHEL	EQUIPMENT EARTHING DETAILS NOTES	
	DRG. No. TB–419–316–006	SHEET No. 1A



NOS.OF RISERS

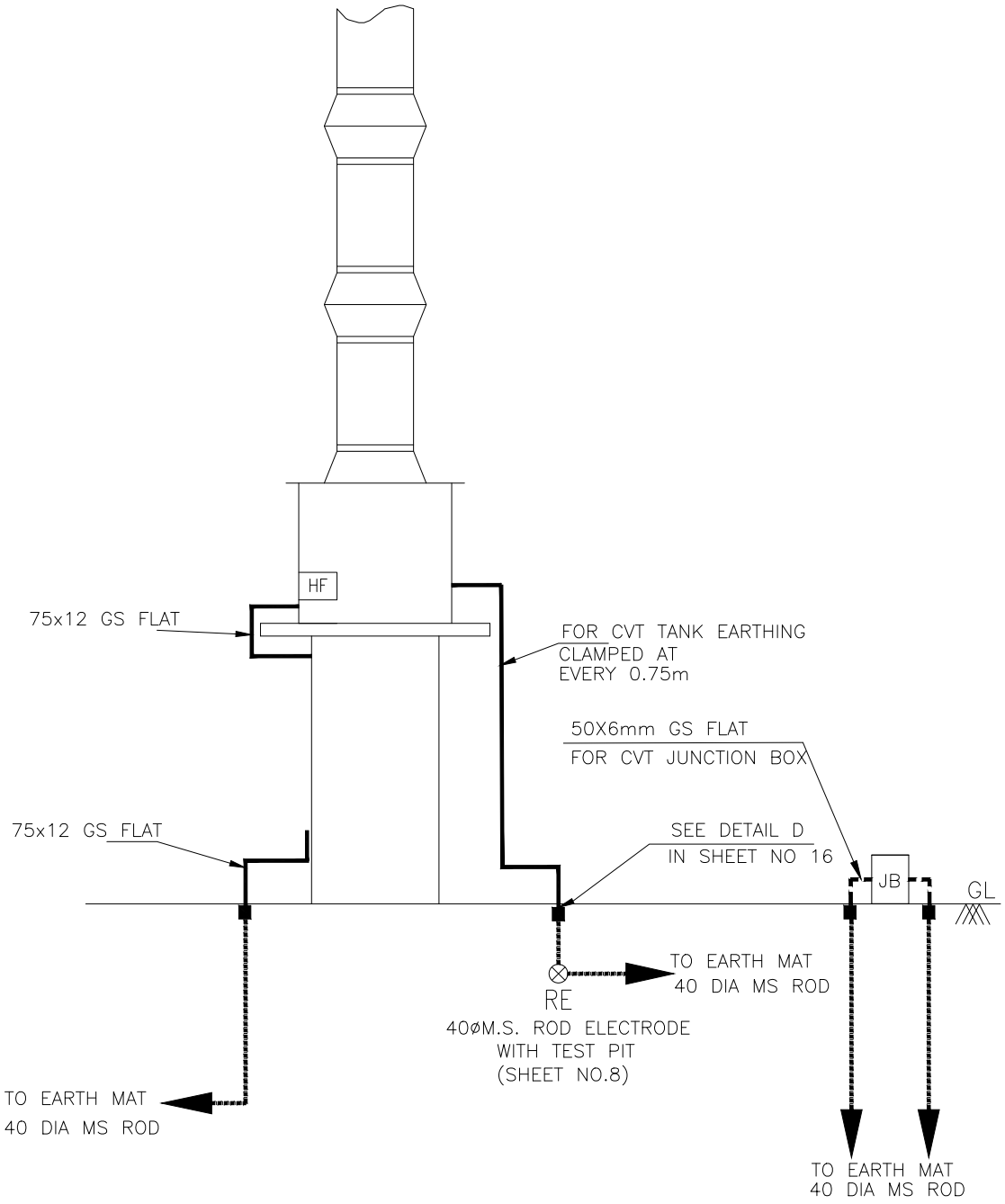
= 2 NOS. PER PHASE

+ 2 NOS. FOR CVT JUNCTION BOX

ROD ELECTRODE = 1 NO. PER CVT (NEUTRAL IS CONNECTED TO GROUND VIA LMU)

EQUIPMENT EARTHING DETAILS
400kV LINE CVT (WITH LMU)

COMPUTERREF.NO.	DRG. No. TB-419-316-006	SHEET No. 2A



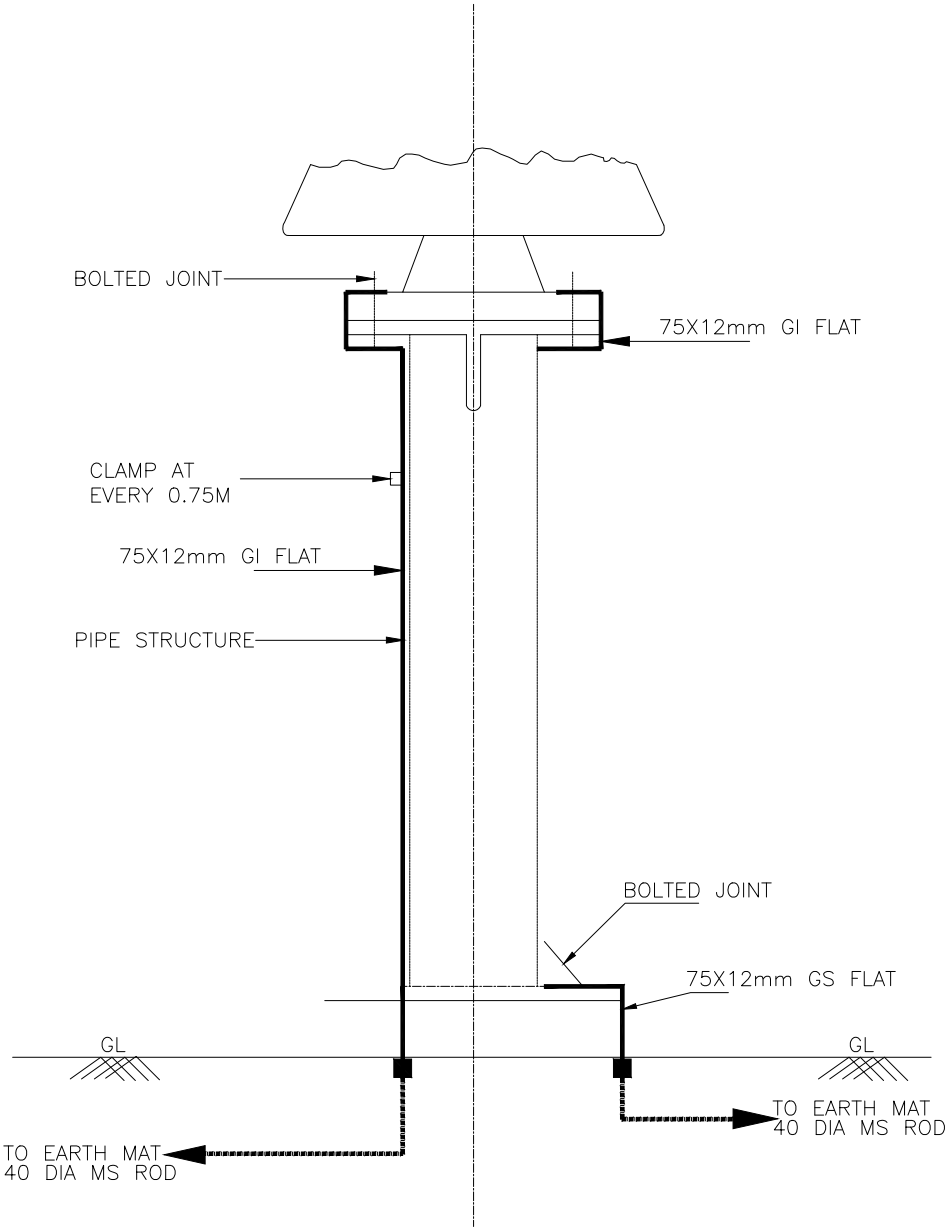
NOS.OF RISERS

= 2 NOS. PER PHASE

+ 2 NOS. FOR CVT JUNCTION BOX

ROD ELECTRODE = 1 NO. PER CVT

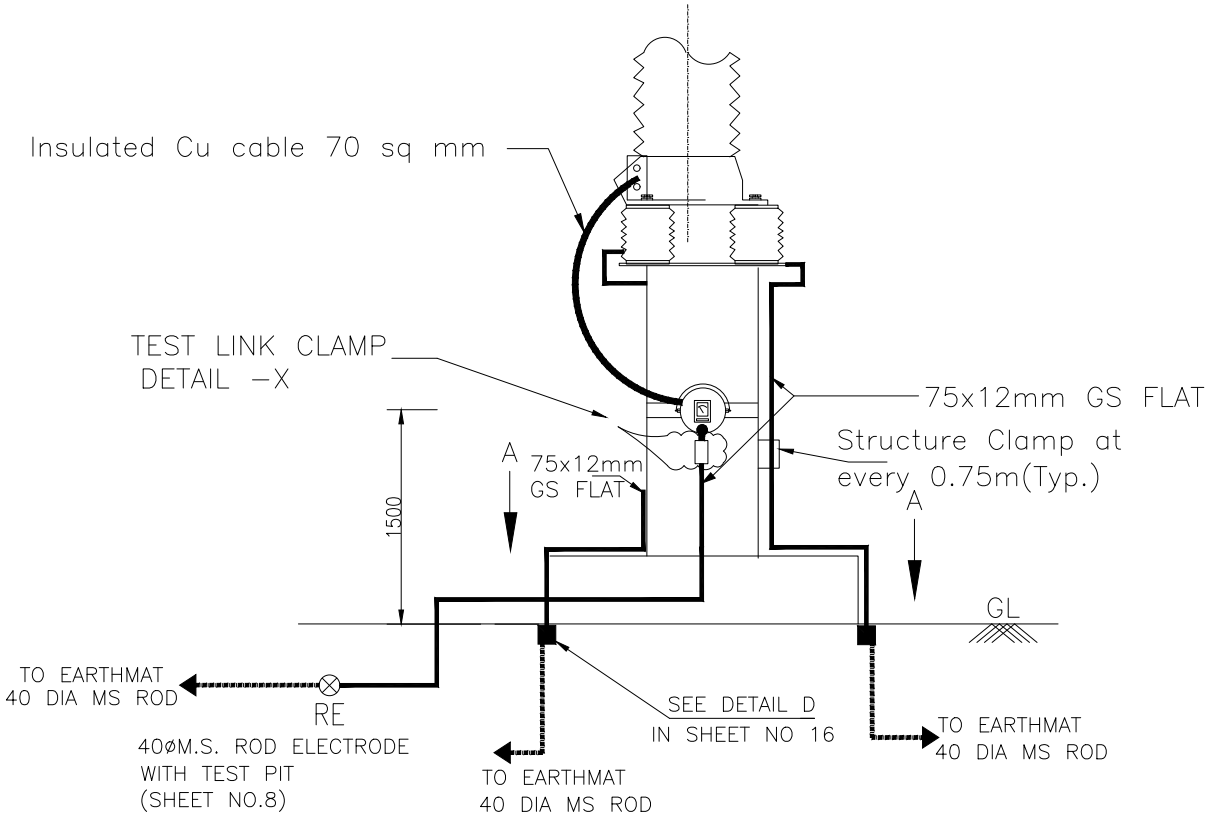
बीएचईएल BHEL	EQUIPMENT EARTHING DETAILS 400kV CVT (WITHOUT LMU)	
COMPUTERREF.NO.	DRG. No. TB-419-316-006	SHEET No. 2B

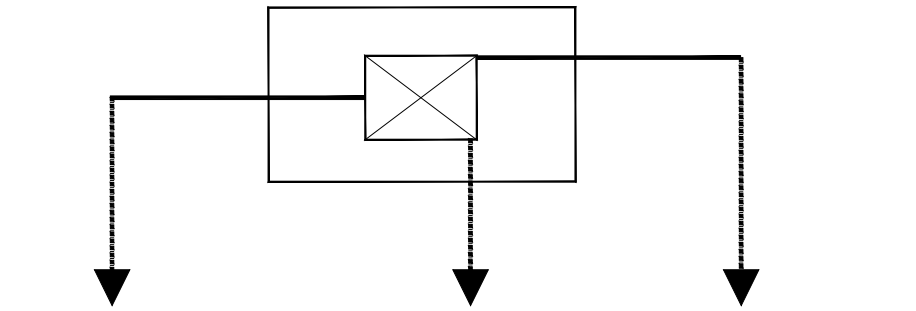


NOS.OF RISERS = 2 NOS.

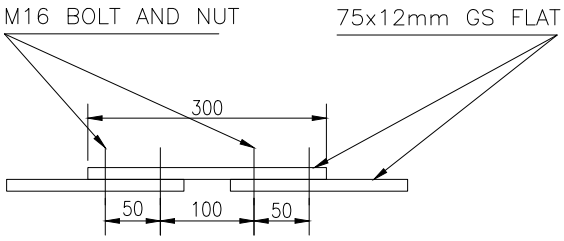
EQUIPMENT EARTHING DETAILS
400kV POST INSULATOR (SOLID CORE TYPE)

DRG. No.	SHEET No.
TB-419-316-006	03





VIEW A–A

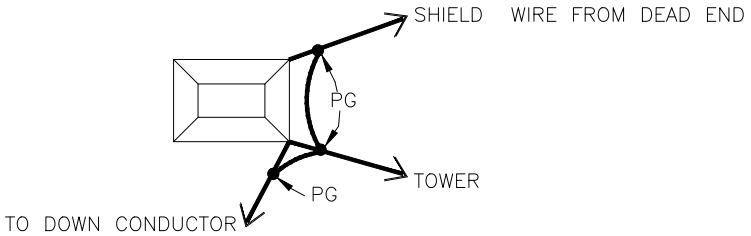


(DETAIL –X)

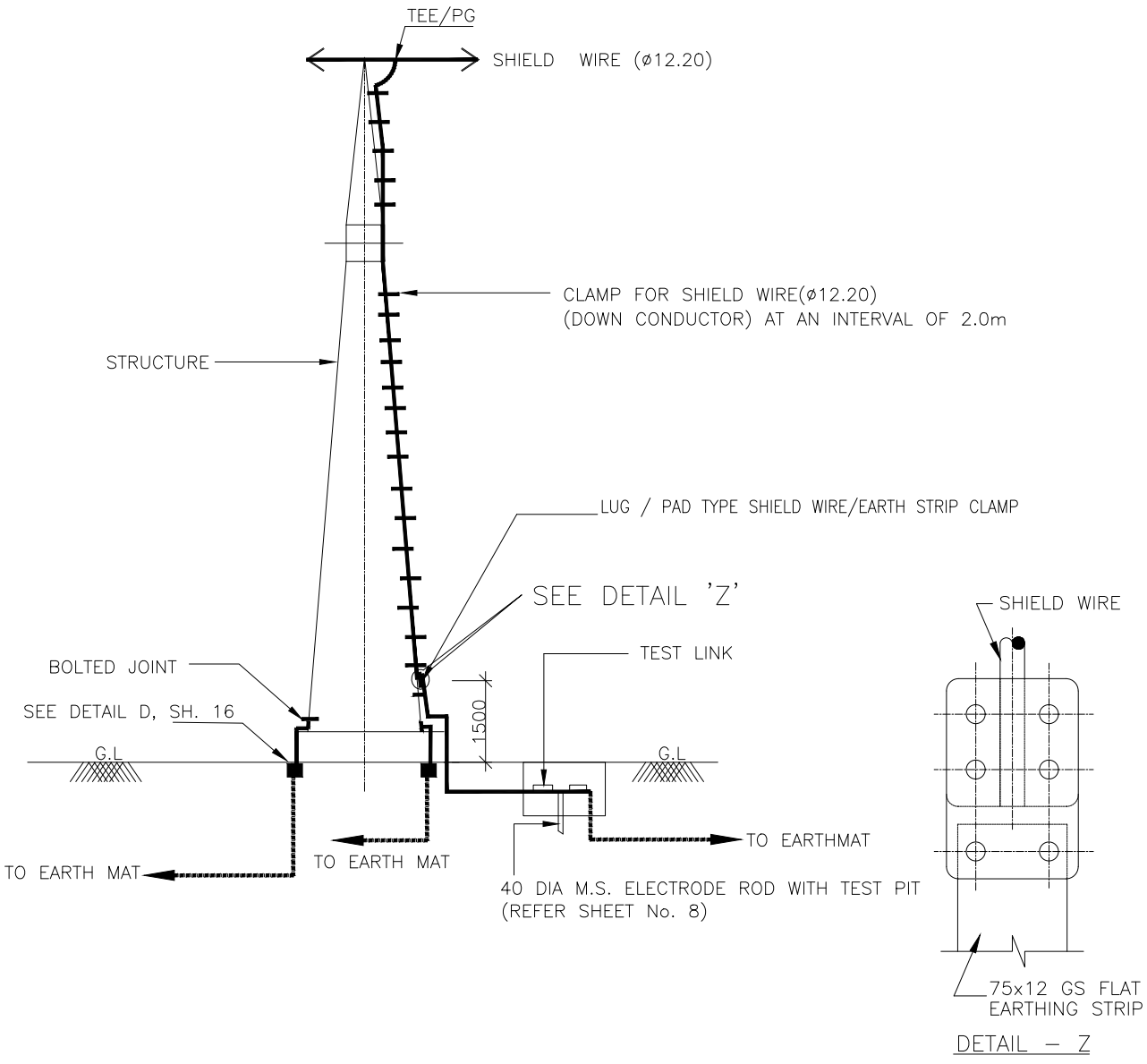
NOTES;

1. LA SHALL BE EARTHED THROUGH EARTH TERMINAL OF SURGE COUNTER
2. NO. OF ROD ELECTRODE : 1 NO.
   NO OF RISERS = 3 NOS.
3. TEST LINK SHALL HAVE PROVISION TO BOLT TEST LEAD BEFORE ISOLATING THE MAIN EARTHING CONNECTIONS (AS PER SKETCH ABOVE) = 1NO.

BHEL	EQUIPMENT EARTHING DETAILS 336kV LIGHTNING ARRESTER	
COMPU. DRG. REF.	DRG.NO. TB–419–316–006	SHEET No. 04



DETAIL WHEN 2 E/WIRES TERMINATES A TOWER

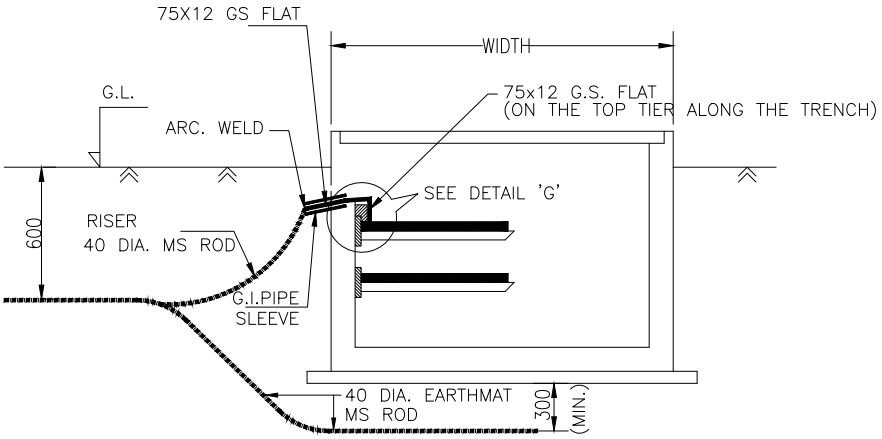


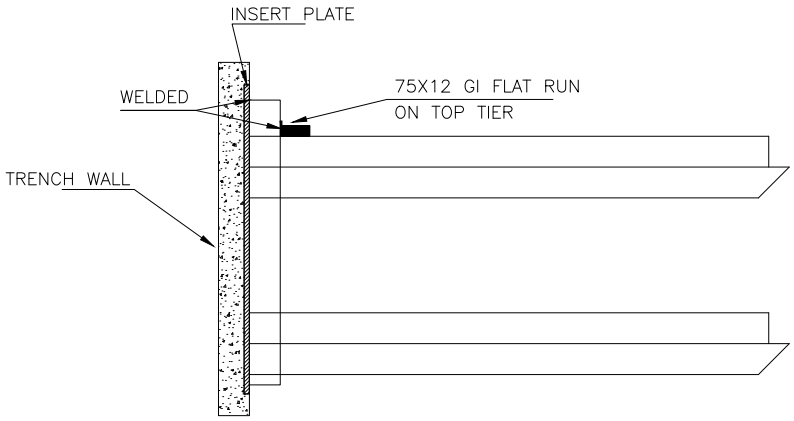
DETAIL – Z

NOTE:

1. TWO EARTHING STRIP SHALL BE CONNECTED TO ONE RISER.
2. NO. OF ROD ELECTRODE : 1 NO. PER TOWER WITH DOWN CONDUCTOR.
3. NO. OF RISERS = 2 NOS.

बीएचईएल BHEL	EQUIPMENT EARTHING DETAILS TOWER WITH PEAK	
COMPUTERREF.NO.	DRG. No. TB–419–316–006	SHEET No. 05





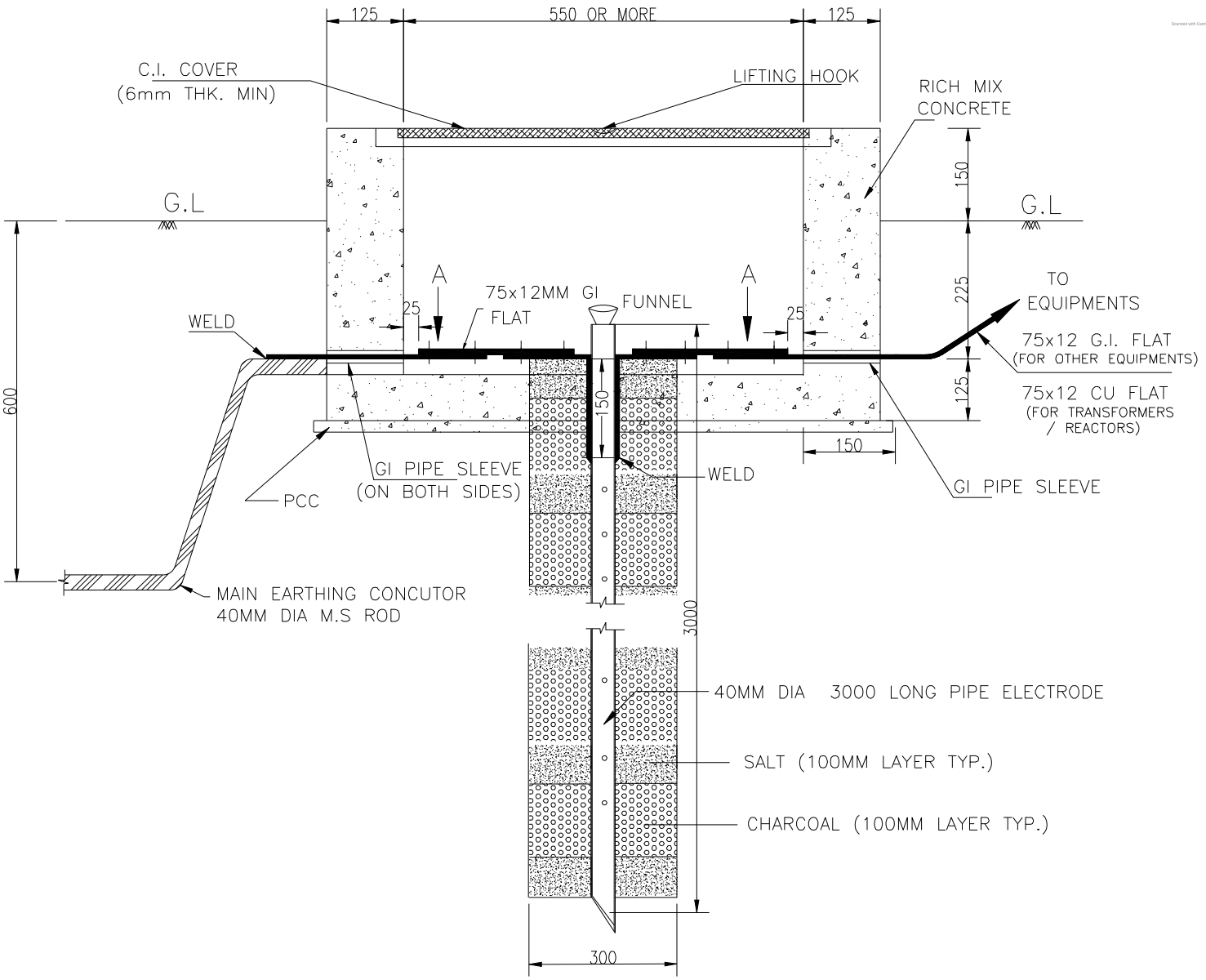
DETAIL 'G'

DETAIL FOR CONNECTING GI FLAT RUNNING
ON TOP TIER TRENCH TO EMBEDDED PLATE.

NOTE:

1. RISERS SHALL BE PROVIDED AT AN INTERVAL OF 20M ALONG THE LENGTH OF TRENCH.
2. THE EARTH STRIP (75x12 G.S. FLAT) SHALL BE WELDED/CLEATED TO TOP RACK ALONG THE TRENCH RUN AT EVERY 0.75M.
3. WHERE THE CABLE RACKS ARE PROVIDED ON BOTH SIDES OF THE TRENCH, BOTH SIDES SHALL BE EARTHED AS PER ABOVE.
4. CABLE & CABLE TRAY EARTHING SHALL BE DONE AS PER SPECIFICATION.

बीएचईएल BHEL	EQUIPMENT EARTHING DETAILS CABLE TRENCH	
COMPU. DRG. REF.	DRG. NO. TB–419–316–006	SHEET 06

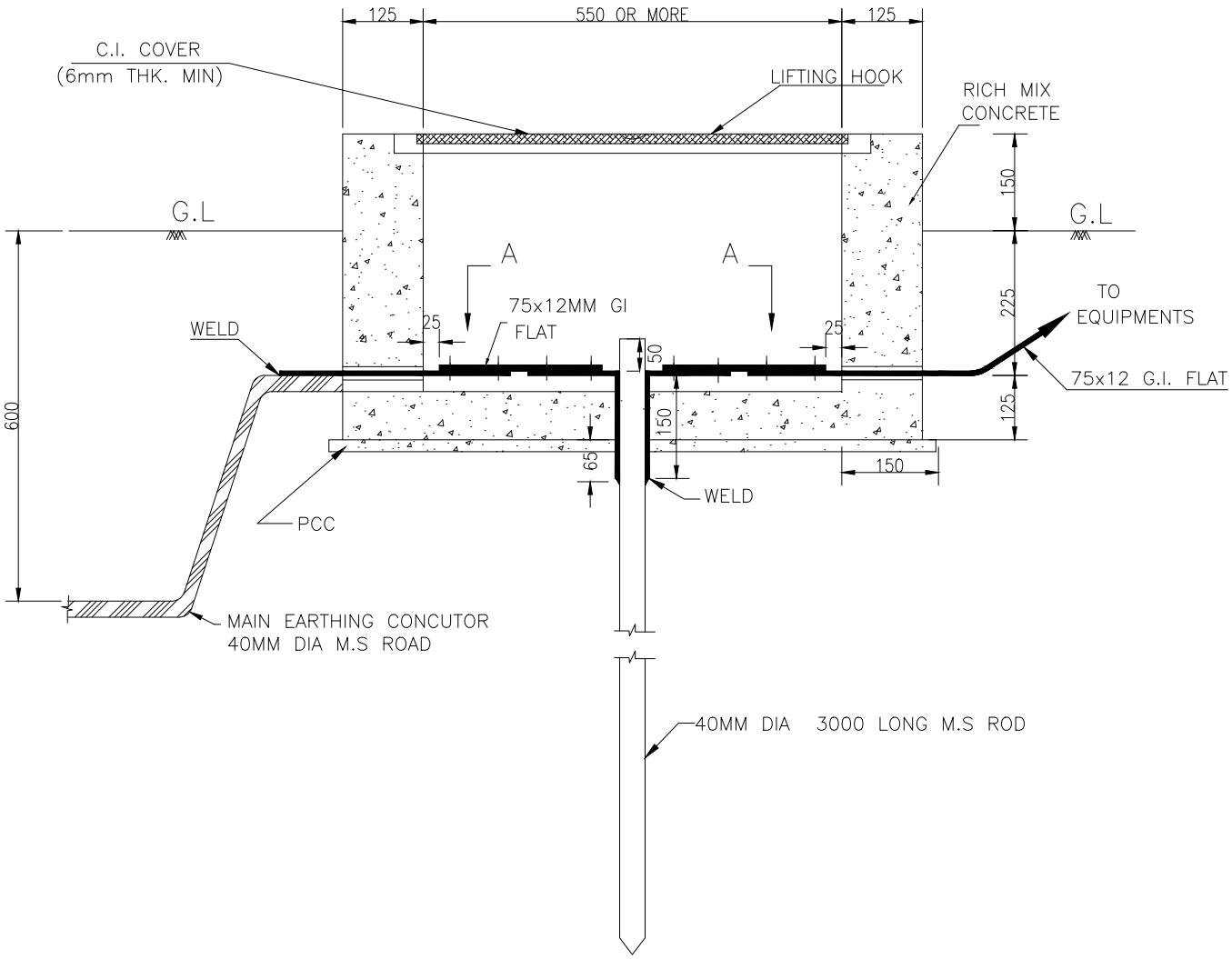


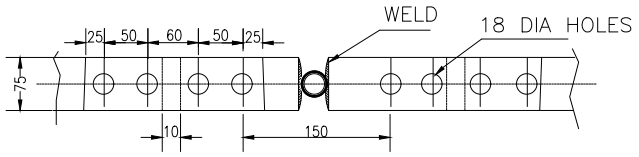
VIEW–'A'

NOTE:

1. SUPPLY OF FIXING BOLTS NUTS & WASHERS FOR GI FLAT EARTHING CONDUCTOR IS ALSO FORMS PART OF THE SCOPE.
2. TO BE USED FOR CONNECTING TRANSFORMER /REACTOR NEUTRAL
3. GI PIPE SHALL CONFORM TO IS 1239.
4. PIPE EARTHING SHALL CONFORM TO IS 3043.

BHEL	EQUIPMENT EARTHING DETAILS PIPE EARTH ELECTRODE WITH TREATED PIT	
COMPU. DRG. REF.	DRG. No. TB–419–316–006	SHEET No. 07





VIEW–'A'

NOTES:–

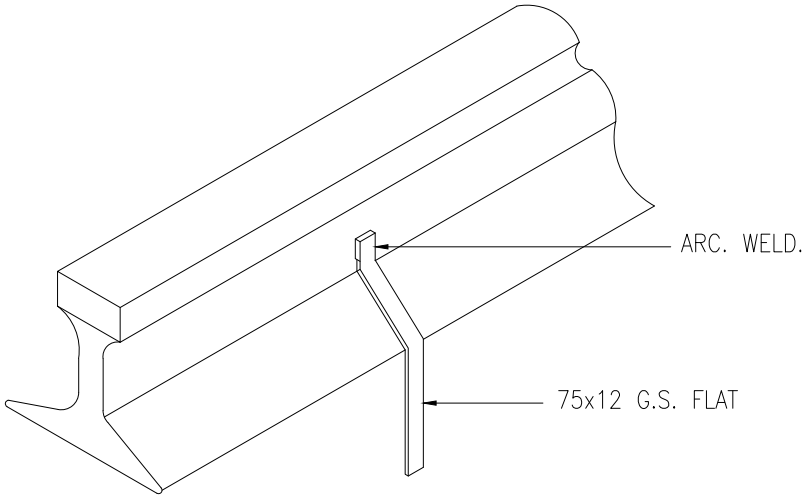
1. SUPPLY OF FIXING BOLTS NUTS & WASHERS FOR GI FLAT EARTHING CONDUCTOR IS ALSO FORMS PART OF THE SCOPE.
2. TO BE USED FOR CONNECTING DOWN CONDUCTOR OF LIGHTINING MASTS & TOWERS WITH PEAK.

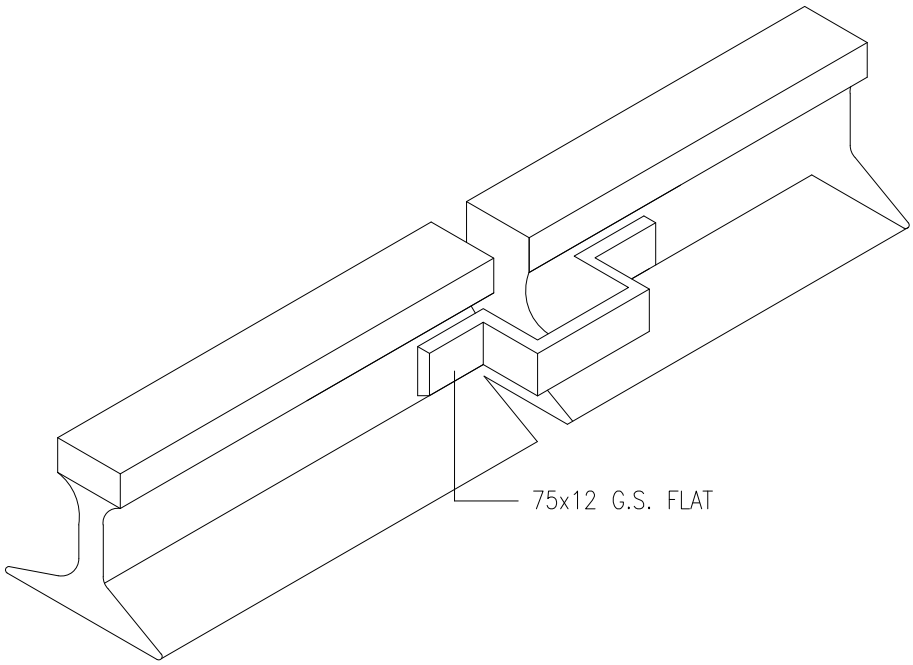
2. ALSO APPLICABLE FOR CVT AND LA.

EQUIPMENT EARTHING DETAILS

ROD EARTH ELECTRODE WITH TEST PIT

COMPU. DRG. REF.	DRG. No.	SHEET No.
	TB–419–316–006	8

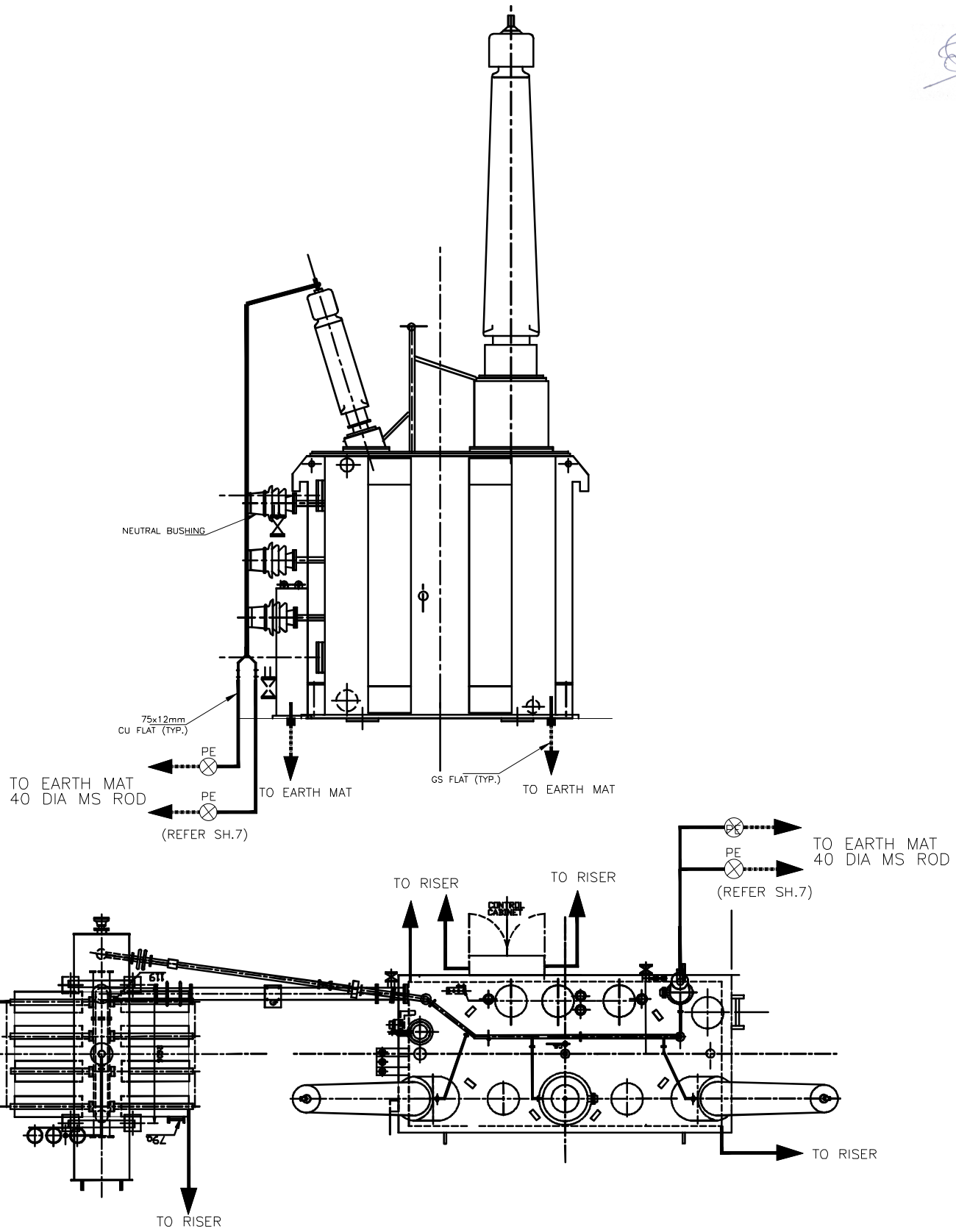




NOTE:—

1. RAILWAY TRACKS WITHIN SWITCHYARD AREA SHALL BE EARTHED AT A SPACING OF 30 m AND ALSO AT BOTH ENDS.

बीएचईएल BHEL	EQUIPMENT EARTHING DETAILS RAIL BONDING	
COMPU. DRG. REF.	DRG. NO. TB—419—316—006	SHEET No. 09



MINIMUM DISTANCE OF 6000MM SHALL BE MAINTAINED BETWEEN TWO TREATED (PIPE) ELECTRODES.

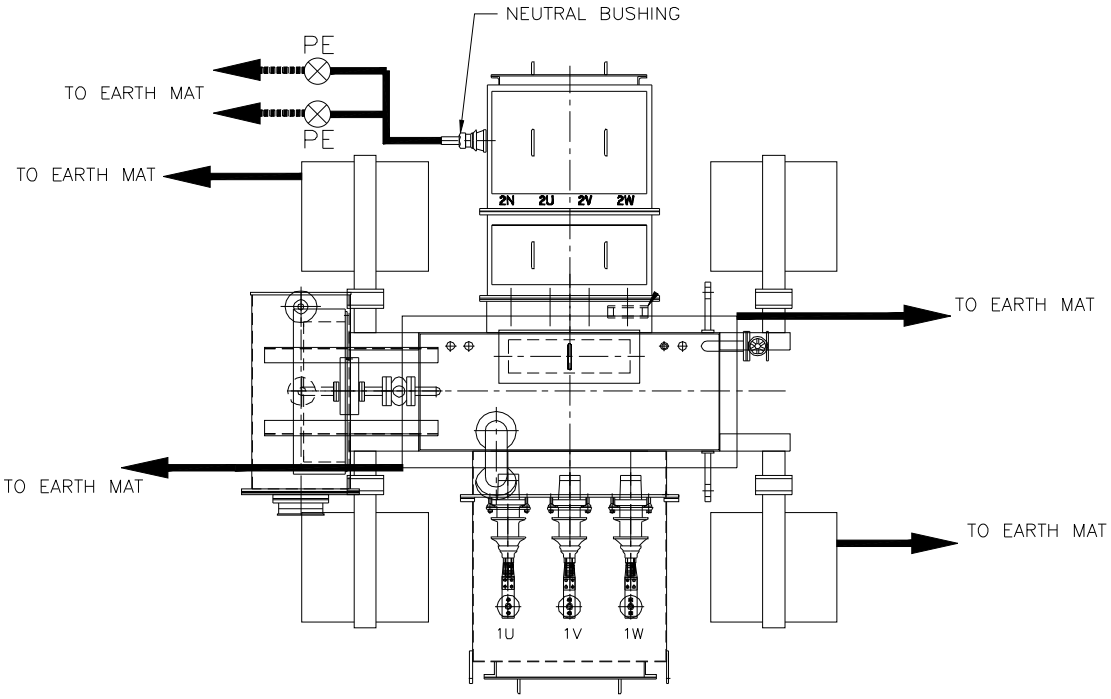
NO. OF PIPE EARTH ELECTRODE WITH TREATED PIT (REFER SHEET NO. 7) = 2 NOS.

NO.OF RISERS = 8 NOS. FOR EARTHING OF FOLLOWING PARTS OF 400KV BUS REACTOR
(TWO EARTHING STRIPS CAN BE CONNECTED TO ONE RISER)

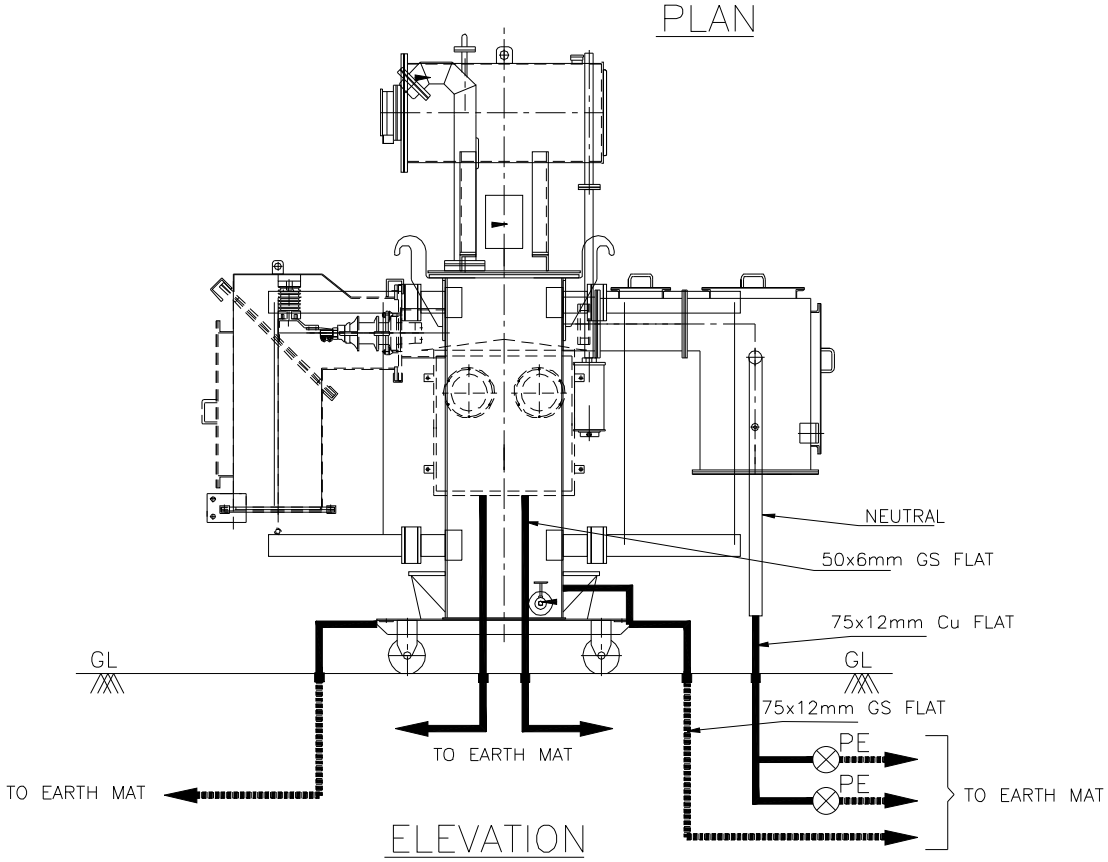
MAIN TANK	– 2 Nos. (75x12 GS FLAT)
RADIATOR SUPPORT	– 2 Nos. (75x12 GS FLAT)
CONTROL CABINET/MB	– 2 Nos. (50x6 GS FLAT)
NEUTRAL EARTHING	– 2 Nos. (75x12 CU FLAT THROUGH PIPE ELECTRODE)

EQUIPMENT EARTHING DETAILS
BUS REACTOR

COMPU. DRG. REF.	DRG. NO.	SHEET
	TB–419–316–006	10A



PLAN



ELEVATION

MINIMUM DISTANCE OF 6000MM SHALL BE MAINTAINED BETWEEN TWO TREATED (PIPE) ELECTRODES.
NO.OF PIPE EARTH ELECTRODE WITH TREATED PIT (REFER SHEET NO. 11) = 2 NOS.
NO.OF RISERS = 6 NOS. FOR EARTHING OF FOLLOWING PARTS OF TRANSFORMER
(TWO EARTHING STRIPS CAN BE CONNECTED TO ONE RISER):

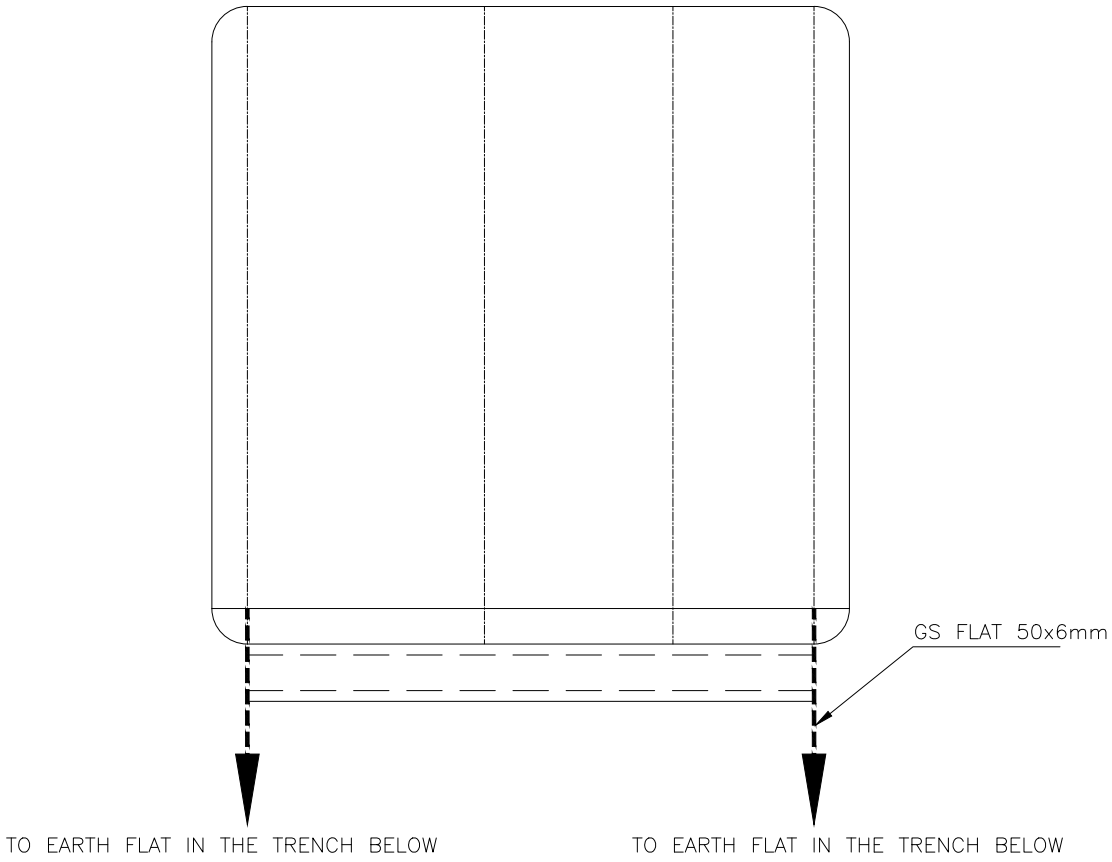
MAIN TANK	2 Nos. (75x12 GS FLAT)
RADIATOR BANK	2 Nos. (75x12 GS FLAT)
MARSHALLING BOX	2 Nos. (50x6 GS FLAT)
NEUTRAL EARTHING	2 Nos. (75x12 Cu FLAT THROUGH PIPE ELECTRODE)

EQUIPMENT EARTHING DETAILS

SWITCHYARD SERVICE TRANSFORMER

DRG. No. TB-419-316-006

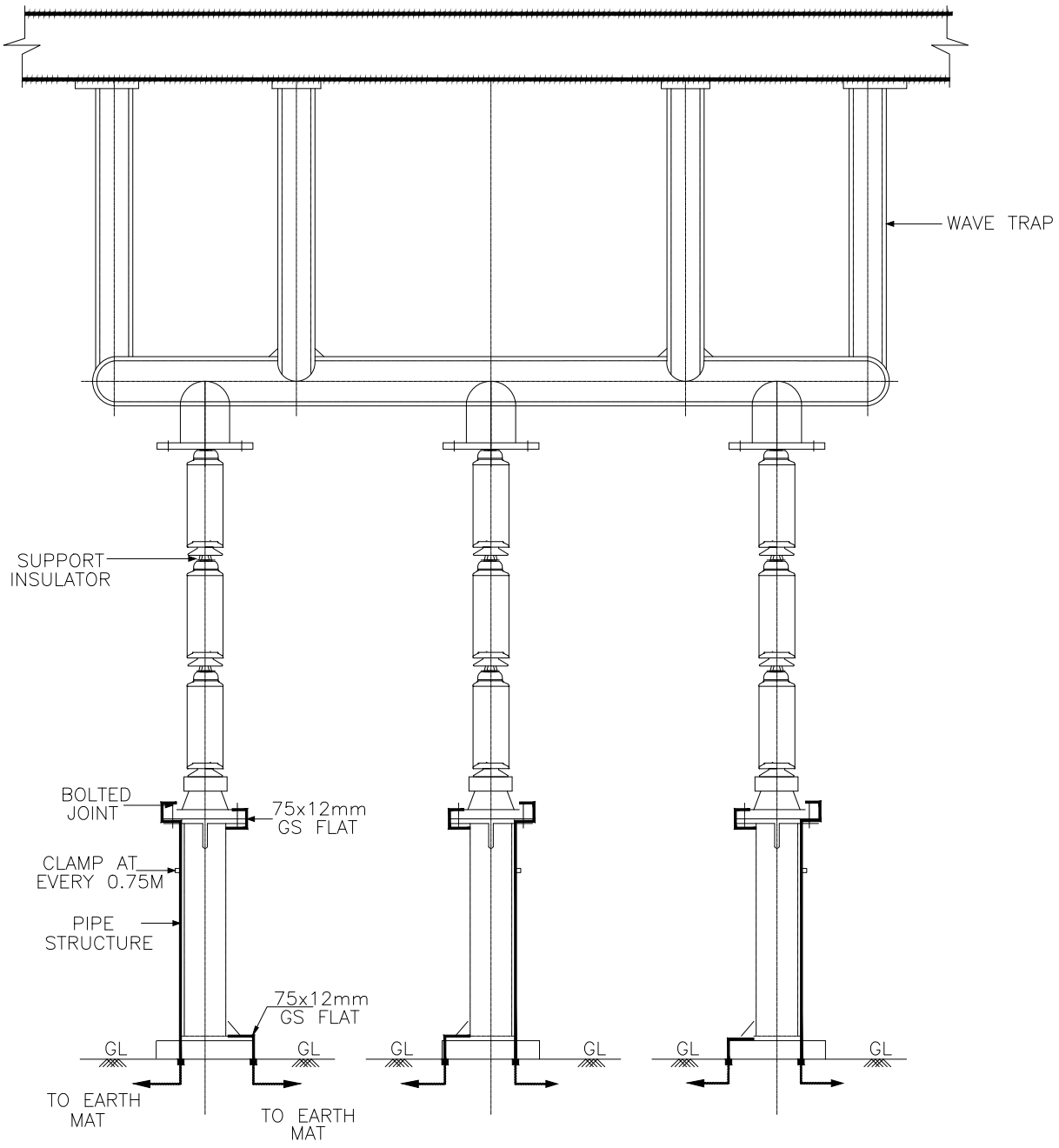
SHEET No. 10B



EQUIPMENT EARTHING DETAILS

ALL PANELS/KIOSKS/MBs/BATTERY CHARGER/AC DC BOARDS/MLDB

DRG. No.	SHEET No.
TB-419-316-006	11



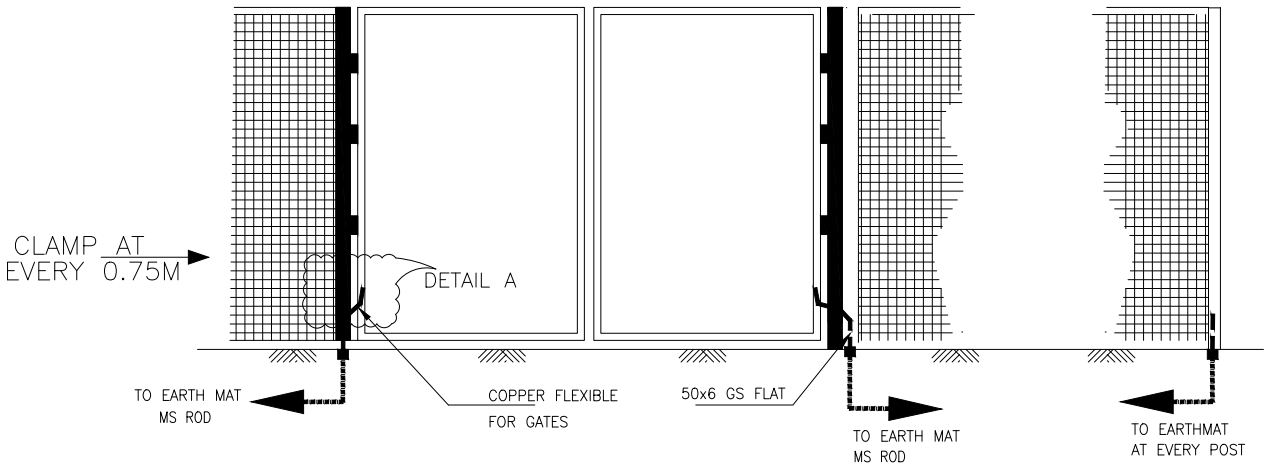
NOS.OF RISERS= 2 NOS./STRUCTURE

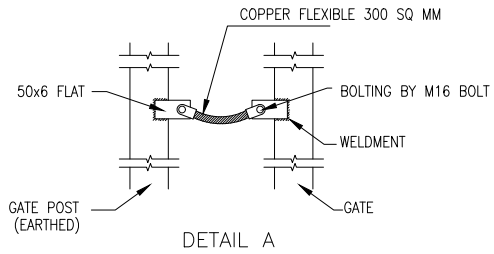
EQUIPMENT EARTHING DETAILS
400kV WAVE TRAP

COMPUTERREF.NO.	DRG. No.	SHEET No.
	TB-419-316-006	12

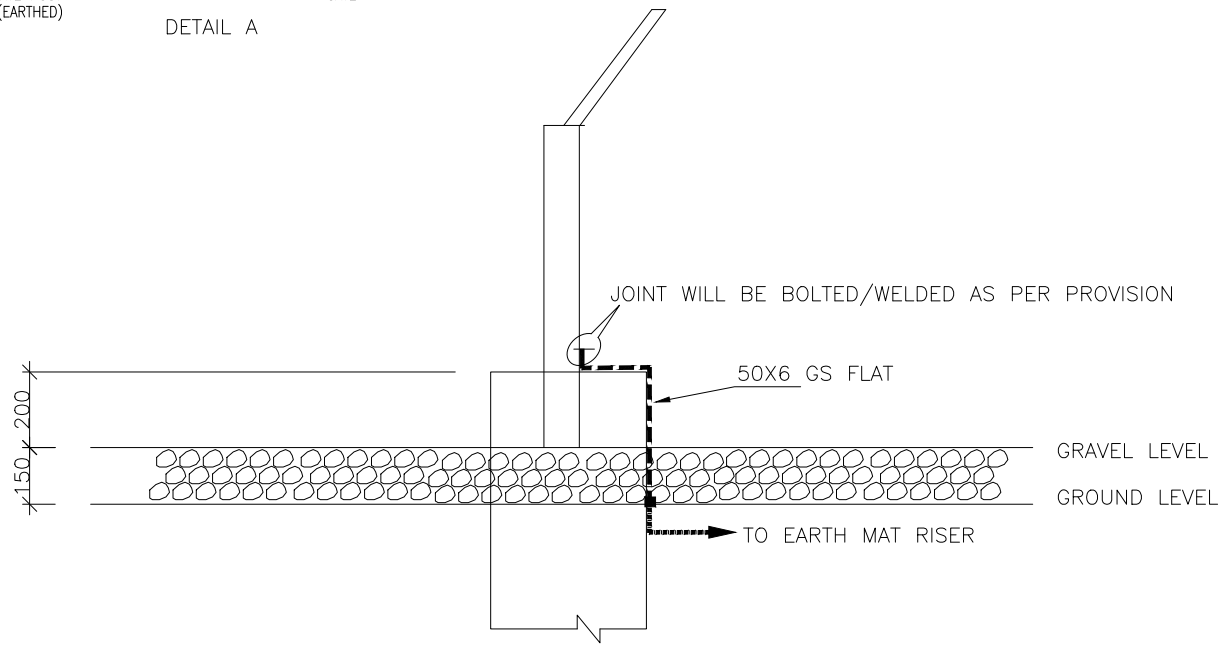
FENCE GATE

FENCE GROUNDING





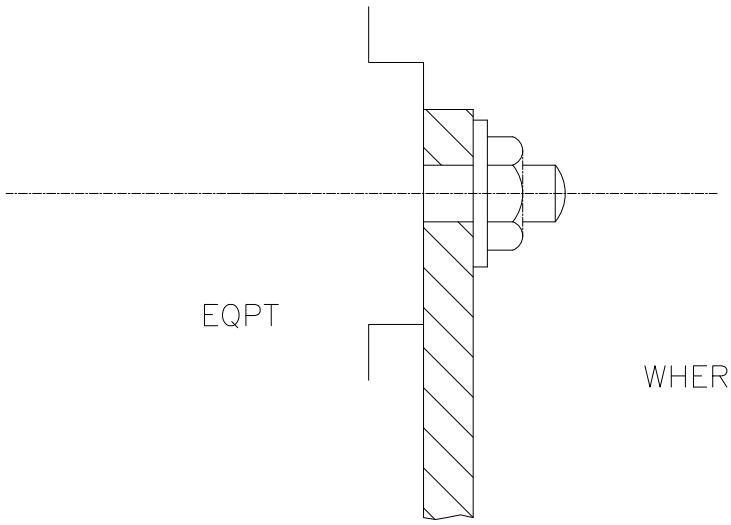
DETAIL A



EVERY POST OF FENCE & GATES SHALL BE CONNECTED TO EARTHING LOOP BY 50X6 MM GS FLAT.
EARTHING CONDUCTOR SHALL BE BURRIED 2000mm OUTSIDE THE SWITCHYARD FENCE.

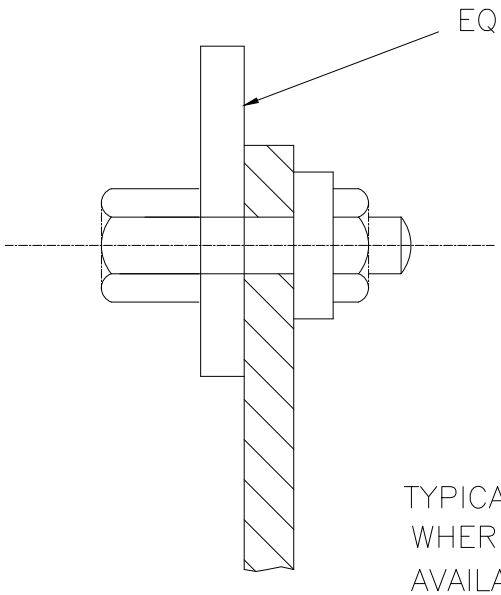
FENCE EARTHING

BHEL	EQUIPMENT EARTHING DETAILS GATE/FENCE POST	
	DRG. No. TB–419–316–006	SHEET No. 13



WHERE STUD AVAILABLE

TYPICAL EARTHING TERMINAL JOINT



TYPICAL EARTHING TERMINAL JOINT WHERE ONLY THROUGH HOLE IS AVAILABLE

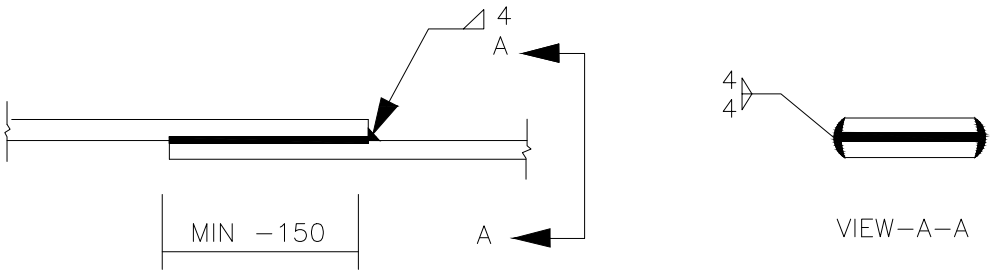
NOTE

1. THIS IS GENERAL TYPICAL BOLTING ARRANGEMENT APPLICABLE TO ALL PANELS, EQUIPMENT ETC. WHERE BOLTING ARRANGEMENT IS PROVIDED.
2. IN CASE EARTHING TERMINAL COMPRISES ONLY A TAPPED HOLE SUITABLE BOLT/ SCREW WITH WASHER MAY BE USED FOR EARTHING CONDUCTOR TERMINATION

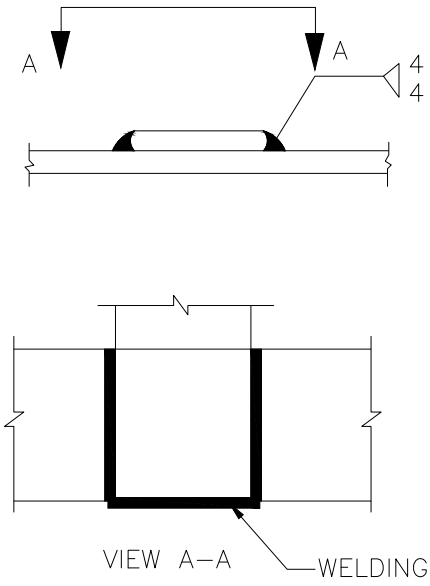
BHEL	EQUIPMENT EARTHING DETAILS TYPICAL ARRANGEMENT OF BOLTED JOINTS	
	DRG. No. TB–419–316–006	SHEET No. 14

STRIP TO STRIP (75x12/50X6 MS FLAT)

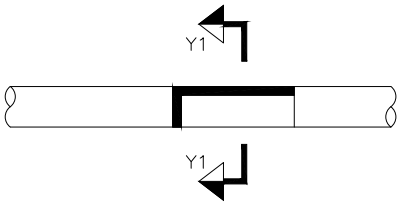
1. STRAIGHT LAP JOINT/RISER



2. CROSS LAP JOINT

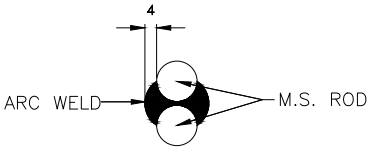


BHEL	EQUIPMENT EARTHING DETAILS WELDING DETAILS	
COMPUTERREF.NO.	DRG. No. TB–419–316–006	SHEET No. 15

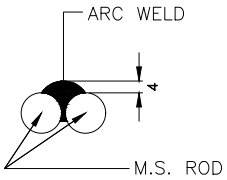


ELEVATION

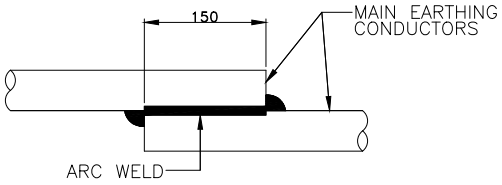
(CONDUCTOR IN HORIZONTAL PLANE)

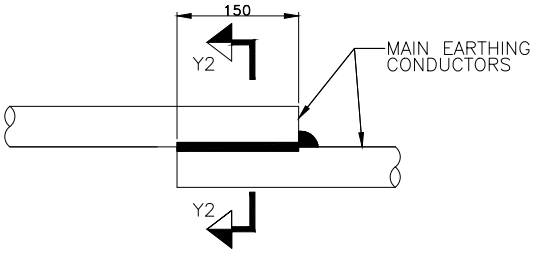


SECTION Y2-Y2



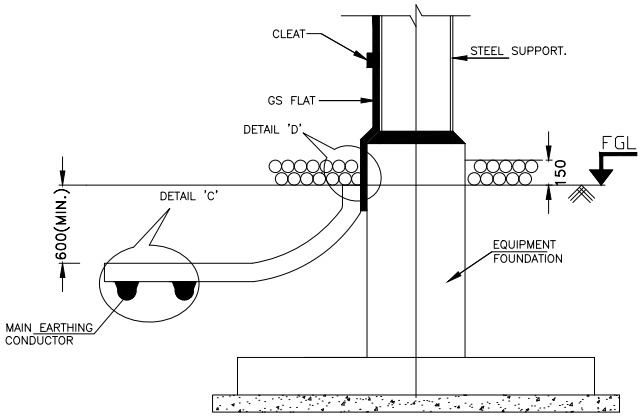
SECTION Y1-Y1



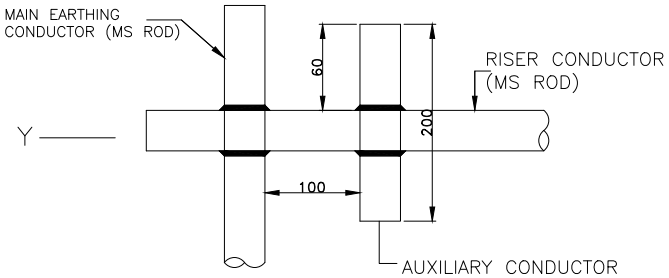


ELEVATION

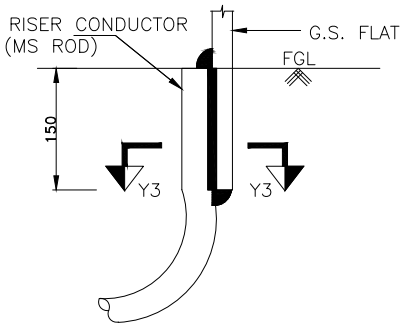
(CONDUCTOR IN VERTICAL PLANE)



TYPICAL DETAILS OF RISER

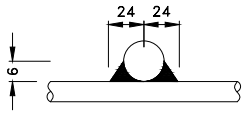


PLAN

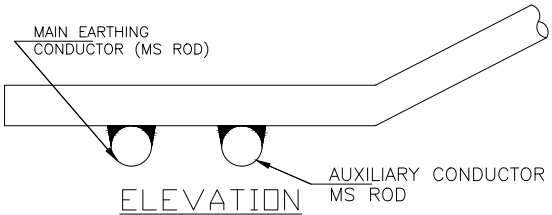


ELEVATION

DETAIL-D

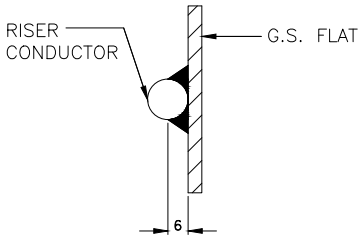


VIEW-Y



ELEVATION

DETAIL-C



TYPICAL OVERLAPPING JOINT OF TWO CONDUCTORS

SECTION Y3-Y3

EQUIPMENT EARTHING DETAILS

WELDING DETAILS

COMPUTERREF.NO.	DRG. No. TB-419-316-006	SHEET No. 16

एन टी पी सी लिमिटेड
(भारत सरकार का उद्यम)
NTPC Limited
(A Govt. of India Enterprise)
(Formerly National Thermal Power Corporation Ltd.)
(केंद्रीय कार्यालय नोएडा)
Corporate Center NOIDA

Reference : CC-ENGG-4540-001-230-PVC-C-001 **Date :** 13/04/2023

From : Subodh Pandit ADDL. GENERAL MANAGER	**To :** BHARAT HEAVY ELECTRICALS LTD NEW DELHI 110049 IN **Cc :** sisodia@bhel.in

Subject : EPC TTPP3 (2x660MW)

Please find enclosed following drawings/ documents for necessary action at your end.

Vendor Drg. No.	:	TB-1-419-607-640
Orgn. Drg. No.	:	4540-001-230-PVC-C-001
Revision No.	:	00
Drg. Title	:	SWITCHYARD CONTROL ROOM BUILDING - ARCHITECTURAL PLAN AND ELEVATION
App. Category	:	CATREL
Release Date	:	13/04/2023

Scan to verfiy

Comments : AUTO ARCHIVED IN NTPC REPOSITORY

BHARAT HEAVY ELECTRICALS LIMITED

TRANSMISSION BUSINESS ENGINEERING MANAGEMENT

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NTPC Doc No.	**4540-001-230-PVC-C-001**	Rev. No.	**00**	Prepared	Checked	Approved
BHEL Doc No.	**TB-1-419-607-640**					
TYPE OF DOC.	**DRAWING DOCUMENT**		SIGN	**-SD-**	**-SD-**	**-SD-**
TITLE **SWITCHYARD CONTROL ROOM BUILDING-ARCHITECTURAL PLAN AND ELEVATION**			NAME	**VG**	**SV**	**PLK**
			DATE	10-04-23	12-04-23	12-04-23
			GROUP	**TBEM**	W.O. No	

CUSTOMER	**NTPC Ltd.**
PROJECT	**400kV GIS at Talcher Thermal Power Project Stage-III (2 X 660 MW)**
NOA NO.	**CS-4540-001A-2-SCNOA-7228-Dated 27-Sep-2022**
Station	**Talcher, Orissa**

CONTENTS

Section	Description	No. of Sheets
1	Architectural Plan and Elevation of Switchyard Control Room Building	03

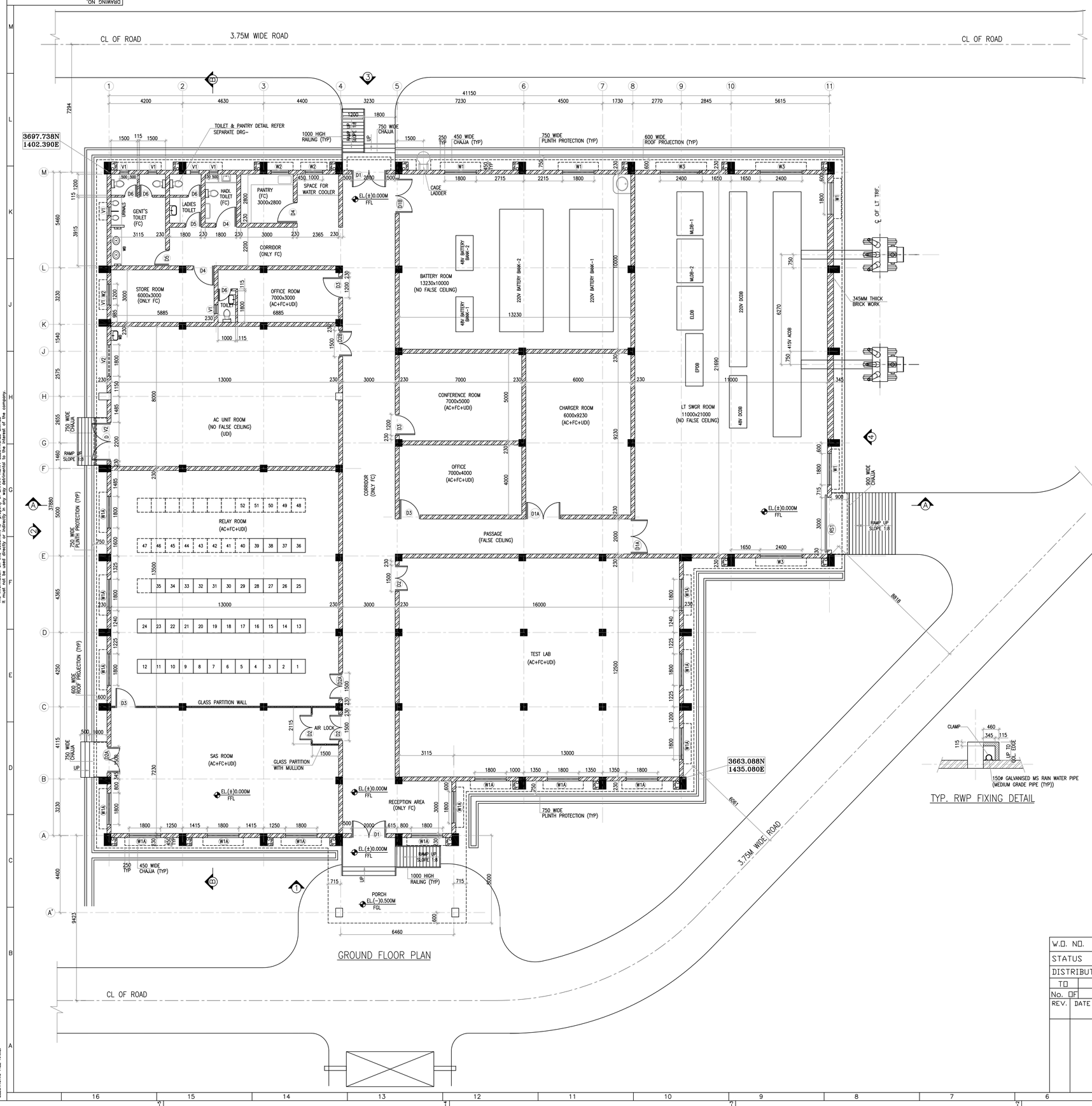
NOTE: **We confirm that this document meets all the contract requirements including safety and statuary requirements and facilitate ease of operation and maintenance. In case any deviation is found, the Contractor shall carry out all required changes/ modifications without any cost implications to NTPC. In addition, Penalty on account of noncompliance of contract specification as deemed fit by the Employer shall be recovered**

Rev No.	Date	Altered	Checked	Approved	REVISION DETAILS
					Re-submission of this drawing will be done after finalization of structural drawings.

Distribution	To	TBEM	TBMM	TBQM	Vendor
	Copies	1	1	1	

FIRST ANGLE PROJECTION
ALL DIMENSIONS ARE IN MM

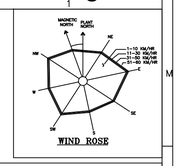
DRAWING NO. 4540-001-230-PVC-C-001

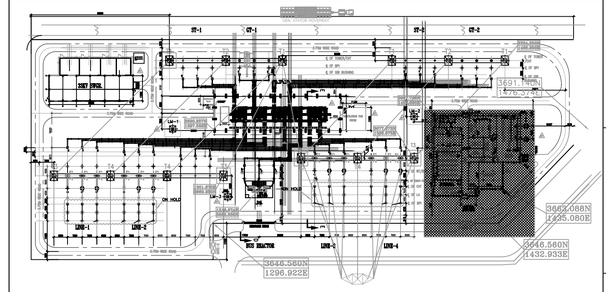


GROUND FLOOR PLAN

TYP. RWP FIXING DETAIL

NORTH





KEY PLAN

NOTES:

1. ALL DIMENSION ARE IN MILIMETRE & ELEVATIONS ARE METRE.
2. SIZE OF COLUMNS ARE TENTATIVE AND SUBJECT TO CHANE AS PER STRUCTURAL DRAWING.
3. DOOR WIDTH ARE CLEAR MASONARY OPENING AND DOOR HEIGHTS ARE FROM FFL TO BOTTOM OF LINTEL.
4. ALL DIMENSIONS ARE READ AS UNPLATERED MASONARY & CONCRETE UNLESS NOTED OTHERWISE.
5. READ THIS DRAWING IN CONJECTION WITH TECHNICAL SPECIFICATION AND TENDOR DRAWING.
6. DPC SHALL BE 50 MM THICK IN CEMENT CONCRETE (1:1.5:3) WITH WATER PROOFING COMPOUND FOLLOWED BY TWO LAYERS OF BITUMEN COATING 85/25 GRADE AS PER IS: 702 @ 1.7 KG./SQ.M.
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8. EXHAUST FAN OPENING FOR VENTILATION (TO BE PROVIDED BY TBG−MECHANICAL GROUP), REFER DRAWING VENTILATION FANS LAYOUT FOR CONTROL ROOM BUILDING HAVING DRAWING NUMBER TB−DG−419−553−06.
9. FOR DETAIL FINISHING SCHEDULE REFER SWITCHYARD CONTROL ROOM BUILDING − DETAILS OF DOORS & WINDOWS AND FINISHING SCHEDULE HAVING DRAWING NUMBER TB−1−419−607−643.
10. FINISHED GROUND LEVEL (F.G.L) OF SWITCHYARD IS R.L 69.000M. EL.(±)0.000M CORRESPONDS TO FINISHED FLOOR LEVEL WHICH IS 500MM ABOVE F.G.L.

LEGEND :−	
RL	REDUCED LEVEL
FGL	FINISHED GROUND LEVEL
FFL	FINISHED FLOOR LEVEL
BOB	BOTTOM OF BEAM
TOC	TOP OF CONCRETE
TOP	TOP OF PARAPET WALL
PCC	PLAIN CEMENT CONCRETE
TOB	TOP OF BEAM
AC	AIR CONDITIONED
FC	FALSE CEILING
UDI	UNDER DECK INSULATION
DPC	DAMP PROOF COURSE
RS	ROLLING SHUTTER
D	DOOR
W	WINDOW
V	VENTILATOR
EF	EXHAUST FAN
FG	FIX GLAZING

230 THICK BRICK WALL

115 THICK BRICK WALL

REFERENCE DRAWINGS

SL.NO.	DESCRIPTION	NTPC/BHEL DRAWING NUMBER
1.	PLOT PLAN	4540−001−301−POC−F−001
2.	400kV SWITCHYARD SINGLE LINE DIAGRAM	4540−001−230−PVE−P−001
3.	400 kV LAYOUT PLAN & SECTION	4540−001−230−PVE−F−023
4.	VENTILATION FANS LAYOUT FOR CONTROL ROOM BUILDING	TB−DG−419−553−06
5.	CONCEPTUAL CONTROL ROOM BUILDING LAYOUT	4540−001−230−PVE−F−023A
6.	SWITCHYARD CONTROL ROOM BUILDING− GROUND FLOOR DETAILS INCL. CABLE TRENCHES	4540−001−230−PVC−C−004

NTPC DRG. No. 4540−001−230−PVC−C−001

PROJECT	TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)
OWNER	NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)
	BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP NOIDA

W.O. NO.	419
STATUS	CONTRACT
DISTRIBUTION	
TO	
No. OF	

REV.	DATE	ALTD	CHD	APPD

DEPT CODE		NAME	SIGN	DATE
M	DRN	TKR	−−	10.04.23
	CHD	DKU	−−	10.04.23
	APPD	VK	−−	10.04.23

TITLE

SWITCHYARD CONTROL ROOM BUILDING
ARCHITECTURAL PLAN AND ELEVATION

DEPT.	SCALE	DRAWING NO.
SIGN		TB−1−419−607−640
DATE		SHEET 01 OF 03 REV. 00

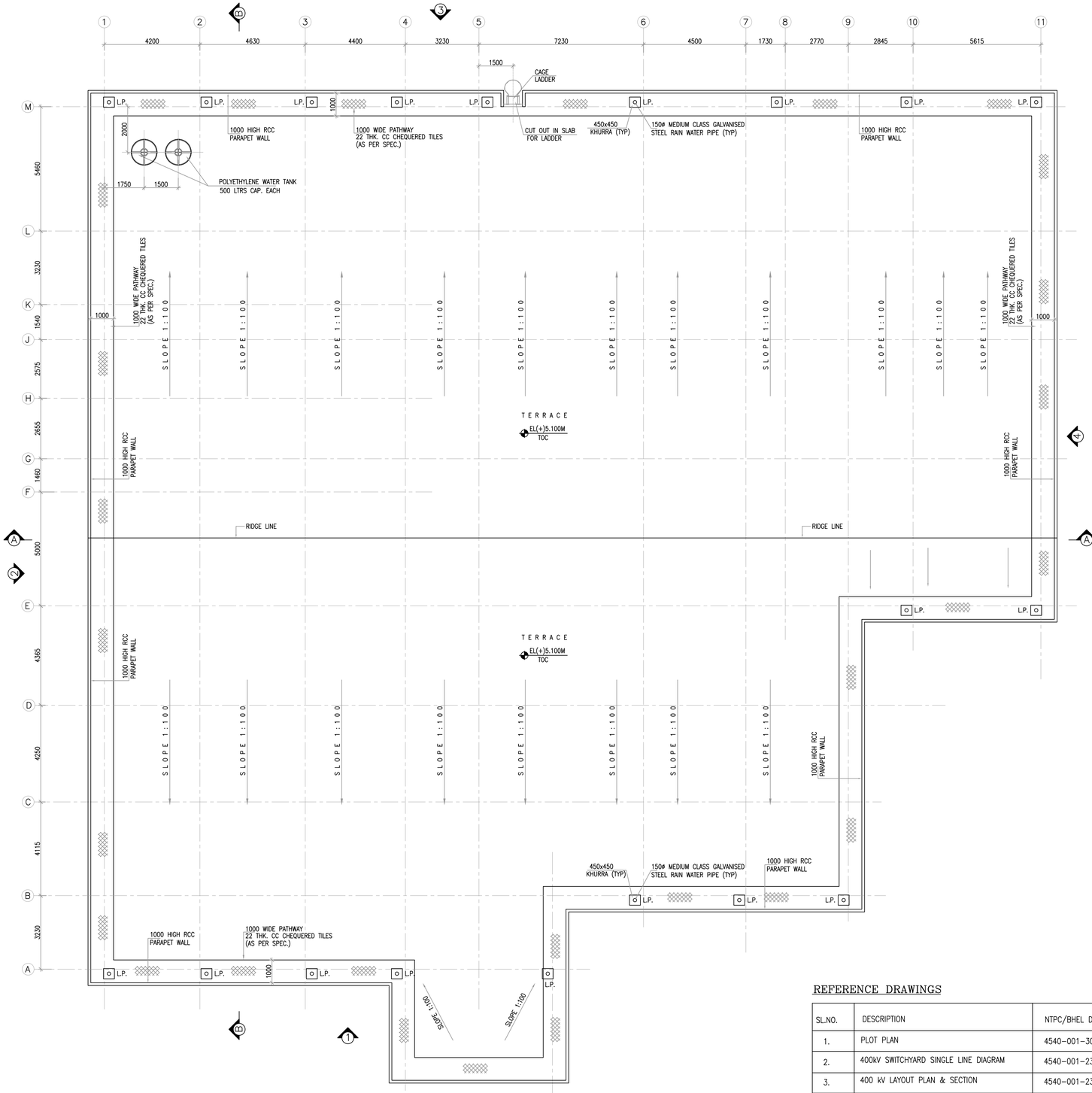
FORMAT SIZE A1

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ELECTRONIC FILE NAME:

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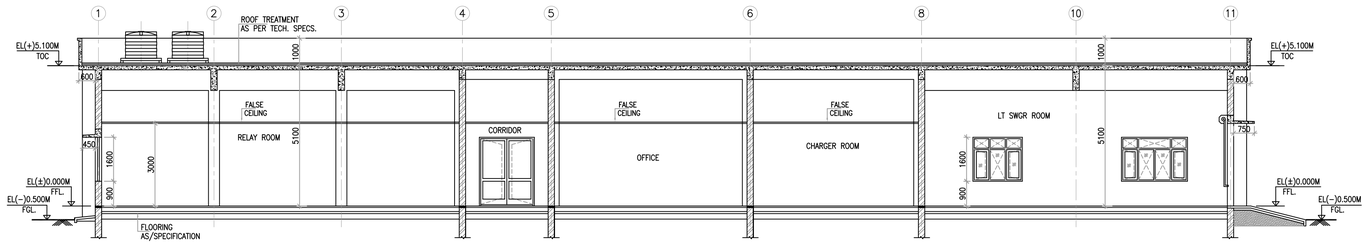
ELECTRONIC FILE NAME:


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1500
CAGE LADDER
L.P.
1000 HIGH RCC PARAPET WALL
1000 WIDE PATHWAY 22 THK. CC CHEQUERED TILES (AS PER SPEC.)
CUT OUT IN SLAB FOR LADDER
450x450 KHURRA (TYP)
150ø MEDIUM CLASS GALVANISED STEEL RAIN WATER PIPE (TYP)
2000
1750 1500
POLYETHYLENE WATER TANK 500 LTRS CAP. EACH
1000
SLOPE 1:100
TERRACE
EL(+)5.100M
TOC
RIDGE LINE
M L K J H G F E D C B A
5460 3230 1540 2575 2655 1460 5000 4385 4250 4115 3230
1000 HIGH RCC PARAPET WALL
1000 WIDE PATHWAY 22 THK. CC CHEQUERED TILES (AS PER SPEC.)
450x450 KHURRA (TYP)
150ø MEDIUM CLASS GALVANISED STEEL RAIN WATER PIPE (TYP)
1000 HIGH RCC PARAPET WALL
1000 WIDE PATHWAY 22 THK. CC CHEQUERED TILES (AS PER SPEC.)
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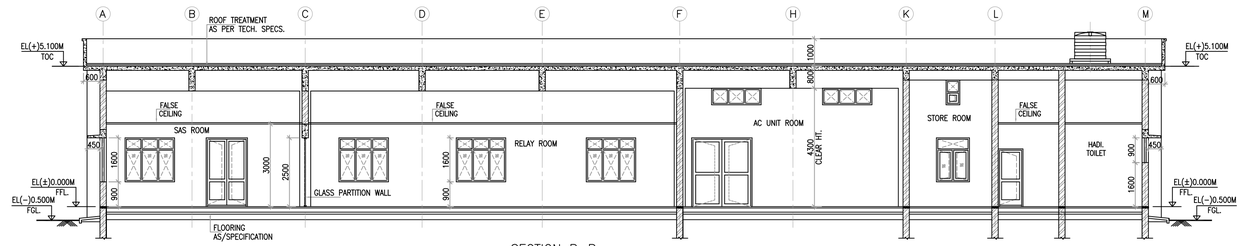
DRAWING NO. 4540-001-230-PVC-C-001

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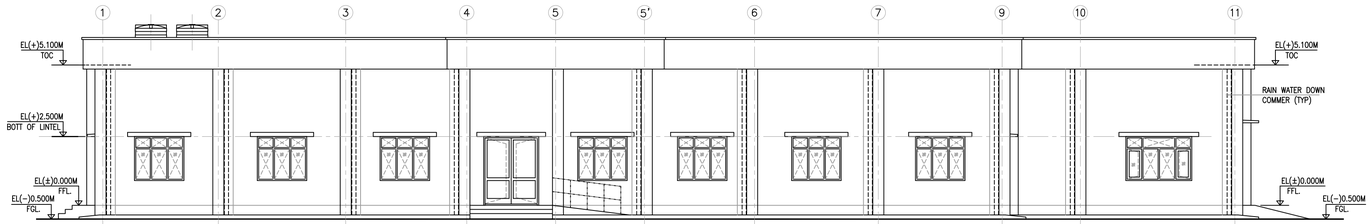
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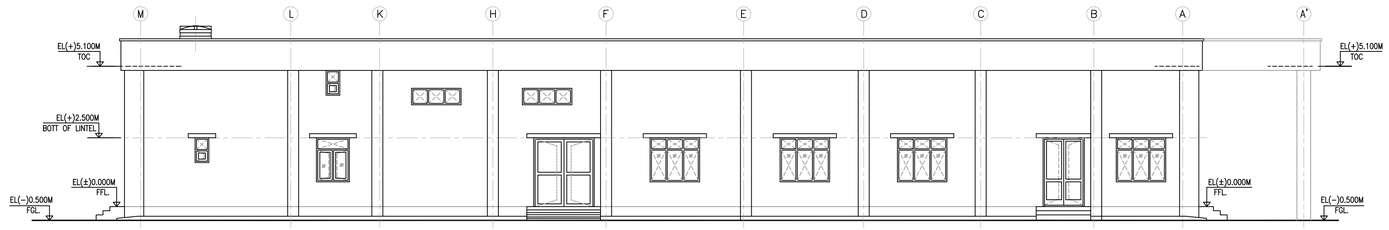
SECTION A–A



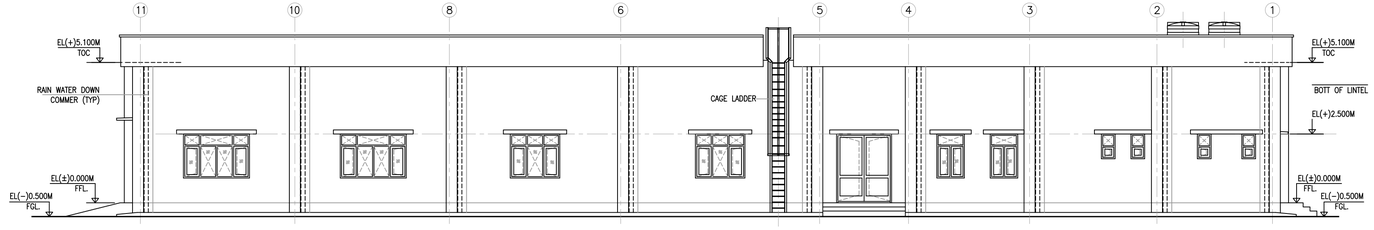
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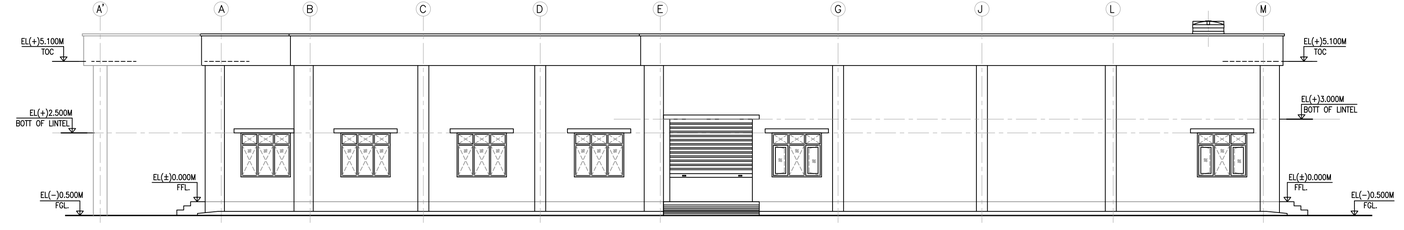
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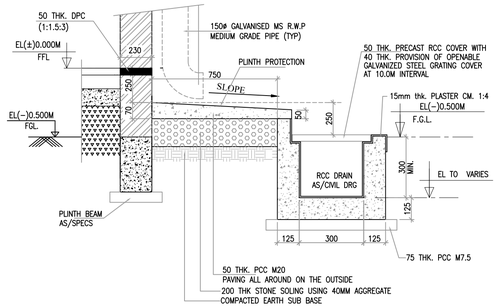
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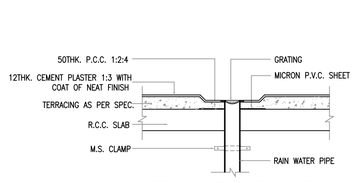
ELEVATION – 3



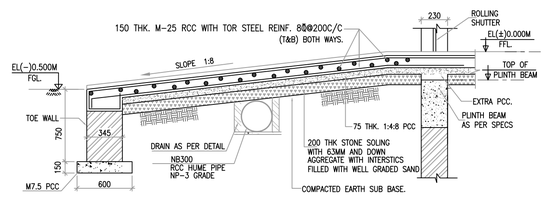
ELEVATION – 4



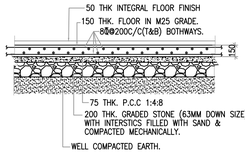
PLINTH PROTECTION ALONG BUILDING WITH DRAIN–TYPICAL



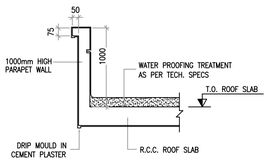
TYPICAL DETAIL OF KHURRA WITH RAIN WATER PIPE



DETAIL OF RAMP



DETAIL OF GRADE SLAB



TYP. DETAIL OF PARAPET

REFERENCE DRAWINGS

SL.NO.	DESCRIPTION	NTPC/BHEL DRAWING NUMBER
1.	PLOT PLAN	4540–001–301–POC–F–001
2.	400kV SWITCHYARD SINGLE LINE DIAGRAM	4540–001–230–PVE–P–001
3.	400 kV LAYOUT PLAN & SECTION	4540–001–230–PVE–F–023
4.	VENTILATION FANS LAYOUT FOR CONTROL ROOM BUILDING	TB–DG–419–553–06
5.	CONCEPTUAL CONTROL ROOM BUILDING LAYOUT	4540–001–230–PVE–F–023A
6.	SWITCHYARD CONTROL ROOM BUILDING– GROUND FLOOR DETAILS INCL. CABLE TRENCHES	4540–001–230–PVC–C–004

NOTES:

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8. EXHAUST FAN OPENING FOR VENTILATION (TO BE PROVIDED BY TBC–MECHANICAL GROUP), REFER DRAWING VENTILATION FANS LAYOUT FOR CONTROL ROOM BUILDING HAVING DRAWING NUMBER TB–DG–419–553–06.
9. FOR DETAIL FINISHING SCHEDULE REFER SWITCHYARD CONTROL ROOM BUILDING – DETAILS OF DOORS & WINDOWS AND FINISHING SCHEDULE HAVING DRAWING NUMBER TB–1–419–607–643.
10. FINISHED GROUND LEVEL (F.G.L) OF SWITCHYARD IS R.L 69.000M. EL.(±)0.000M CORRESPONDS TO FINISHED FLOOR LEVEL WHICH IS 500MM ABOVE F.G.L.

NTPC DRG. No. 4540–001–230–PVC–C–001

PROJECT	TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)
OWNER	NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)
	BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP NOIDA

W.O. NO.	419
STATUS	CONTRACT
DISTRIBUTION	
TO	
No. OF	

REV.	DATE	ALTD	CHD	APPD

DEPT CODE		NAME	SIGN	DATE
M	DRN	TKR	--	10.04.23
	CHD	DKU	--	10.04.23
	APPD	VK	--	10.04.23

TITLE: ARCHITECTURAL CONTROL BUILDING

DEPT. | SIGN | DATE | SCALE

DRAWING NO. TB–1–419–607–640

SHEET 03 OF 03 | REV. 00

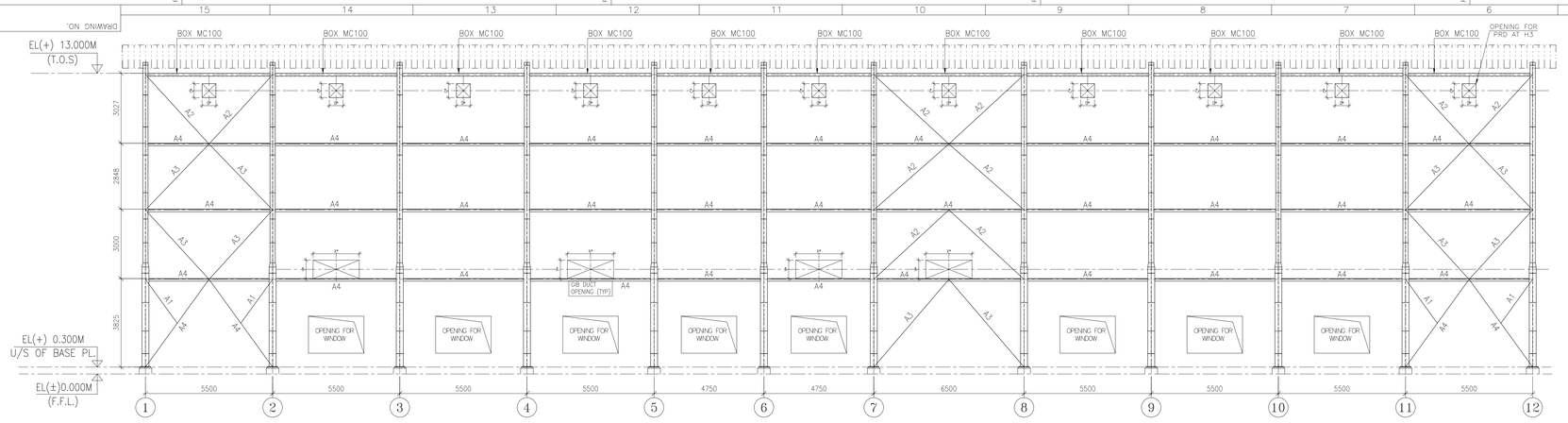
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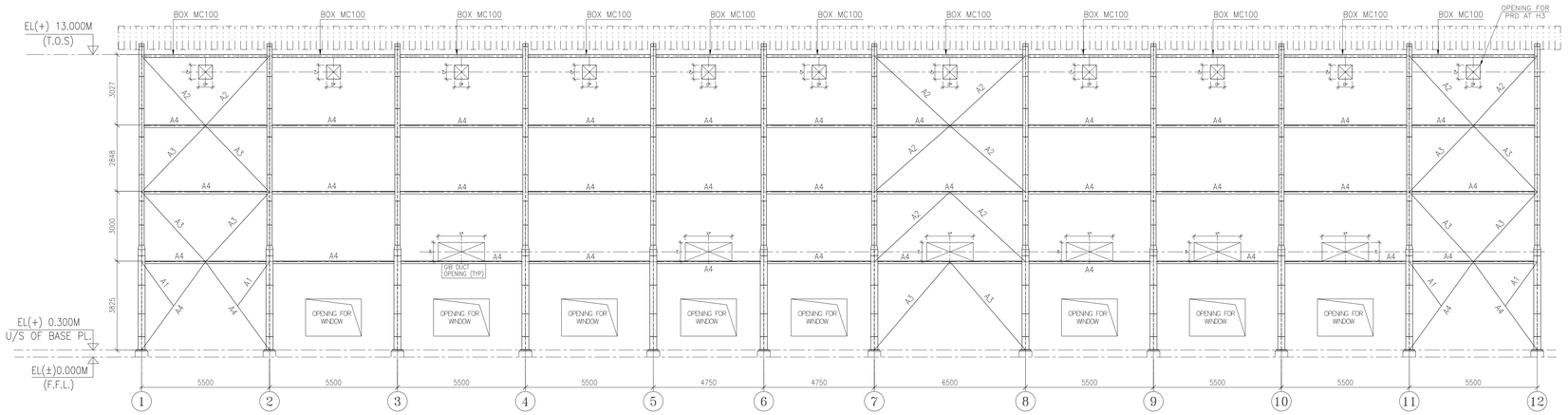
FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM

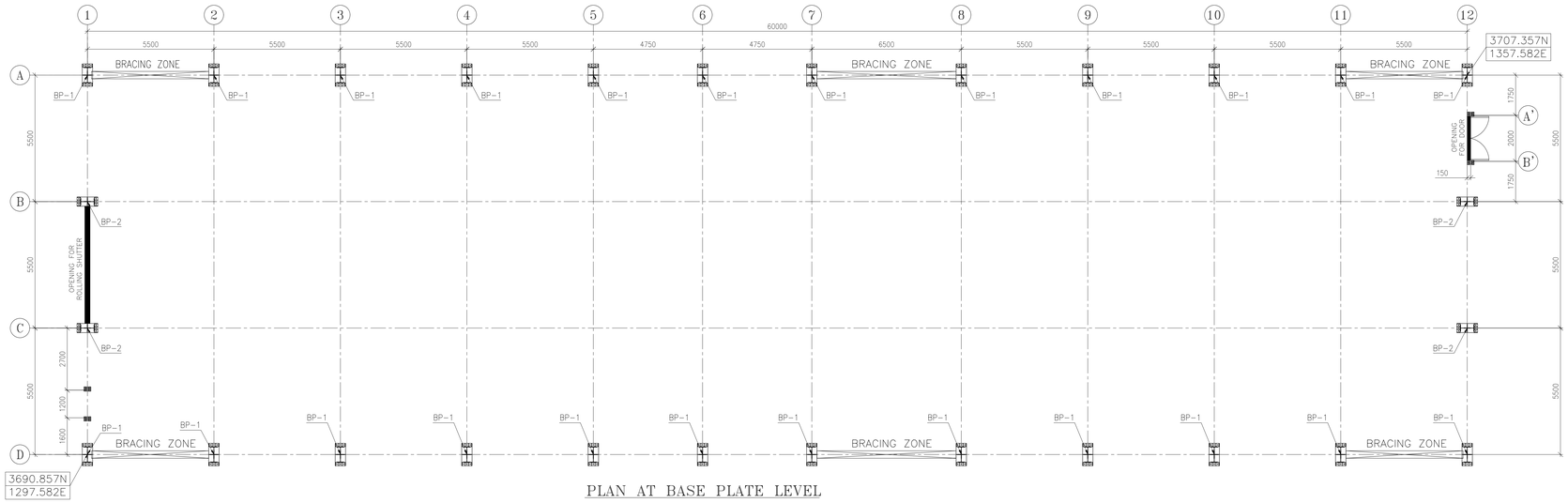
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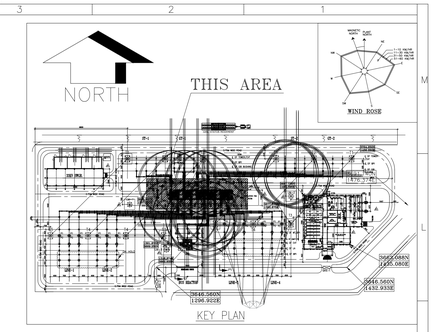
ELEVATION ALONG GRID A
(FOR CLARITY GRIT/RUNNER ARE NOT SHOWING)

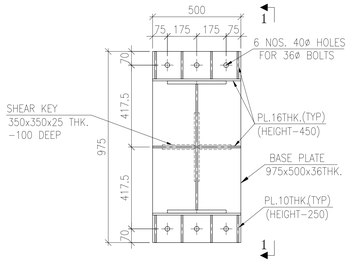


ELEVATION ALONG GRID D
(FOR CLARITY GRIT/RUNNER ARE NOT SHOWING)

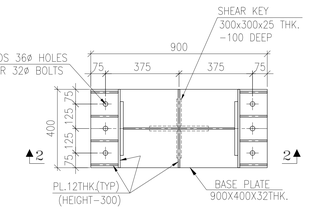


PLAN AT BASE PLATE LEVEL





DETAIL OF BASE PLATE
(FOR BP-1)



DETAIL OF BASE PLATE
(FOR BP-2)

SECTION 1-1

SECTION 2-2

NOTE:-

1) ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
2) THIS DRAWING IS NOT BE SCALED,ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3) ALL FILLET WELDS ARE 6mm FILLET WELDS U.N.O.
4) ALL BUTT WELDS SHALL BE PROVIDED WITH A SEALING RUN.
5) ALL GUSSET PLATES SHALL BE 8mm THK U.N.O.
6) ALL INCLINED MEMBERS AND GUSSET PLATES ARE TO BE CHECKED BY FULL SHOP LAYOUT.
7) ALL ERECTION HOLES ARE 18ø MKD. FOR 16ø ERECTION BOLTS(U.N.O.)
8) ALL PERMANENT HOLES ARE 22ø MKD. FOR 20ø PERMANENT BOLTS(U.N.O.)
9) ALL CONTACT SURFACES OF GUSSET PLATES HAVING ERECTION BOLTS SHALL BE WELDED AFTER ERECTION AND ALIGNMENT.
10) ALL MATERIALS SHALL BE CLEAN, RUST FREE, AND STRAIGHTENED BEFORE FABRICATION.
11) ALL ROLLED SECTIONS AND CONNECTION PLATES SHALL BE OF GRADE DESIGNATION E 250 GRADE 'A' FOR THICKNESS UPTO 20MM & OF E 250 GRADE 'B' FOR THICKNESS ABOVE 20MM AS PER IS : 2062.

LEGEND :-

FFL	FINISHED FLOOR LEVEL
FGL	FINISHED GROUND LEVEL
U/S BASE PLATE	UNDER SIDE OF BASE PLATE
WP	WORKING POINT
TOC	TOP OF CONCRETE
TOS	TOP OF STEEL
B.O.M	BOTTOM OF MONORAIL
℄	CENTER LINE
U.N.O	UNLESS NOTED OTHERWISE
THK.	THICKNESS
PL.	PLATE
TYP.	TYPICAL
STIFF.	STIFFENER
FL.PL.	FLANGE PLATE
CONT.	CONTINUOUS
MC.	MOMENT CONNECTION

NTPC DRG. No. 4540-001-230-PVE-F-*****

PROJECT: TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)

OWNER: एन टी पी सी NTPC — NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)

W.O. NO. 419
STATUS CONTRACT
DISTRIBUTION
TO
No. OF

REV.	DATE	ALTD	CHD	APPD

BHARAT HEAVY ELECTRICALS LTD
TRANSMISSION BUSINESS GROUP
NOIDA

DEPT CODE		NAME	SIGN	DATE
S	DRN	AVIJIT	--	01.06.23
	CHD	NIRMALYA	--	01.06.23
	APPD	DKU	--	01.06.23

TITLE
STRUCTURAL GA OF GIS BUILDING

DEPT. SIGN DATE
SCALE

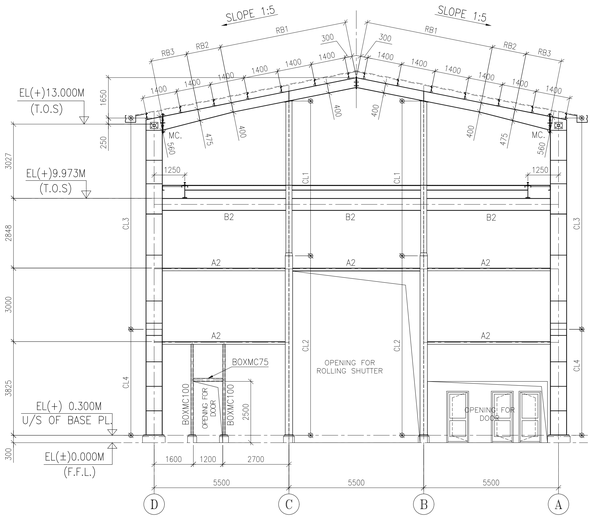
DRAWING NO.
4540-001-230-PVE-F-****

SHEET 01 OF 03 REV. 00

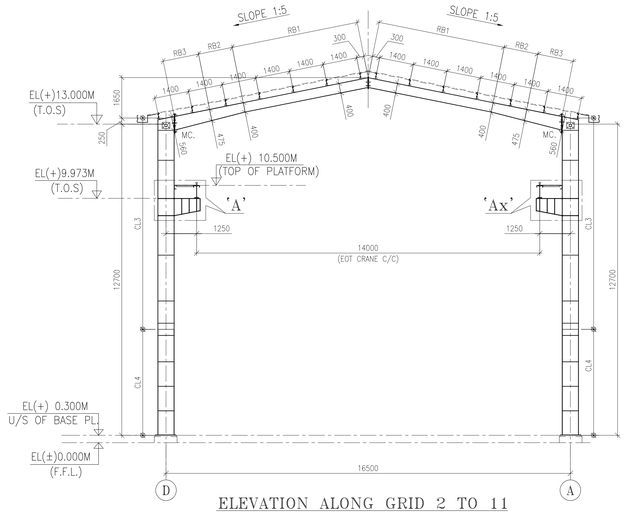
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FORMAT SIZE A1

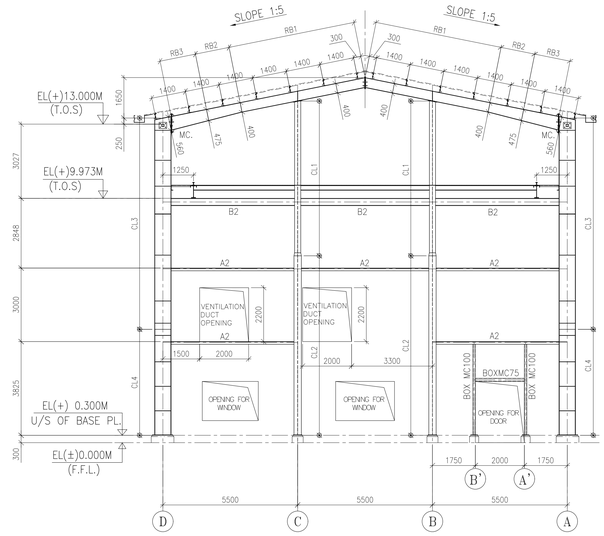
FIRST ANGLE PROJECTION
ALL DIMENSIONS ARE IN MM
DRAWING NO.



ELEVATION ALONG GRID 1

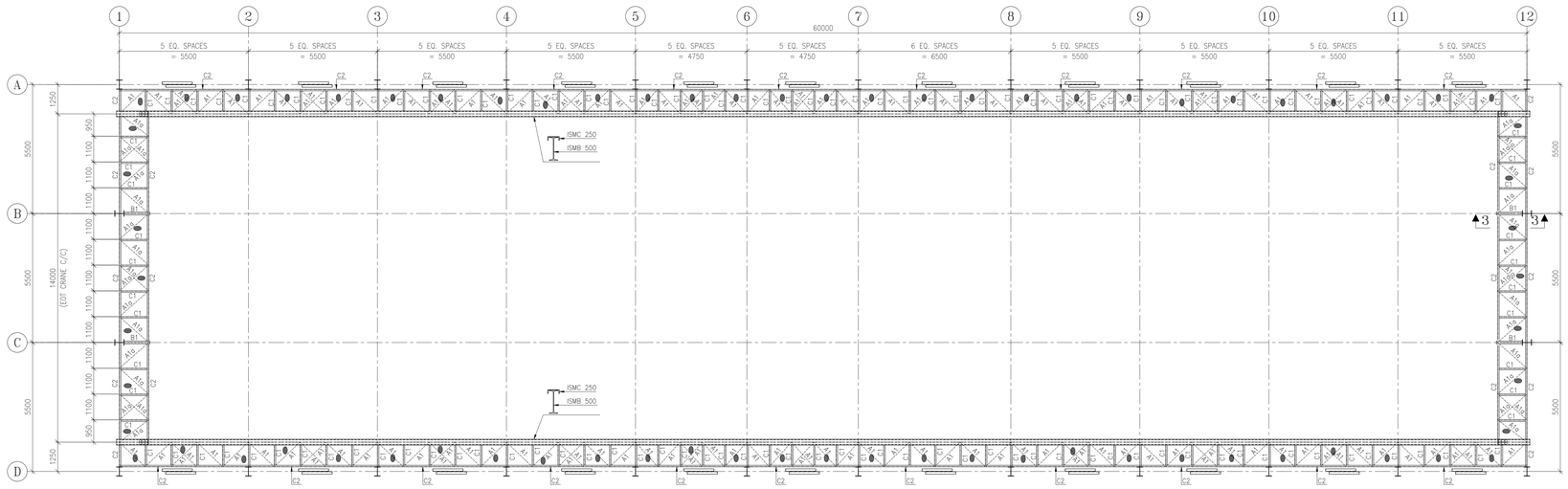


ELEVATION ALONG GRID 2 TO 11

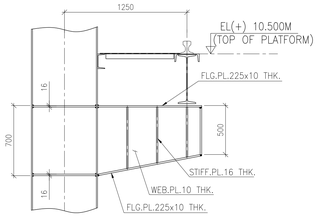


ELEVATION ALONG GRID 12

SCHEDULE OF MEMBERS (FOR ALL SHEET)	
BEAM. MKD.	MEMBER
C1	ISMC75
C2	ISMC200
B1	ISMB250
B2	1) PL.460x10 THK. 2) PL.225x20 THK.
RB1	1) PL.380x6 THK. 2) PL.175x10 THK.
RB2	1) PL.(451-380)x8 THK. 2) PL.225x12 THK.
RB3	1) PL.(536-451)x8 THK. 2) PL.225x12 THK.
A1	L 50x50x6
A1a	L 65x65x6
A2	2/Ls.75x75x8
A3	2/Ls.90x90x8
A4	2/Ls.100x100x8
A5	2/Ls.110x110x8
CL1	1) PL.576x8 THK. 2) PL.200x12 THK.
CL2	1) PL.568x8 THK. 2) PL.275x16 THK.
CL3	1) PL.651x10 THK. 2) PL.225x12 THK.
CL4	1) PL.643x10 THK. 2) PL.300x16 THK.



PLAN AT EL(+)10.500M (TOP OF PLATFORM)



DETAIL-'A' (AS DRN.)
DETAIL-'AX' (OPP. HAND)

NOTE:-

1) ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
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4) ALL BUTT WELDS SHALL BE PROVIDED WITH A SEALING RUN.
5) ALL GUSSET PLATES SHALL BE 8mm THK U.N.O.
6) ALL INCLINED MEMBERS AND GUSSET PLATES ARE TO BE CHECKED BY FULL SHOP LAYOUT.
7) ALL ERECTION HOLES ARE 18ø MKD. FOR 16ø ERECTION BOLTS(U.N.O.)
8) ALL PERMANENT HOLES ARE 22ø MKD. FOR 20ø PERMANENT BOLTS(U.N.O.)
9) ALL CONTACT SURFACES OF GUSSET PLATES HAVING ERECTION BOLTS SHALL BE WELDED AFTER ERECTION AND ALIGNMENT.
10) ALL MATERIALS SHALL BE CLEAN, RUST FREE, AND STRAIGHTENED BEFORE FABRICATION.
11) ALL ROLLED SECTIONS AND CONNECTION PLATES SHALL BE OF GRADE DESIGNATION E 250 GRADE 'A' FOR THICKNESS UPTO 20MM & OF E 250 GRADE 'B' FOR THICKNESS ABOVE 20MM AS PER IS : 2062.

LEGEND :-

FFL	FINISHED FLOOR LEVEL
FGL	FINISHED GROUND LEVEL
U/S BASE PLATE	UNDER SIDE OF BASE PLATE
WP	WORKING POINT
TOC	TOP OF CONCRETE
TOS	TOP OF STEEL
B.O.M	BOTTOM OF MONORAIL
℄	CENTER LINE
U.N.O	UNLESS NOTED OTHERWISE
THK.	THICKNESS
PL.	PLATE
TYP.	TYPICAL
STIFF.	STIFFENER
FL.PL.	FLANGE PLATE
CONT.	CONTINUOUS
MC.	MOMENT CONNECTION

W.O. NO.	419
STATUS	CONTRACT
DISTRIBUTION	
TO	
No. OF	
REV. / DATE / ALTD / CHD / APPD	

NTPC DRG. No. 4540-001-230-PVE-F-*****

PROJECT: TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)

OWNER: NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)

BHARAT HEAVY ELECTRICALS LTD
TRANSMISSION BUSINESS GROUP
NOIDA

DEPT CODE		NAME	SIGN	DATE
S	DRN.	AVIJIT	--	01.06.23
	CHD.	NIRMALYA	--	01.06.23
	APPD.	DKU	--	01.06.23

TITLE: STRUCTURAL GA OF GIS BUILDING

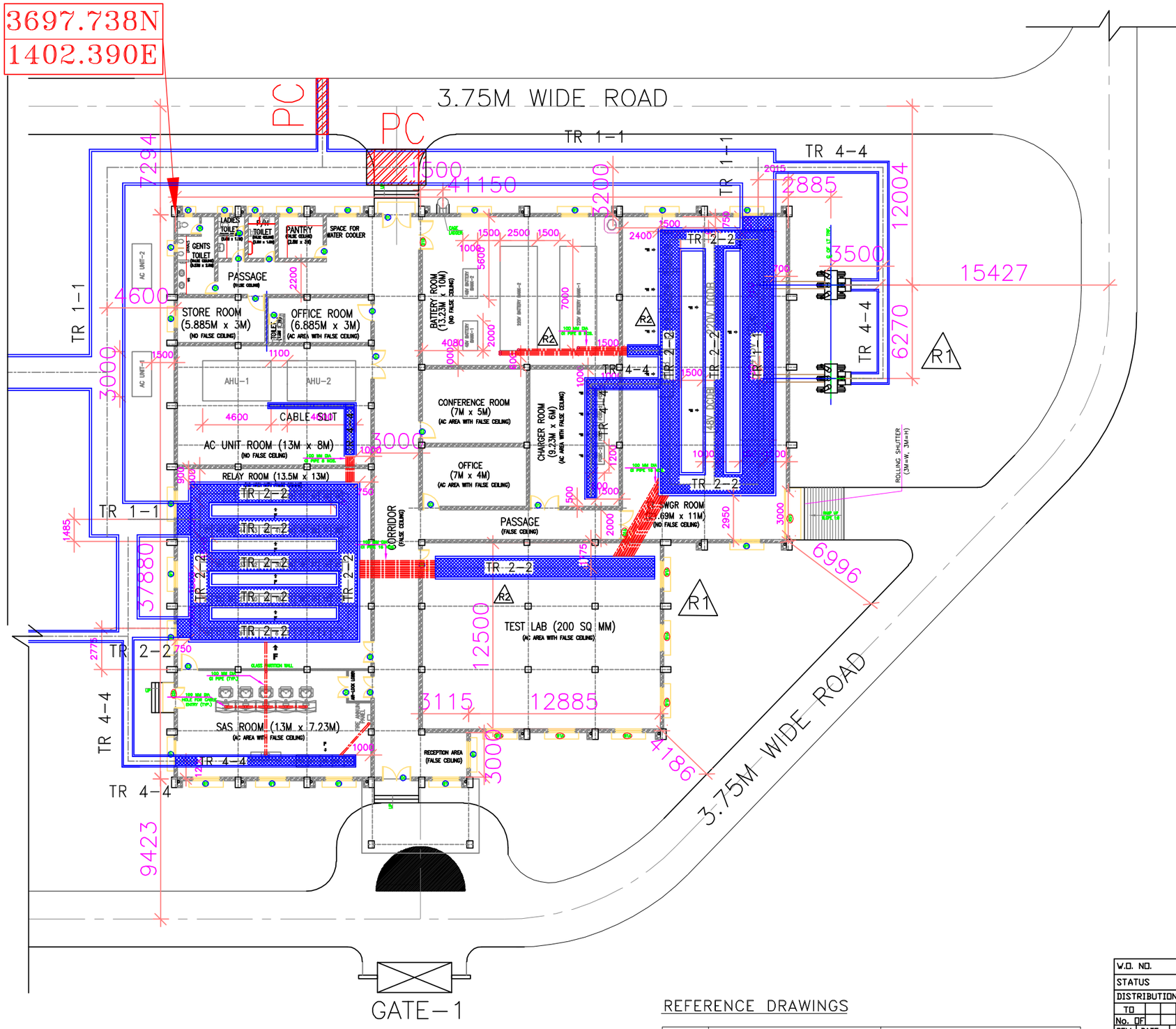
DEPT. / SCALE / SIGN / DATE

DRAWING NO. 4540-001-230-PVE-F-****

SHEET 02 OF 03 REV. 00

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ELECTRONIC FILE NAME:

FORMAT SIZE A1



NORTH

KEY PLAN

NOTES:

1. ALL DIMENSION ARE IN MM UNLESS NOTED OTHERWISE.
2. POWER & CONTROL CABLE SHALL BE LAID ON SEPERATE TRAYS.
3. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH TECHNICAL SPECIFICATION.
4. THE LOCATION AND QTY. OF PANELS ARE INDICATIVE, ACTUAL LOCATION MAY BE DECIDED AT SITE.
5. WHEREVER CUTOUT IS PROVIDED FOR FUTURE PANELS SAME SHALL BE COVERED TO FULLY FLUSH WITH THE FINISHED FLOOR.
6. CABLE RACKS SHALL BE FIXED AT EVERY 2000MM INTERVAL IN TRENCHES INSIDE CONTROL ROOM BUILDING.
7. PANELS ON TRENCHES SHALL BE SUPPORTED ON CHANNELS FIXED OVER TRENCHES FLUSHED WITH FFL. 50MM FRONT SIDE OF PANEL SHALL BE SUPPORTED ON FINISHED FLOOR LEVEL.
8. GI PIPES TO BE EMBEDDED IN FLOOR OF CONTROL ROOM FROM TRENCH UPTO WORK STATIONS & PRINTERS.
9. LOCATION OF HOLES & GI PIPE ROUTING IN SAS ROOM IS INDICATIVE & MAY BE MODIFIED AS PER SITE REQUIREMENT.
10. DETAILED ARRANGEMENT OF PIPE ENTRY IN CONTROL ROOM BUILDING & OTHER CIVIL DETAILS OF CABLE TRENCHES SHALL BE SHOWN SEPARATELY IN CIVIL DRAWING NO. 4540-001-230-PVC-C-004 (SWITCHYARD CONTROL ROOM BUILDING - GROUND FLOOR DETAILS INCLUDING INDOOR CABLE TRENCHES)
11. ALL CONDUITS (INCLUDING SPARE CONDUIT) SHALL BE WATER SEALED AS WELL AS FIRE SEALED. CONDUITS SHALL BE FILLED UPTO MAXIMUM 40%.
12. Bus ducts shall be supported by support structures.
13. PCC flooring of built up trenches shall be sloped for effective drainage with sump pits and sump pumps.

REFERENCE DRAWINGS

SL.NO.	NTPC DRAWING NUMBER	DESCRIPTION
1.	4540-001-230-PVE-F-023	400 kV LAYOUT PLAN & SECTION
2.	4540-001-230-PVE-F-023A	CONCEPTUAL CONTROL BUILDING LAYOUT

W.O. NO.	419			
STATUS	CONTRACT			
DISTRIBUTION				
TO				
No. OF				
REV.	DATE	ALTD	CHD	APPD
02	23.11.23	PC	RD	VK

DRAWINGS REVISED IN LINE WITH NTPC COMMENTS DT 25.08.23

NTPC DRG. No. 4540-001-230-PVE-F-001

PROJECT: TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)

OWNER: NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)

BHARAT HEAVY ELECTRICALS LTD
TRANSMISSION BUSINESS GROUP
NOIDA

DEPT CODE		NAME	SIGN	DATE
M	DRN	PC	-sd-	19.05.23
	CHD	RD	-sd-	19.05.23
	APPD	VK	-sd-	19.05.23

TITLE: INDOOR CABLE TRENCH LAYOUT FOR SWITCHYARD CONTROL ROOM BUILDING (ELECTRICAL DRAWING)

DEPT. | SCALE | SIGN | DATE

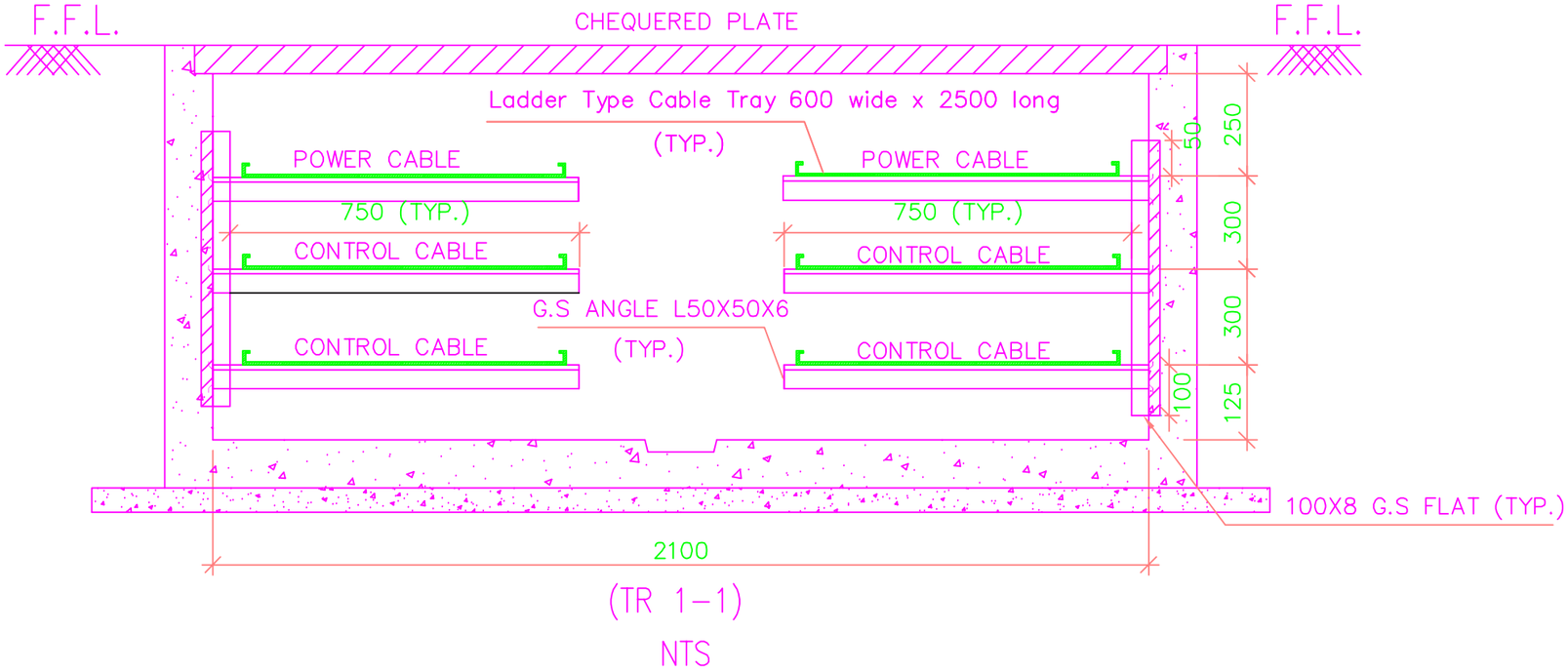
DRAWING NO. 4540-001-230-PVE-F-001

SHEET 01 OF 02 | REV. 02

FORMAT SIZE A3

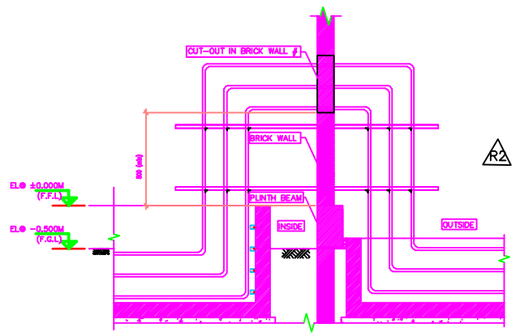
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DRAWING NO. 4540-001-230-PVE-F-023A
FIRST ANGLE PROJECTION
ALL DIMENSIONS ARE IN MM
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ELECTRONIC FILE NAME:



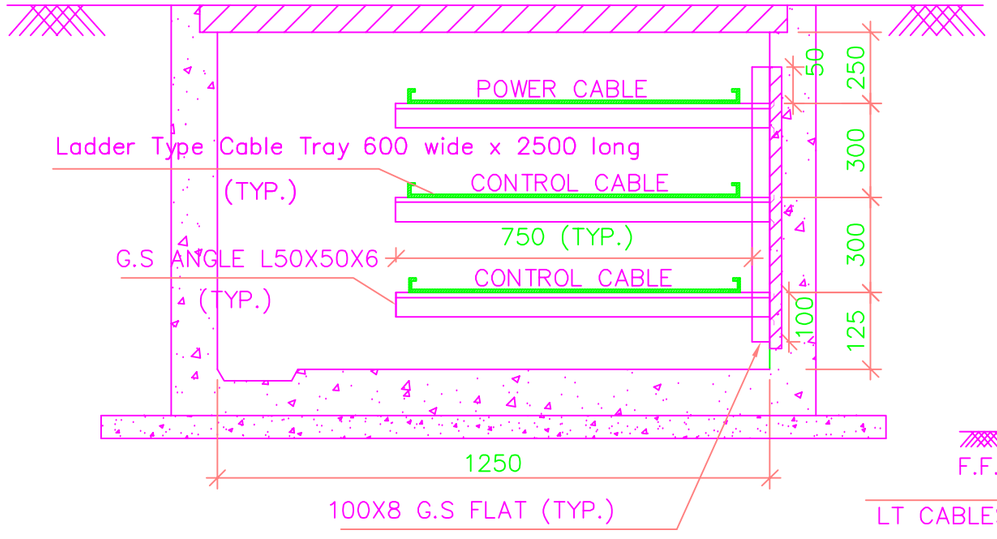
(TR 1-1)

NTS



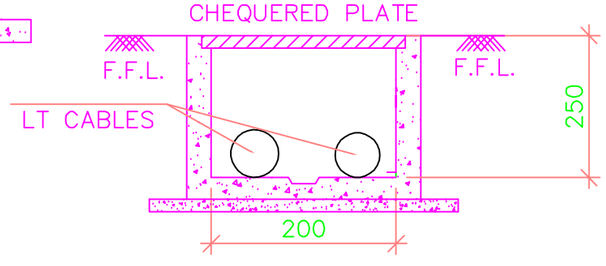
(TYP. ARRANGEMENT OF CABLE ENTRY TO CONTROL BUILDING, GIS HALL & VENTILLATION FAN ROOM)

NTS



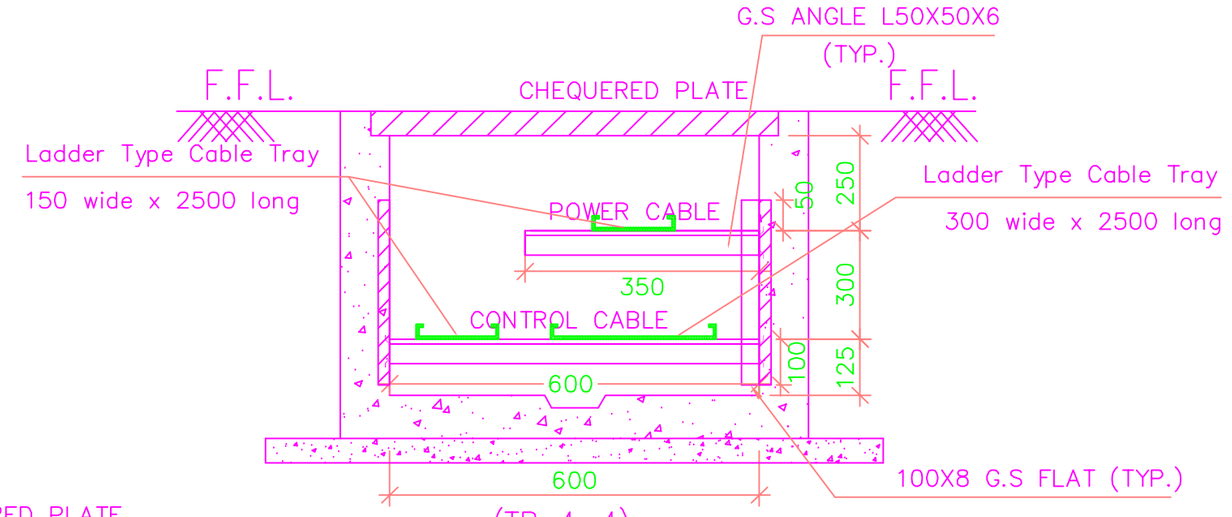
(TR 2-2)

NTS



CABLE SLIT (AHU ROOM)

NTS



(TR 4-4)

NTS

NTPC DRG. No. **4540-001-230-PVE-F-001**

PROJECT	TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)
OWNER	**NTPC Limited** (A GOVERNMENT OF INDIA ENTERPRISE)
	BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP NOIDA

W.O. NO. 419
STATUS CONTRACT
DISTRIBUTION
TO
No. OF

DEPT CODE		NAME	SIGN	DATE
M	DRN	PC	-sd-	19.05.23
	CHD	RD	-sd-	19.05.23
	APPD	VK	-sd-	19.05.23

REV.	DATE	ALTD	CHD	APPD
02	23.11.23	PC	RD	VK

DRAWINGS REVISED IN LINE WITH NTPC COMMENTS DT 25.06.23

TITLE: INDOOR CABLE TRENCH LAYOUT FOR SWITCHYARD CONTROL ROOM BUILDING (ELECTRICAL DRAWING)

DEPT. | SCALE NTS | DRAWING NO. 4540-001-230-PVE-F-001
SIGN
DATE
SHEET 02 OF 02 | REV. 02

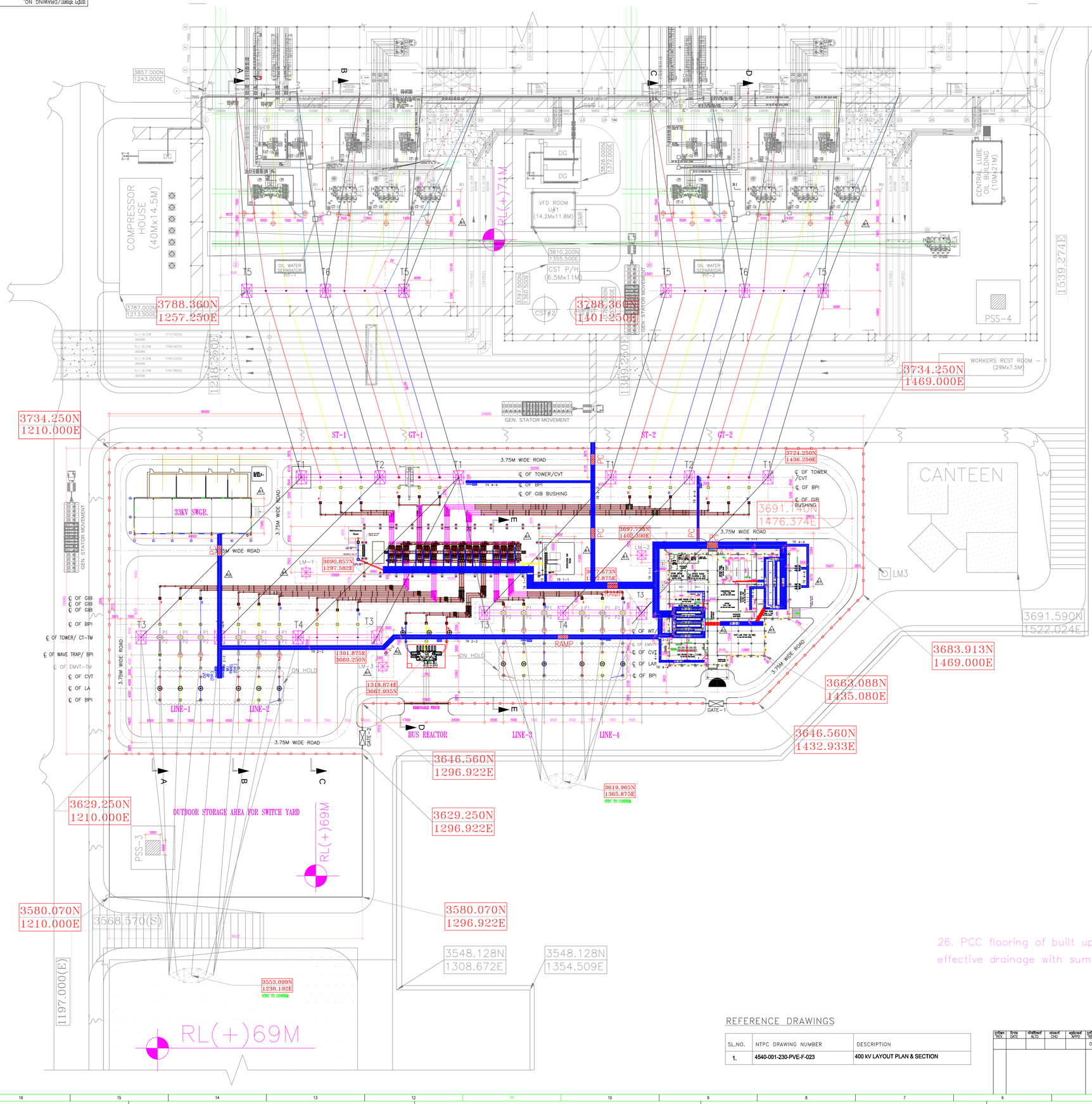
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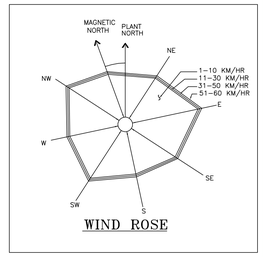
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It must not be used directly or indirectly in any way detrimental to the interest of the company/इसका प्रयोग कंपनी के हितों के प्रतिकूल किसी भी तरह से प्रत्यक्ष या अप्रत्यक्ष रूप से नहीं किया जाना चाहिए

D:\PROJECT FOLDER\P_R_O_J_E_C_T_S\NTPC TALCHER\CABLE TRENCH LAYOUT\SWITCH YARD OUTDOOR CABLE TRENCH LAYOUT_R2_2023-11-23.dwg

ड्राफ्टी संख्या/DRAWING NO.

फर्स्ट एंगल प्रोजेक्शन/FIRST ANGLE PROJECTION — सभी माप मि॰ मी॰ मे है/ALL DIMENSIONS ARE IN MM





NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. THE LOCATION OF CABLE TRENCHES MARKED IN THIS DWG MAY BE SLIGHTLY MODIFIED TO SUIT SITE CONDITIONS.
3. OPENINGS FOR TAKING OUT GI PIPES TO EQUIPMENTS SHALL BE PROVIDED IN CABLE TRENCHES. OPENING OF SIZE SUITABLE TO DIA 50/100 PIPE SHALL BE PROVIDED BELOW TOP CABLE SUPPORT.
4. JB=INDICATES JUNCTION BOX; MUP=INDICATES MERGING UNIT PANEL
5. JB & MUP SHALL BE PEDESTAL MOUNTED ON CABLE TRENCHES. EXACT COORDINATES TO BE SUITABLY DECIDED AT SITE.
6. 1.1kV CONTROL CABLE SHALL BE PLACED IN MULTI-LAYER ON GI CABLE RACK SUPPORT (ANGLE).
7. CABLE SUPPORT FOR OUTDOOR TRENCHES SHALL BE PROVIDED AT EVERY 600mm INTERVAL.
8. AUXILIARY POWER CABLES SHALL BE LAID IN TOP TIERS AND CONTROL CABLES IN BOTTOM TIERS.
9. FIBER OPTIC CABLE SHALL BE LAID IN 50/ 100mm DIA GI PIPE AND THE SAME SHALL BE ROUTED THROUGH BOTTOM OF TRENCH.
10. CABLES FOR LIGHTING PURPOSE SHALL BE LAID IN GI PIPE/TRENCH. SEPARATE DRAWING SHALL BE SUBMITTED FOR LIGHTING SYSTEM.
11. DETAILS OF CABLE TRENCHES INSIDE CONTROL ROOM SHALL BE SHOWN IN SEPARATE DRAWING.
12. EARTH CONDUCTOR 75X12 GI FLAT TO BE WELDED IN VERTICAL ON THE CABLE SUPPORT BEFORE INSTALLATION OF CABLES.
13. CABLES CROSSING ROAD SHALL BE LAID IN BOX/PIPE CULVERT.
14. FOR POWER AND CONTROL CABLES, SEPARATE PIPES SHALL BE USED CONSIDERING 60% VOID FOR EACH PIPE I.E 40% FILLING CRITERIA.
15. ALL OTHER DETAILS PERTAINING TO CIVIL WORKS SHALL BE REFLECTED IN RESPECTIVE CIVIL DRAWINGS.
16. GI PIPES SHALL BE SECURELY FIXED AT BOTH ENDS.
17. AFTER LAYING THE CABLES, THE ENDS OF THE GI PIPES SHALL BE FULLY SEALED TO PREVENT INGRESS OF WATER INSIDE THE PIPE.
18. CONTROL CABLES AND POWER CABLES MUST BE LAID IN SEPARATE GI PIPES.
19. THE PURPOSE OF TRENCH LAYOUT DRAWING (ELECTRICAL) IS FOR FOLLOWS USE AS :
    - TO BE USED AS CIVIL INPUT FOR CABLE TRENCHES.
    - FOR ERECTION OF CABLE RACKS AT SITE.
    - FOR CABLE LAYING AND ROUTING AT SITE.
20. THE CABLE OF CVT SECONDARY TERMINAL BOX AND JUNCTION BOX SHALL BE LAID IN 100/50MM GI PIPE.
21. CABLES CROSSING ROAD SHALL BE LAID IN BOX/PIPE CULVERT. IT IS INDICATED BY ▨
22. DETAILS OF CABLE TRENCH LOWEST POINT CONNECTION TO NEAREST DRAIN SHALL BE SHOWN SEPARATELY IN CIVIL DRAWING NO. 4540-001-230-PVE-C-020 (OUTDOOR CABLE TRENCH DETAILS).
23. PULL BOXES (600x600x400 mm) SHALL BE USED AT THE FREE END TURNING AND @15M IF PIPE LENGTH EXCEEDS 15M.
24. Non-removable cover slab with RAMP over trench to be provided for ease of vehicle movement in switch yard at locations shown.
25. Bus ducts shall be supported by support structures.
26. PCC flooring of built up trenches shall be sloped for effective drainage with sump pits and sump pumps.

REFERENCE DRAWINGS

SL.NO.	NTPC DRAWING NUMBER	DESCRIPTION
1.	4540-001-230-PVE-F-023	400 KV LAYOUT PLAN & SECTION

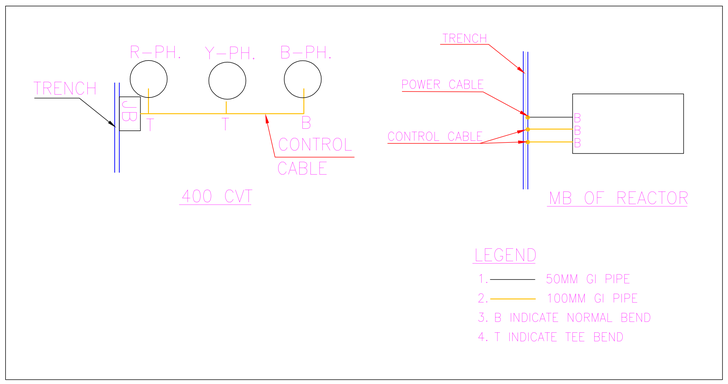
इश्यूकिए गए/ISSUED	दिनांक/DATE	परीक्षितकर्ता/CHKD	अनुमोदकर्ता/APPD	इश्यूकिए गए/ISSUED	दिनांक/DATE	परीक्षितकर्ता/CHKD	अनुमोदकर्ता/APPD	इश्यूकिए गए/ISSUED	दिनांक/DATE	परीक्षितकर्ता/CHKD	अनुमोदकर्ता/APPD
				02	23.11.23	PC RD	VK	01	14.08.23	PC RD	VK
				DOCUMENT REVISED IN LINE WITH NTPC COMMENTS DT 25.08.23				DOCUMENT REVISED IN LINE WITH NTPC COMMENTS DT 09.06.23			

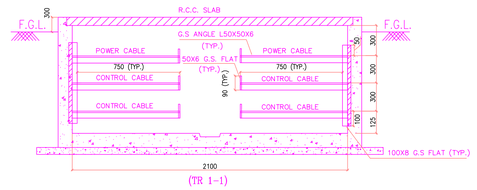
ग्राहक ड्राइंग संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-022
NTPC	ग्राहक/CUSTOMER: एन टी पी सी लिमिटेड N T P C LIMITED
कार्य संख्या- JOB NO. 419	परियोजना PROJECT: TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)
स्थिति STATUS: CONTRACT	भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD
मुद्रण स्केल मीटर में PRINT SCALE IN METRE: 0 2 4 6 8 10 20 30 40 50	TRANSMISSION BUSINESS GROUP नोएडा (उ॰प्र॰)/NOIDA (U.P.)
शीर्षक/TITLE: 400kV GIS SWITCHYARD OUTDOOR CABLE TRENCH ARRANGEMENT LAYOUT (ELECTRICAL DRAWING)	
डिज़ाइन DESIGN: PC; ड्राफ्टर्समैन/DRN: PC; टीमलीडर/TL: RD; लीडर/CHD: RD; अनुमोदकर्ता/APPD: VK	DEPT CODE: M; नाम NAME; हस्ताक्षर SIGNATURE; दिनांक DATE: 19.05.2023
डिज़ाइन DEPT.; स्केल SCALE –; हस्ताक्षर SIGN; दिनांक DATE	ड्राइंग संख्या/ DRAWING NO. 4540-001-230-PVE-F-022; शीट SHEET 1 OF 2; पुनरीक्षण REV. 02

फ्रेमेट साइज़ A0 FORMAT SIZE A0

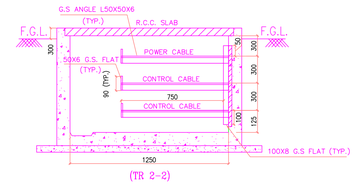
फर्स्ट एंगल प्रोजेक्शन/FIRST ANGLE PROJECTION
सभी माप मि॰ मी॰ मे है/ALL DIMENSIONS ARE IN MM
ड्राईंग संख्या/DRAWING NO.
COPY RIGHT AND CONFIDENTIAL/कॉपीराइट और गोपनीय
The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED/इस दस्तावेज की सामग्री भारत हेवी इलेक्ट्रिकल्स लिमिटेड की संपत्ती है
must not be used directly or indirectly in any way detrimental to the interest of the company/इसका प्रयोग प्रत्यक्ष या परोक्ष रूप से किसी भी प्रकार से कंपनी के हित के प्रतिकूल नहीं होना चाहिए
D:\PROJECT FOLDER\P_R_O_J_E_C_T_S\NTPC TALCHER\CABLE TRENCH LAYOUT\SWITCH YARD OUTDOOR CABLE TRENCH LAYOUT_R2_2023-11-23.dgn

GI PIPE DETAILS OF 400 kV EQUIPMENTS

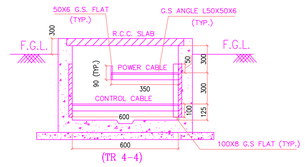




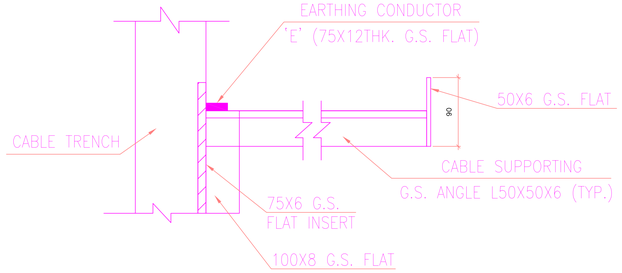
(TR 1-1)



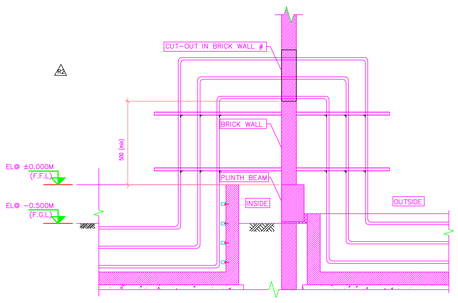
(TR 2-2)



(TR 4-4)



TYP. CABLE SUPPORT EARTH CONDUCTOR 'E' RUNS ON TOP TIERS ONLY



(TYP. ARRANGEMENT OF CABLE ENTRY TO CONTROL BUILDING, GIS HALL & VENTILLATION FAN ROOM)

CUT-OUT SIZE IN BRICK WALL:
a) Height 600 mm
b) Width as per individual Trench Section

Cut-outs shall be filled with POP after completion of cable laying.



JB/ MUP FIXING DETAIL ON TRENCH
A & B DIMENSIONS ARE AS PER JB/ MUP DRAWINGS.
X=TRENCH WALL THICKNESS.

0.0														
पुनरीक्षण REV.	दिनांक DATE	परीक्षित/ ALTD	संचालन/ CHD	अनुमोदन/ APPD	पुनरीक्षण REV.	दिनांक DATE	परीक्षित/ ALTD	संचालन/ CHD	अनुमोदन/ APPD	पुनरीक्षण REV.	दिनांक DATE	परीक्षित/ ALTD	संचालन/ CHD	अनुमोदन/ APPD
					02	23.11.23	PC	RD	VK	01	14.08.23	PC	RD	VK
						DOCUMENT REVISED IN LINE WITH NTPC COMMENTS DT 25.08.23					DOCUMENT REVISED IN LINE WITH NTPC COMMENTS DT 09.06.23			

ग्राहक ड्राईंग संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-022
ग्राहक/CUSTOMER	एन टी पी सी लिमिटेड N T P C LIMITED
परियोजना PROJECT	TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)
कार्य संख्या- JOB NO. 419	
स्थिति STATUS CONTRACT	
मुद्रण स्केल मीटर में PRINT SCALE IN METRE 0.2 0.4 0.6 0.8 1.0 20 30 40 50	भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP नोएडा (उ॰प्र॰)/NOIDA (U.P.)
DEPT. CODE M	

	नाम NAME	हस्ताक्षर SIGNATURE	दिनांक DATE
तैयारकर्ता/DSN	PC	Sd/-	19.05.2023
डिजाइनकर्ता/DESN	PC	Sd/-	19.05.2023
जांचकर्ता/CHD	RD	Sd/-	19.05.2023
अनुमोदनकर्ता/APPD	VK	Sd/-	19.05.2023

शीर्षक/TITLE
400kV GIS SWITCHYARD OUTDOOR CABLE TRENCH ARRANGEMENT LAYOUT (ELECTRICAL DRAWING)

विभाग DEPT.	स्केल – SCALE–
हस्ताक्षर SIGN	
दिनांक DATE	

ड्राईंग संख्या/ DRAWING NO. 4540-001-230-PVE-F-022

शीट SHEET 2 OF 2 पुनरीक्षण REV. 02

फार्मेट साइज AO FORMAT SIZE AO

एन टी पी सी लिमिटेड
(भारत सरकार का उद्यम)
NTPC Limited
(A Govt. of India Enterprise)
(Formerly National Thermal Power Corporation Ltd.)
(केंद्रीय कार्यालय नोएडा)
Corporate Center NOIDA

Reference : CC-ENGG-4540-001-230-PVE-P-003 **Date :** 30/12/2023

From : Subodh Pandit ADDL. GENERAL MANAGER	**To :** BHARAT HEAVY ELECTRICALS LTD NEW DELHI 110049 IN **Cc :** singhjp@bhel.in

Subject : EPC TTPP3 (2x660MW)

Please find enclosed following drawings/ documents for necessary action at your end.

Vendor Drg. No.	:	GD53A000721
Orgn. Drg. No.	:	4540-001-230-PVE-P-003
Revision No.	:	01
Drg. Title	:	GAS SINGLE LINE DIAGRAM
App. Category	:	CAT-I
Release Date	:	30/12/2023

Scan to verfiy

Comments : Minor correctons marked

COMMENT RESOLUTION SHEET				
PROJECT	400kV GIS Switchyard at NTPC Talcher TPP Stage-III (2x660MW)			
DRG / DOC TITLE	400kV GIS Gas SLD			
NTPC DRG / DOC NO.	4540-001-230-PVE-P-003			
Revision	1			
Reviewed By	NTPC			
Review Date / Location	27-12-2023/NTPC TALCHER			

400kV GIS SWITCHYARD					
SR. No.	Page No. / Clause No. / Sheet No.	NTPC Observations / Comments dt 04/12/2023 & Discussion had on 12/12/2023	GE Reply 15/12/2023	NTPC Observations / Comments dt 21/12/2023	GE Reply 27/12/2023
1		Confirm GIS continuous operability at plant full load conditions even in case of failure of mechanical ventillation of GIS Hall. Also, the LCCs & all other GIS equipment, sensors etc. shall also be suitable for continuous operation even in case of failure of mechanical ventillation. Please confirm.	We confirmed the same		
2		What are the design changes & improvements over previous version? Confirm whether all supplied equpiment are of proven and type tested design	CB made significant changes from its previous design, which had a twin breaking chamber and a larger size. T155-3, on the other hand, has a small size and a single breaking chamber. Supplied equipment are type tested as per IEC guide line.		
3		Confirm (+/-) of switch impulse withstand voltage	Noted and Incorporated		
4		Internal arc fault withstand time without burn through: 300ms as per specificaiton regirement	Noted and Incorporated		
5		Ratings & locations of LA shall be based on Insulation Coordination studies. Same shall be submitted	Noted, Same will be submitted.	**Notes as marked in the Drawing to be added.**	**Noted.**
6		Change the CT bay name in BOM table	Noted and Incorporated		
7		BOM is indicative only. M/s BHEL to supply all the material as per system requirement	Noted	**Notes as marked in the Drawing to be added.**	**Noted.**
8		Earth switches with BUs I/II VT is missing, kindly include.	Noted and Incorporated		
9		Mention the reference drawings list Approved SLD and protection SLD.	Noted and Incorporated		
10		Typical Comment: This gas compartment is relatively long. Pls reconcile to increase compartmentatlization. Eg: Line 3 & 4 GIB compartmentalization is different from Line 1 &2. Similarly, GT2 compartmentalization is different from GT1 Applicable for all GIB ducts both incoming and outgoing	Outdoor SF6 Busduct Compartments shown are only indicative & minimum and the same will be determined at the equipment layout preparation.	1) A note to be mentioned in the drawing "Gas compartments shown for Outdoor SF6 Busducts are tentative & minimum". Basis of gas compartmentalization shall also be mentioned in note. 2) Similar tentative arrangements to be shown for all lines/GT/ST.	1) Noted, same note is included in the revised GSLD and basis of gas compartmentalization is also included as part of note in GSLD. 2) Single gas compartment is shown for outdoor for all lines/GT/ST bays. Actual compartment will be concluded at that time of GIS layout finalizaiton.
11		Typical Comment: Device numbering shall be as per SLD	Noted and Incorporated		
12		Remove 'FOR VT' text in Legend table	Noted and Incorporated		
13		Typical Comment: Service continuity shall be ensured in adverse situations during Maintenance, Repairs and dielectric testing at site. (Cigre TB 585/ 870) Maintenance or Repair of any single component (e.g. Isolator or Earth switch) shall not result in non-availability of bus. Gas Partitioning shall be revised and updated accordingly.	Being 1.5 circuit breaker scheme, service continuity will be secured for Maintenance, Reapirs and dielectric testing. However, its an active busbar system and disconnector is part of busbar, when we go for maintenance on disconector assembled on busbar is required respective busbar shutdown, same time service continuity will be secured from other busbar. Hence the given gas partitioning is meeting the service continuity requirement.		
14		Busduct after CT-M/L: This gas compartment is relatively long. Pls reconcile to increase compartmentatlization.	Outdoor SF6 Busduct Gas compartmentalization will be finalized after concluding the GIS indoor and outdoor layout.		
15		All Bays TYPICAL Comment for compartments comprising 89L/ 89LE/ CT-L: Gas Compartmentalization to be increased such that debris/ contaminants from switching/ moving components does not enter/effect the other components. Drg to be updated accordingly.	Contamination of gas is mainly possible at CB compartment due to multiple switching for various reason, so CB compartment is shown as separate compartment. Other moving components like disconnector & earthing switches will be operated only at NO load condition. So, generating of contaminated SF6 gas is not possible in these compartments. Hence the given gas barrier location is adequate for preventing from mixing with contaminant gas. CT cores are air insulated, only busbar will be insulated with SF6 gas.	**Further discussions with BHEL & OEM is required in this regard.**	As per discussion happened with customer on 27-Dec-2023, customer has agreed to proceed with standard and type tested design of GE GIS bays; that is earthing switch is part of CT compartment. However, CT's in all outgoing lines will be configured in separate gas compartment.
16		Device numbering shall be as per approved SLD. Mismatch observed in Tie Bays.	Noted and incorporated		
17		Location of Bus E/S not as per SLD. Bus extension to be possible from either end of the bus.	As per discussion location of surge arrester, Bus VT & Bus earthing switch is located betweeen dia-1 and dia-2.		
18		Confirm full compliance to Cl. No. 2.03.01 & 2.03.02 of TS Section-2.	Both the points are complied		
19		Confirm that the Surge arrestors for main buses shall be of GIS type only.	Yes, the given surge arrestor is GIS type only		
20		Pl. check whether PDC required in Surge Arrester compartment.	PDC are located very closer to surge arrester on both side, so PDC is not required separately for surge arrester.		
21		Correct the text in LEGENDS for Manual Disconnecting Link.	Noted and incorporated		

COMMENT RESOLUTION SHEET					
PROJECT	400kV GIS Switchyard at NTPC Talcher TPP Stage-III (2x660MW)				
DRG / DOC TITLE	400kV GIS Gas SLD				
NTPC DRG / DOC NO.	4540-001-230-PVE-P-003				
Revision	1				
Reviewed By	NTPC				
Review Date / Location	27-12-2023/NTPC TALCHER				
400kV GIS SWITCHYARD					
SR. No.	Page No. / Clause No. / Sheet No.	NTPC Observations / Comments dt 04/12/2023 & Discussion had on 12/12/2023	GE Reply 15/12/2023	NTPC Observations / Comments dt 21/12/2023	GE Reply 27/12/2023
22		1) Gas partitioning philosphy shall ensure Service Continuity in GIS with utmost priority. Additional gas compartments may be provided wherever necessary for ensuring service continuity with highest availability and Minimum outage time. Review the proposed arrangment and confirm. 2) Confirm whether working in a compartment with is possible with adjacent one under full gas pressure. 3) Confirm Whether suitable Provisions for on-site dielectric testing after maintenance and repair are being provided. 4) What is the overall MTTR of the GIS 5) Confirm whether Service Continuity MRE 00 is ensured with the offered partitioning scheme as per IEC 62271-203 (Annexure-F).	1) we are meeting the service continuity requirement as described in NTPC technical specification. 2)we can work If gas through barrier is located after pressurized compartment, however these intervention must be carried out using procedure validated by the manufacturer. 3) Doing on-stie dielectric testing after maintenance/ repair is possible, method statment shall be secured and validated before performing this dielectric testing. 4) MTTR is based on the GIS component which involves the materials availability in the site and the nature of the failure. 5) we are meeting the service continuity requirement as described in NTPC technical specification.	1) Step by step procedure for gas working/ manufacturer recommendations shall be provided to NTPC? Method statement by OEM for dielectric testing at site shall be provided by OEM? In which drawing/ document? 4) MTTR to be mentioned for each type of component: CB, DS, ES, SA, VT, CT etc., considering spare materials are available at site.	1) OEM recommended procedures are covered in O&M manual and Method statement shall be included as part of O&M manual. 4) MTTR is a part of Method statement and will be submitted along with the O&M Manual
23		1.0 Compartment wise gas quantity, gas pressure and alarm ON/ Reset set point may be indicated 2.0 Basis of selection of number of PD coupler to shall be provided as per specification requirement. 3.0 What is the provision to relieve the excess SF6 pressure i.e PRD etc.	1.0 Separate sheet will be submitted for gas qty of all gas compartments. Gas pressure & alarm details are already captured in GSLD. Kindly refer 1st page of GSLD. 2.0 Attached the philosopy for location of PD sensors. 3.0 The setup is with Rupture Diaphram, it pressure is exceeds the set value, it will burst and release the SF6 gas.		
24		what is the setting of bursting disc.	It is included in first page of GSLD (Refer table 'SF6 density monitoring details')		
25		M/s BHEL/ GE to provide necessary maintenance and monitoring equipments as per the requirements specified in the technical specifications.	Spares and tools documents will be submitted seperately for approval as per the technical specification and BOM.		
26				In the BOM table, Tie Bay CT nomenclature (CTA1 & CTA2) to be corrected as per gas SLD.	Corrected as per gas SLD

फर्स्ट एंगल प्रोजेक्शन/FIRST ANGLE PROJECTION | सभी माप मि. मी. मे है/ALL DIMENSIONS ARE IN MM

ड्राॅइंग संख्या/DRAWING NO.

MAIN CHARACTERISTICS		
Model No. of GIS		T155-3
Rated Current -Busbar & Tie Bays at 50°C	Ir	3150 A
Rated Current -Line, GT & ST Bays at 50°C	Ir	3150 A
Rated Frequency	fr	50Hz
Short-time Withstand Current	Ik	63kA
Duration of Short circuit Current	tk	1s
Highest system Voltage	Ur	420kV rms
Power frequency withstand Voltage 1.) Phase to Earth and Between Phases 2.) Across isolating distance	Ud	650 kV rms 815 kV rms
Lightning Impulse withstand Voltage 1.) Phase to Earth and Between Phases 2.) Across isolating distance	Up	+/-1425kVc 1425(+240)KVp
Switching Impulse withstand Voltage 1.) Phase to Earth and Between Phases 2.) Across isolating distance	Us	+/- 1050kVc 900(+345) KVp
Internal arc fault withstand time without burn through	ms	300
Peak withstand Current	Ip	157.5kA
Ambient Design Temperature	°C	50
Seismic withstand level		0.3g
Creepage		31mm/kV (13020 mm)

APPLICABLE STANDARDS	
High Voltage Alternating Current Circuit Breaker	IEC 62271-100
High Voltage Alternating Current Disconnector & Earthing Switch	IEC 62271-102
Gas Insulated Metal Enclosed Switchgear	IEC 62271-203
HV Bushing	IEC 60137
Current Transformers	IEC 61869-2
Voltage Transformers	IEC 61869-3
SF6 Gas	IEC 60376
Pressure Vessel	CENELEC

VOLTAGE TRANSFORMER DATA (EMVT)
According to IEC 61869-3

Rated Voltage Factor = 1.2 continuous / 1.5, 30s , Fr = 50 Hz

VT NO	BAY NAME	Quantity	Core	Ratio (rms)	Class	Output (VA)	Thermal Burdens (VA)
T01 T02	METERING	06 Nos	Sec-1	400kV/√3 / 110V/√3	3P	50	1000
			Sec-2	400kV/√3 / 110V/√3	3P	50	1000
			Sec-3	400kV/√3 / 110V/√3	0.2	50	1000

SF6 DENSITY MONITORING DETAILS	
CIRCUIT BREAKER	OTHER COMPARTMENTS
Bars RELATIVE AT 20°C Nominal : 6.3 bar Gas Refill Level : 6.0 bar Breaker Block Level : 5.7 bar Zone Trip Level : 5.7 bar Rupture Diaphram Bursting Pressure : 13 bar ±10%	Bars RELATIVE AT 20°C Nominal : 6.3 bar Gas Refill Level : 5.8 bar Zone Trip Level : 5.5 bar Rupture Diaphram Bursting Pressure : 11 bar ±10%

SURGE ARRESTER
According to IEC 60099-4

SA NO	Quantity (1 phase)	Ur	Uc	In	Class ID	TYPE
SA1, SA2	06 Nos	392 kV	314 kV	20 kA	4	PSB392F

BILL OF MATERIAL - (BOM)

RATING	QTY.	DESCRIPTION	DEVICE CODE
420KV, 3150A, 63kA-1 Sec	06	CIRCUIT BREAKER WITH CSD (3 PH)	401-52, 402-52, 407-52, 408-52, 411-52, 412-52
420KV, 3150A, 63kA-1 Sec	09	CIRCUIT BREAKER WITHOUT CSD (3 PH)	403-52, 404-52, 405-52, 406-52, 409-52, 410-52, 413-52, 414-52, 415-52
420KV, 3150A, 63kA-1 Sec	42	MOTOR OPERATED DISCONNECTOR (3PH)	401-89A, 401-89B, 401-89T, 402-89A, 402-89B, 403-89A, 403-89B, 403-89L, 404-89A, 404-89B, 404-89T, 405-89A, 405-89B, 406-89A, 406-89B, 406-89L, 407-89A, 407-89B, 407-89T, 408-89A, 408-89B, 409-89A, 409-89B, 409-89L, 410-89A, 410-89B, 410-89T, 411-89A, 411-89B, 412-89A, 412-89B, 412-89R, 413-89A, 413-89B, 413-89L, 414-89A, 414-89B, 415-89A, 415-89B, 415-89L, 4BB1-89, 4BB2-89
420KV, 3150A, 63kA-1 Sec	47	MOTOR OPERATED INSULATED SLOW EARTHING SWITCH (3 PH)	401-89AE, 401-89BE, 401-89TE, 402-89AE1, 402-89AE2, 402-89BE1, 402-89BE2, 403-89AE, 403-89BE, 404-89AE, 404-89BE, 404-89TE, 405-89AE1, 405-89AE2, 405-89BE1, 405-89BE2, 406-89AE, 406-89BE, 407-89AE, 407-89BE, 407-89TE, 408-89AE1, 408-89AE2, 408-89BE1, 408-89BE2, 409-89AE, 409-89BE, 410-89AE, 410-89BE, 410-89TE, 411-89AE1, 411-89AE2, 411-89BE1, 411-89BE2, 412-89AE, 412-89BE, 412-89RE, 413-89AE, 413-89BE, 414-89AE1, 414-89AE2, 414-89BE1, 414-89BE2, 415-89AE, 415-89BE, 4BB1-89E1, 4BB1-89E2, 4BB2-89E1, 4BB2-89E2
420KV, 3150A, 63kA-1 Sec	05	MOTOR OPERATED INSULATED FAST EARTHING SWITCH (3 PH)	403-89LE, 406-89LE, 409-89LE, 413-89LE, 415-89LE
420KV, 3150A, 63kA-1 Sec	30	SF6 TO AIR BUSHING (1PH)	-
-	06	CONTROL SWICHING DEVICE	-
-	40	CURRENT TRANSFORMER (3 PH)	401-CTA, 401-CTB, 401-CTM, 402-CTA1, 402-CTA2, 403-CTA, 403-CTB, 403-CTL, 404-CTA, 404-CTB, 404-CTM, 405-CTA1, 405-CTA2, 406-CTA, 406-CTB, 406-CTL, 407-CTA, 407-CTB, 407-CTM, 408-CTA1, 408-CTA2, 409-CTA, 409-CTB, 409-CTL, 410-CTA, 410-CTB, 410-CTM, 411-CTA1, 411-CTA2, 412-CTA, 412-CTB, 412-CTBR, 413-CTA, 413-CTB, 413-CTL, 414-CTA1, 414-CTA2, 415-CTA, 415-CTB, 415-CTL
-	02	VOLTAGE TRANSFORMER (3 PH)	4BB1-VT, 4BB2-VT
-	02	SURGE ARRESTOR (3 PH)	4BB1-LA, 4BB2-LA

CURRENT TRANSFORMER
According to IEC 61869-2

Ith =63kA,1s Idyn =157.5kA Icth = 120% (All core Tapping's) Iext=Icth

CT No	Bay Name	Quantity (1 phase)	GE Ref	Client Ref	Ratio (A)	Accuracy class	Burden (VA)	Mini. KPV (Vk)	Rct (∩) at 75deg C	Max. Exciting Current (mA) at Vk	ISF
		GT, ST, Bus Reactor, Line and Tie BAYS									
CT-A CT-A1 CT-A2	BAY 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415	P1 60 NOS. P2 (CB)	F1	CORE 1	3000 / 1 2000 / 1 1000 / 1	PS	-	6000 4000 2000	15 10 5	20 30 60	-
			F1	CORE 2	3000 / 1 2000 / 1 1000 / 1	PS	-	6000 4000 2000	15 10 5	20 30 60	-
			N2	CORE 3	3000 / 1 2000 / 1 500 / 1	0.2S	20	-	-	-	<=5
CT-B	BAY 401, 403, 404, 406, 407, 409, 410, 412, 413, 415	P1 (CB) 30 NOS. P2	F1	CORE 1	3000 / 1 2000 / 1 1000 / 1	PS	-	6000 4000 2000	15 10 5	20 30 60	-
			F1	CORE 2	3000 / 1 2000 / 1 1000 / 1	PS	-	6000 4000 2000	15 10 5	20 30 60	-
		Outgoing side GT, ST & Bus Reactor BAYS									
CT-C (CT-M & CT-BR)	BAY 401, 404, 407, 410, 412	P1(DS) 15 NOS. P2	N2	CORE 1	3000 / 1 2000 / 1 500 / 1	0.2S	20	-	-	-	<=5
		Outgoing side Line BAYS									
CT-C (CT-L)	BAY 403, 406, 409, 413, 415	P1(DS) 15 NOS. P2	N2	CORE 1	3000 / 1 2000 / 1 500 / 1	0.2S	20	-	-	-	<=5
			N2	CORE 2	3000 / 1 2000 / 1 500 / 1	0.2S	20	-	-	-	<=5
			F1	CORE 3	3000 / 1 2000 / 1 1000 / 1	PS	-	6000 4000 2000	15 10 5	20 30 60	-
			F1	CORE 4	3000 / 1 2000 / 1 1000 / 1	PS	-	6000 4000 2000	15 10 5	20 30 60	-

GIS COLOR :
INDOOR : RAL 7032
OUTDOOR : RAL 7032

Drawing Reference:
400kV GIS SWITCHYARD SINGLE LINE DIAGRAM: Doc. No. 4540-001-230-PVE-P-001, Rev. 02 01

400kV GIS SWITCHYARD PROTECTION SLD: Doc. No. 4540-001-230-PVE-P-002, Rev. 01

VENDOR NAME	GE T&D INDIA LTD. 142, Vandalur–Walajabad Road Padappai, Chennai 601301 Tamilnadu, India
ग्राहक दृष्टांत संख्या/ CUSTOMER DRAWING NO.	4540-001-230-PVE-P-003
ग्राहक/CUSTOMER	एन टी पी सी लिमिटेड N T P C LIMITED
परियोजना/ PROJECT	TALCHER THERMAL POWER PROJECT STAGE–III (2X660MW)
	भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP नोएडा (उ.प्र.)/NOIDA (U.P.)

कार्य संख्या/ JOB NO. 419
स्थिति/ STATUS: CONTRACT
मुद्रण स्केल मीटर में/ PRINT SCALE IN METRE: 0 2 4 6 8 10 20 30 40 50

DEPT CODE		नाम NAME	हस्ताक्षर SIGNATURE	दिनांक DATE
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	डिजाइनकर्ता/DSGN	RN		
	जाँचकर्ता/CHD	MS		
	अनुमोदनकर्ता/APPD	SR		

पुनरीक्षण/REV	दिनांक/DATE	पीसीबीकर्ता/ALTD	जाँचकर्ता/CHD	अनुमोदनकर्ता/APPD	पुनरीक्षण/REV	दिनांक/DATE	पीसीबीकर्ता/ALTD	जाँचकर्ता/CHD	अनुमोदनकर्ता/APPD	पुनरीक्षण/REV	दिनांक/DATE	पीसीबीकर्ता/ALTD	जाँचकर्ता/CHD	अनुमोदनकर्ता/APPD	पुनरीक्षण/REV	दिनांक/DATE	पीसीबीकर्ता/ALTD	जाँचकर्ता/CHD	अनुमोदनकर्ता/APPD	पुनरीक्षण/REV	दिनांक/DATE	पीसीबीकर्ता/ALTD	जाँचकर्ता/CHD	अनुमोदनकर्ता/APPD
01	27.12.23	RAMU	MURUGAN	SENTHIL	01	15.12.23	RAMU	MURUGAN	SENTHIL	01	07.12.23	RAMU	MURUGAN	SENTHIL	00	20.11.23	RAMU	MURUGAN	SENTHIL	00	14.11.23	RAMU	MURUGAN	SENTHIL
AS PER BHEL COMMENTS UPDATED					AS PER BHEL COMMENTS UPDATED					AS PER BHEL COMMENTS UPDATED					AS PER BHEL COMMENTS UPDATED					FIRST SUBMISSION				

शीर्षक/TITLE: 400kV GIS GAS SINGLE LINE DIAGRAM

विभाग/ DEPT. | स्केल/ SCALE – | ड्राइंग संख्या/ DRAWING NO.: GD53A000721
हस्ताक्षर/ SIGN | दिनांक/ DATE | शीट/ SHEET 1/2 OF | पुनरीक्षण/ REV. 01

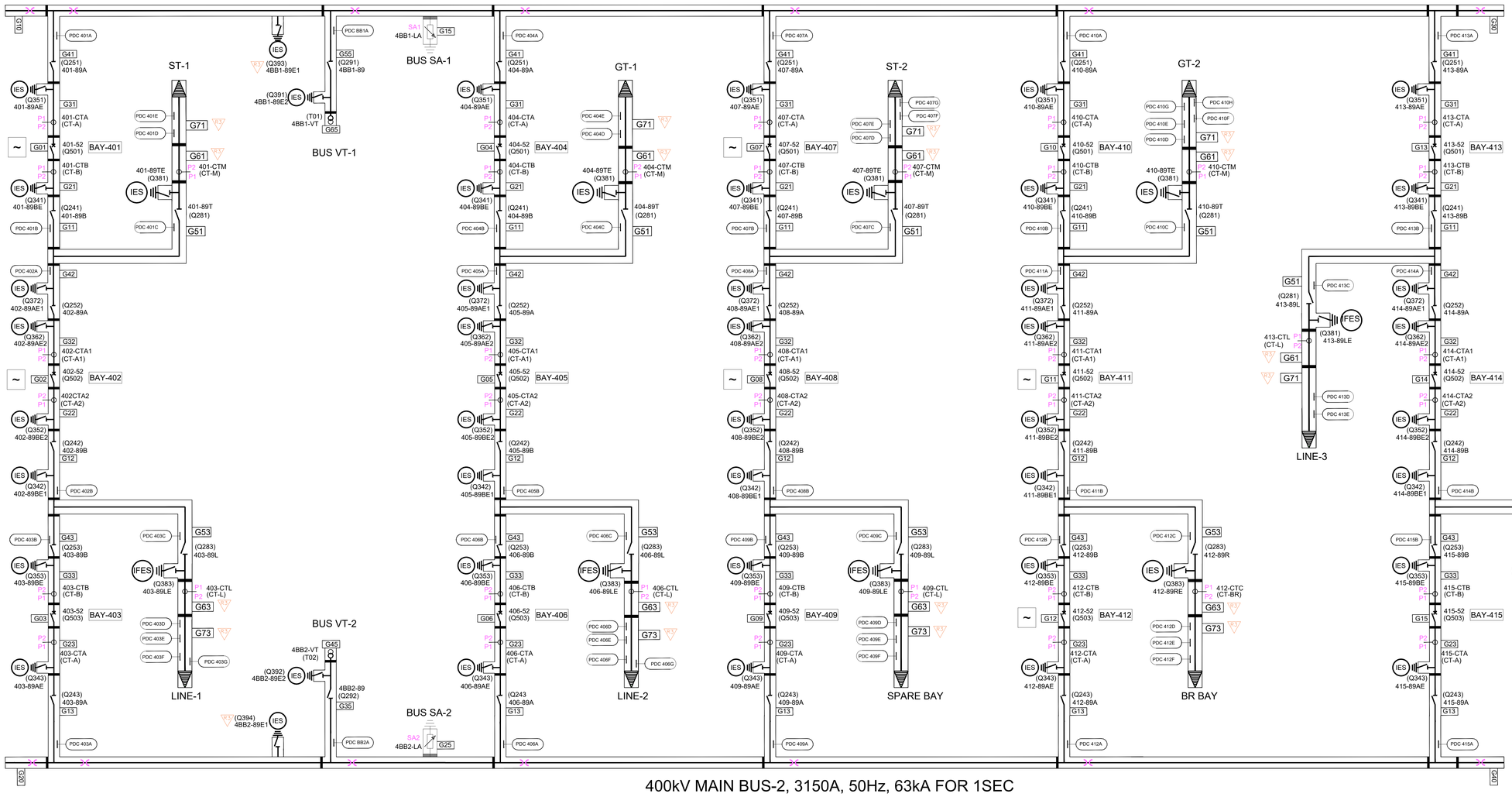
चार्ट साइज A0
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यह ड्राइंग भेल की प्रॉपर्टी है। इसे भेल की लिखित सहमति के बिना उधार देना, कॉपी करना या पुनरुत्पादित करना मना है। इसे मांग करने पर वापस करना होगा। इसका उपयोग केवल भेल द्वारा अधिकृत कार्य के लिए और उस कार्य अधिकार को नियंत्रित करने वाले नियम और शर्तों के अनुसार ही किया जाना है।

C:\Users\220906621\Box\Ckt - Primary Engg Drawings\GD\378_BHEL_NTPC_TH4LCH4B_400kV_T155-3\02_Primary Engineering\03D- Customer\drawings\ 2नि. [संरक्षण]\GD53A000721.dwg

फर्स्ट एंगल प्रोजेक्शन/FIRST ANGLE PROJECTION
सभी माप मि॰ मी॰ मे है/ALL DIMENSIONS ARE IN MM
ड्रॉइंग संख्या/DRAWING NO.
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400kV MAIN BUS-1, 3150A, 50Hz, 63kA FOR 1SEC



400kV MAIN BUS-2, 3150A, 50Hz, 63kA FOR 1SEC

	LEGEND
	CIRCUIT-BREAKER
	DISCONNECTOR
	BUSBAR
	CURRENT TRANSFORMER
	VOLTAGE TRANSFORMER
~	CONTROLLED SWITCHING DEVICE
IES	INSULATED MAINTENANCE EARTHING SWITCH
IFES	INSULATED FAST ACTING EARTHING SWITCH
	SF6-AIR BUSHING
PDC XX	PARTIAL DISCHARGE COUPLER
△	REVISION MODIFICATION
GXX	GAS PARTITIONING
BAY-4XX	GE T&D NUMBERING
	CLOSED CONE
	FUTURE
	MANUAL DISCONNECTING LINK
	SURGE ARRESTER

Note:-
- All the gas compartments are equipped with non-return filling valves, Density Switch, Static Filters & Bursting Disc
- PD coupler locations shown are only indicative & minimum and the same will be determined at the equipment layout preparation
- Static filters are suitable to absorb any water vapor which may penetrate into enclosure as well as by-products of SF6.
- Gas compartments shown for Outdoor SF6 Busducts are tentative & minimum, Gas quantity of each tight compartment is not more than 400kg.

- Ratings & locations of LA shall be based on Insulation Coordination studies.
- BOM is indicative only. M/s BHEL to supply all the material as per system requirement.

REV.	DATE	ALTD	CHD	APPD	REMARKS
01	27.12.23	RAMU	MURUGAN	SENTHIL	AS PER BHEL COMMENTS UPDATED
01	15.12.23	RAMU	MURUGAN	SENTHIL	AS PER BHEL COMMENTS UPDATED
01	07.12.23	RAMU	MURUGAN	SENTHIL	AS PER BHEL COMMENTS UPDATED
00	20.11.23	RAMU	MURUGAN	SENTHIL	AS PER BHEL COMMENTS UPDATED
00	14.11.23	RAMU	MURUGAN	SENTHIL	FIRST SUBMISSION

VENDOR NAME: GE T&D INDIA LTD.
142, Vandalur–Walajabad Road
Padappai, Chennai 601301
Tamilnadu, India

ग्राहक द्वारा संख्या CUSTOMER DRAWING NO.: 4540-001-230-PVE-P-003

ग्राहक/CUSTOMER: एन टी पी सी लिमिटेड / N T P C LIMITED

परियोजना PROJECT: TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)

कार्य संख्या- JOB NO. 419
स्टेटस STATUS: CONTRACT
मुद्रण स्केल मीटर में PRINT SCALE IN METRE

भारत हेवी इलेक्ट्रिकल्स लिमिटेड
BHARAT HEAVY ELECTRICALS LTD
TRANSMISSION BUSINESS GROUP
नोएडा (उ॰प्र॰)/NOIDA (U.P.)

DEPT CODE		नाम NAME	हस्ताक्षर SIGNATURE	दिनांक DATE
M	ड्रॉयरकर्ता/DRN	RN		
	डिजाइनकर्ता/DESN	RN		
	परीक्षकर्ता/CHD	MS		
	अनुमोदनकर्ता/APPD	SR		

शीर्षक/TITLE: 400kV GIS GAS SINGLE LINE DIAGRAM

डिज़ाइन DEPT. | स्केल – SCALE – | ड्रॉइंग संख्या / DRAWING NO.: GD53A000721
हस्ताक्षर SIGN | दिनांक DATE | शीट SHEET: 2/2 OF | पुनरीक्षण REV.: 01

फॉर्मैट साइज़ A0
FORMAT SIZE A0

फर्स्ट एंगल प्रोजेक्शन/FIRST ANGLE PROJECTION

सभी माप मि॰ मी॰ में है/ALL DIMENSIONS ARE IN MM

Scale: NTS Unit:mm	Format: A0
EC Nbr: -----	Q.Level: 3
Created: Logeshwar J	20/02/2024
Reviewed: ---	
Approved: Samikkannu Murugan	20/02/2024
T&D INDIA LTD	Sheet: 1/22
	Product type: T155-3

Q. Authority: CHT
Local Unit: CHT

NTPC_THALCHAR 400kV_T155-3
SECTION & PLAN LAYOUT
GD378

GD53A000723 Rev. 01

	LEGEND
BD	BURSTING DISC
MAD	MOISTURE ABSORBING DEVICE
DS	GAS DENSITY SWITCH
PO	VIEWING WINDOW
V	FILLING VALVE
	PRESSURE GAUGE
	LOCAL CONTROL CUBICLE
$O_{x,y}$	REFERENCE PIN
	CRANK 1
	CRANK 2
	OPEN INSULATOR
	COMMUNICATION INSULATOR
	CLOSE INSULATOR
PDCxx - -	PARTIAL DISCHARGE COUPLER
	MODIFICATION
PDC	UHF SENSOR
DSC	DISCONNECTOR
IES	INSULATED EARTHING SWITCH
IFES	INSULATED FAST EARTHING SWITCH
CT	CURRENT TRANSFORMER
VT	VOLTAGE TRANSFORMER
SA	SURGE ARRESTER

	SUMMARY
PAGE NO	DESCRIPTION
1	Summary
2	Indoor GIS View
3	Outdoor GIS View
4-16	Section view
17	Wall Cut Out Details
18	3D View
19-22	Components 3D View

SF6 DENSITY MONITORING DETAILS	
CIRCUIT BREAKER	OTHER COMPARTMENTS
Bars Relative At 20~C Nominal : 6.3 bar Gas Refill Level : 6.0 bar Breaker Block Level : 5.7 Bar Zone Trip Level : 5.7 bar Rupture Diaphram bursting Pressure: 13 bar'10%	Bars Relative At 20~C Nominal : 6.3 bar Gas Refill Level : 5.8 bar Zone Trip Level : 5.8 bar Rupture Diaphram Bursting Pressure : 11 bar'10%

Reference Documents:-

Gas Single Line Diagram : GD53A000721

GIS COLOR :
INDOOR : RAL 7032
OUTDOOR : RAL 7032

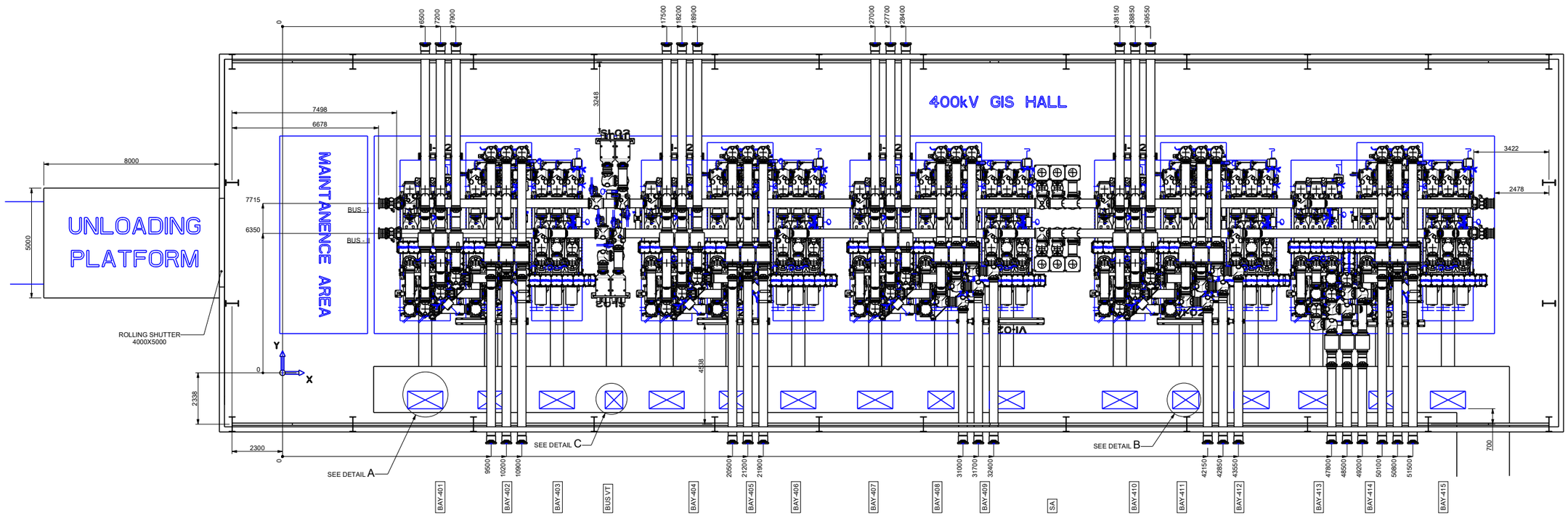
VENDOR NAME	GE T&D INDIA LTD. 142, Vandalur-Walajabad Road Padappai, Chennai 601301 Tamilnadu, India
ग्राहक ड्राईंग संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-026
ग्राहक CUSTOMER	एन टी पी सी लिमिटेड N T P C LIMITED
परियोजना PROJECT	TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)
भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD	TRANSMISSION BUSINESS GROUP नोएडा (उ॰प्र॰)/NOIDA (U.P.)
शीर्षक TITLE	SECTION & ELEVATION PLAN OF TALCHER 400 kV GIS SUB STATION
ड्राईंग संख्या / DRAWING NO.	GD53A000723
शीट SHEET	01 OF 22
पुनरीक्षण REV.	00

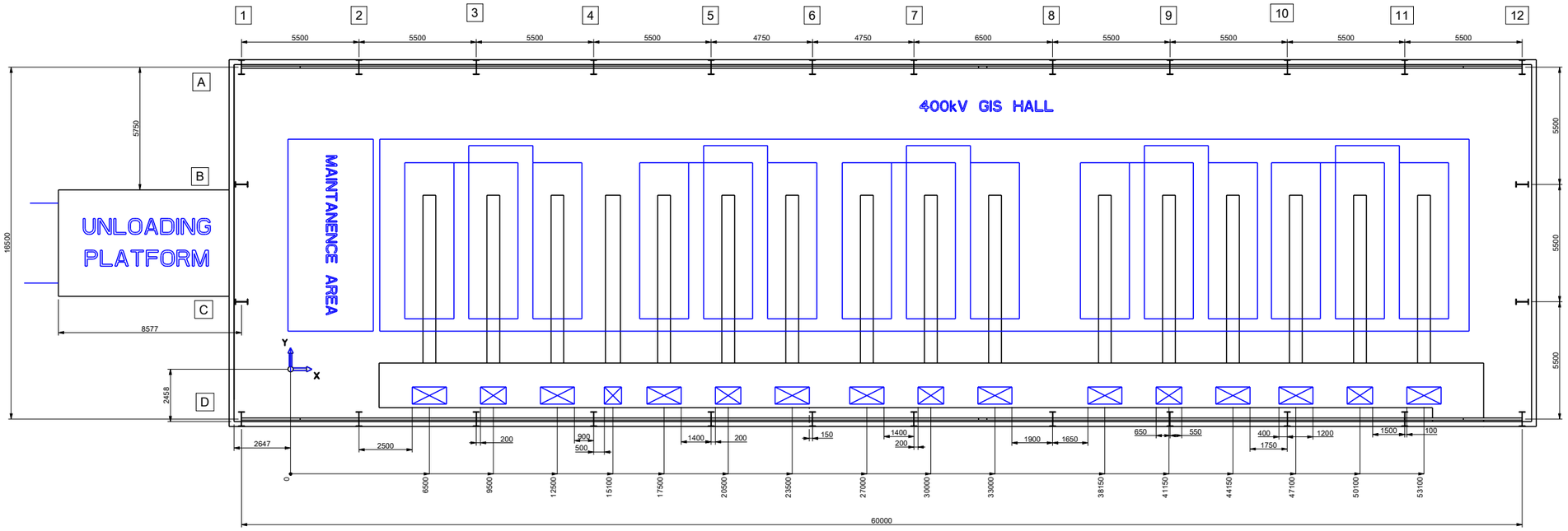
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फर्स्ट एंगल प्रोजेक्शन/FIRST ANGLE PROJECTION सभी माप मि. मी. में हैं/ALL DIMENSIONS ARE IN MM

INDOOR GIS

Scale: NTS Unit:mm	Format: A0	Q. Authority: CHT	NTPC_THALCHAR 400kV_T155-3
EC Nbr: ----	Q Level: 3	Local Unit: CHT	SECTION & PLAN LAYOUT
Created: Logeshwar J		20/02/2024	GD378
Reviewed: ---			
Approved: Samikkannu Murugan		20/02/2024	/
T&D INDIA LTD	Sheet: 2/22		GD53A000723 Rev. 01
	Product type: T155-3		





VENDOR NAME	GE T&D INDIA LTD. 142, Vandalur–Walajabad Road Padappai, Chennai 601301 Tamilnadu, India
ग्राहक दृष्टांत संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-026
ग्राहक CUSTOMER	एन टी पी सी लिमिटेड N T P C LIMITED
परियोजना PROJECT	TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)
भारत हैवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP नोएडा (उ.प्र.)/NOIDA (U.P.)	DEPT. CODE M; बना/DRN AK; डीजा/DES RN; चेकर/CHD MS; अनु/APPD SR
शीर्षक TITLE	SECTION & ELEVATION PLAN OF TALCHER 400 kV GIS SUB STATION
विभाग DEPT. / स्केल SCALE - / ड्राइंग संख्या / DRAWING NO.	GD53A000723
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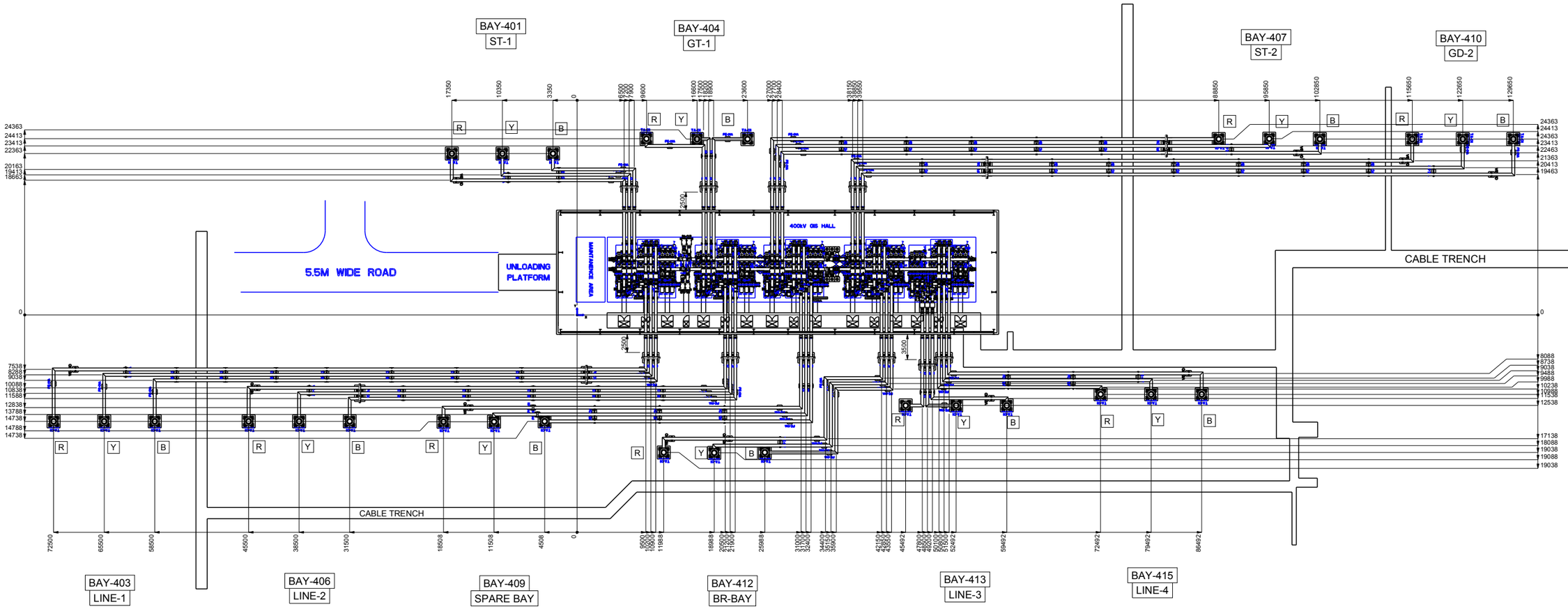
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फर्स्ट एंगल प्रोजेक्शन/FIRST ANGLE PROJECTION

सभी माप मि॰ मी॰ में हैं/ALL DIMENSIONS ARE IN MM

OUTDOOR GIS

Scale: NTS Unit: mm	Format: A0	D. Authority: CHT	NTPC_THALCHAR 400kV_T155-3
EC Nbr: ----	Q.Level: 3	Local Unit: CHT	SECTION & PLAN LAYOUT
Created: Logeshwar J		15/02/2024	GD378
Reviewed: ---			
Approved: Samikkannu Murugan		15/02/2024	
T&D INDIA LTD	Sheet: 3/22	Product type: T155-3	GD53A000723 Rev. 01



Outdoor GIB Length of unit in mm				
BAY Name	R	Y	B	TOTAL
BAY-401	45225	38225	30525	113975
BAY-403	109000	103400	97800	310200
BAY-404	32425	25375	27075	84875
BAY-406	93000	87400	81800	218475
BAY-407	86327	91975	96825	275127
BAY-409	77658	72028	66408	216094
BAY-410	100875	106475	111375	318725
BAY-412	62662	55712	48662	167036
BAY-413	28008	30392	37392	92792
BAY-415	45442	52442	59442	157326
Overall GIB Total Length				1954625

NOTE:

1. ALL DIMENSION ARE IN MM.
2. OUTDOOR PLINTH HEIGHT SHALL BE MAINTAINED 300MM FROM FGL.
3. MAXIMUM DISTANCE BETWEEN STRUCTURE IS 9 METER.
4. THE GIB LENGTH IS MEASURED FROM THE INDOOR TAKEOFF TO THE BUSHING.

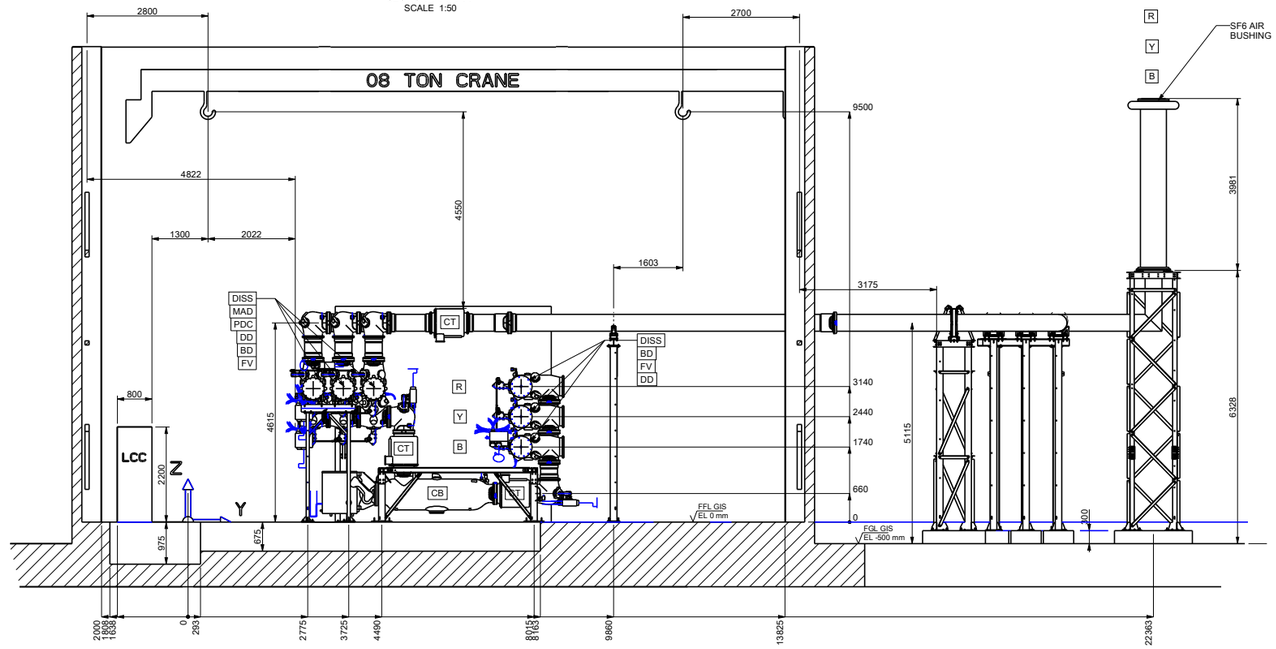
VENDOR NAME	GE T&D INDIA LTD. 142, Vandalur-Walajabad Road Padappai, Chennai 601301 Tamilnadu, India
ग्राहक ड्राईंग संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-026
ग्राहक/CUSTOMER	एन टी पी सी लिमिटेड N T P C LIMITED
परियोजना PROJECT	TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)
भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP नोएडा (उ॰प्र॰)/NOIDA (U.P.)	DEPT CODE M नाम NAME / हस्ताक्षर SIGNATURE / दिनांक DATE निरूपणकर्ता/DRN AK डिजाइनकर्ता/DESN RN परीक्षणकर्ता/CHD MS अनुमोदनकर्ता/APPD SR
शीर्षक/TITLE	SECTION & ELEVATION PLAN OF TALCHER 400 kV GIS SUB STATION
विभाग DEPT. / स्केल SCALE: -- / ड्राईंग संख्या / DRAWING NO.	GD53A000723
ड्राईंग SIGN / दिनांक DATE	शीट SHEET 03 OF 22 / पुनरीक्षण REV. 00

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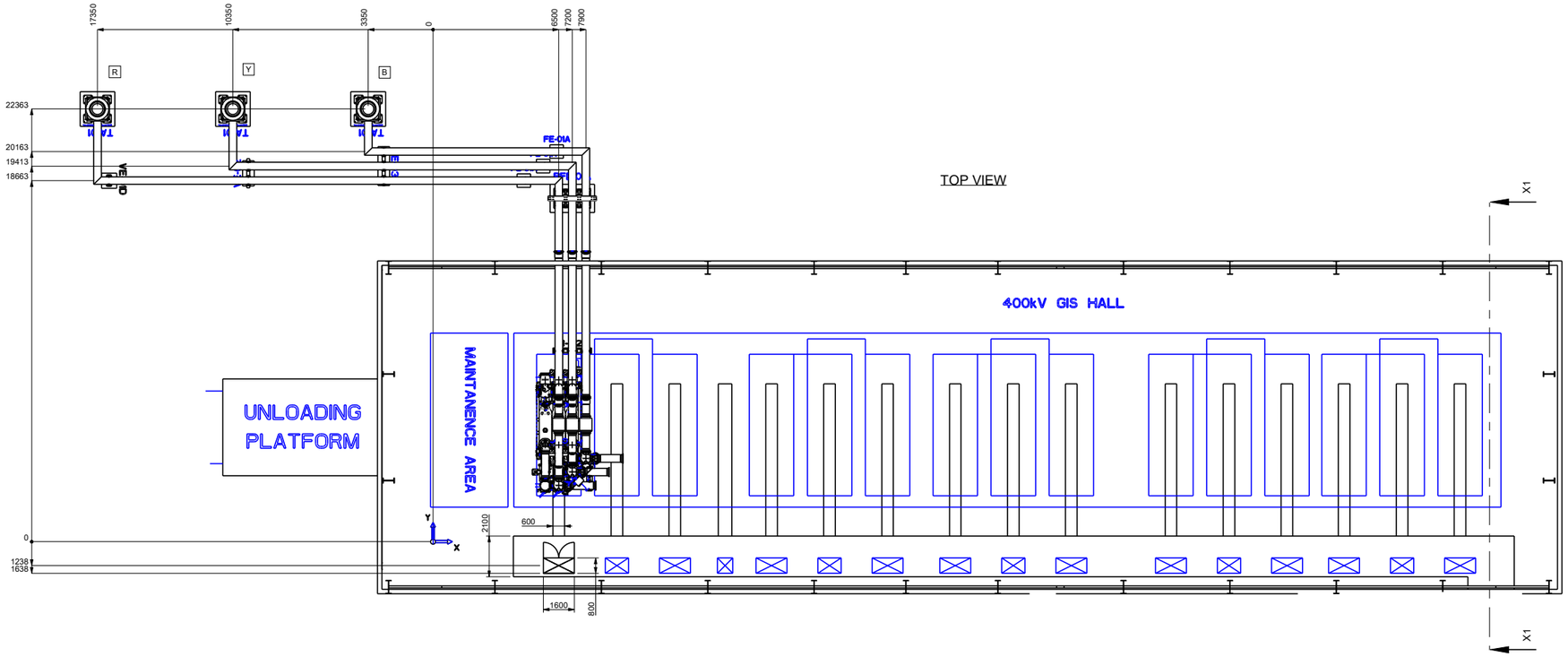
फर्स्ट एंगल प्रोजेक्शन/FIRST ANGLE PROJECTION सभी माप मि॰ मी॰ में हैं/ALL DIMENSIONS ARE IN MM

Bay-401 / ST-1

SECTION X1-X1
SCALE 1:50



TOP VIEW



VENDOR NAME	GE T&D INDIA LTD. 142, Vandalur-Walajabad Road Padappai, Chennai 601301 Tamilnadu, India
ग्राहक ड्राइंग संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-026
ग्राहक CUSTOMER	एन टी पी सी लिमिटेड N T P C LIMITED
परियोजना PROJECT	TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)
	भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION BUSINESS GROUP नोएडा (उ॰प्र॰)/NOIDA (U.P.)

	नाम NAME	हस्ताक्षर SIGNATURE	दिनांक DATE
तैयारकर्ता/DSN	AK		
डिजाइनकर्ता/DESN	RN		
जांचकर्ता/CHD	MS		
अनुमोदनकर्ता/APPD	SR		

शीर्षक TITLE
SECTION & ELEVATION PLAN OF TALCHER 400 kV GIS SUB STATION

ड्राइंग संख्या / DRAWING NO.	GD53A000723
विभाग DEPT.	
स्केल SCALE	–
शीट SHEET	04 OF 22
पुनरीक्षण REV.	00

फॉर्मेट साइज़ A0
FORMAT SIZE A0

GD53A000723 / 01

NTPC_THALCHAR 400kV_T155-3
SECTION & PLAN LAYOUT
GD378

Scale: NTS Unit:mm Format: A0
EC Nbr: ---- Q.Level: 3
Created: Logeshwar J 20/02/2024
Reviewed: --- /
Approved: Samikkannu Murugan 20/02/2024 /
T&D INDIA LTD
Sheet: 4/22
Product type: T155-3
Co. Authority: CHT
Local Unit: CHT

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फर्स्ट एंगल प्रोजेक्शन/FIRST ANGLE PROJECTION सभी माप मि. मी. मे हैं/ALL DIMENSIONS ARE IN MM

Bay-402 / TIE BAY

TYPICAL BAY FOR 405,408,411,414

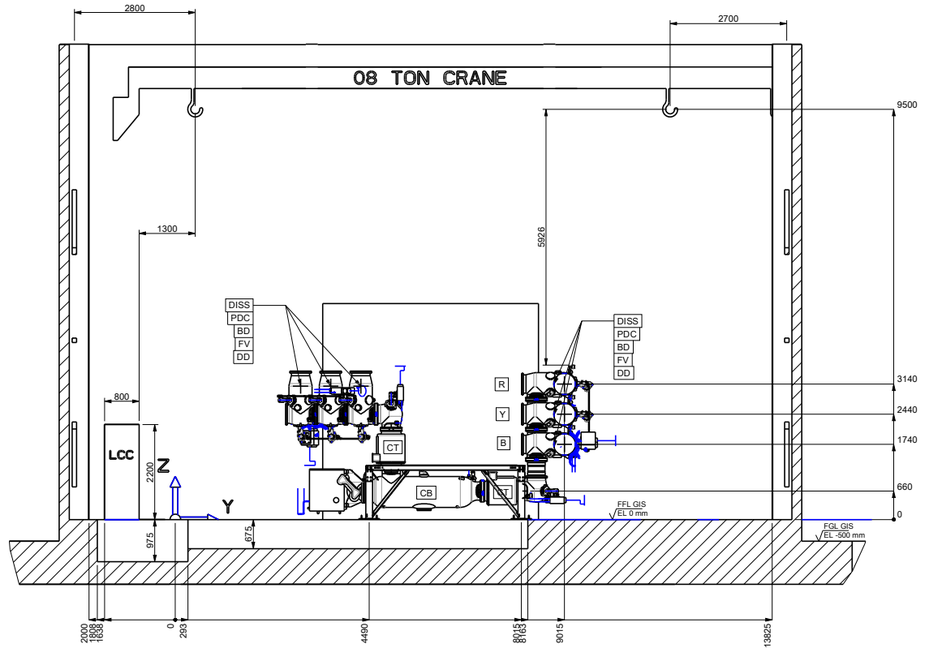
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EC Nbr: ----		Q Level: 3	Local Unit: CHT
Created: Logeshwar J			20/02/2024
Reviewed: ---			
Approved: Samikkannu Murugan			20/02/2024

T&D INDIA LTD | Sheet: 5/22 | Product type: T155-3

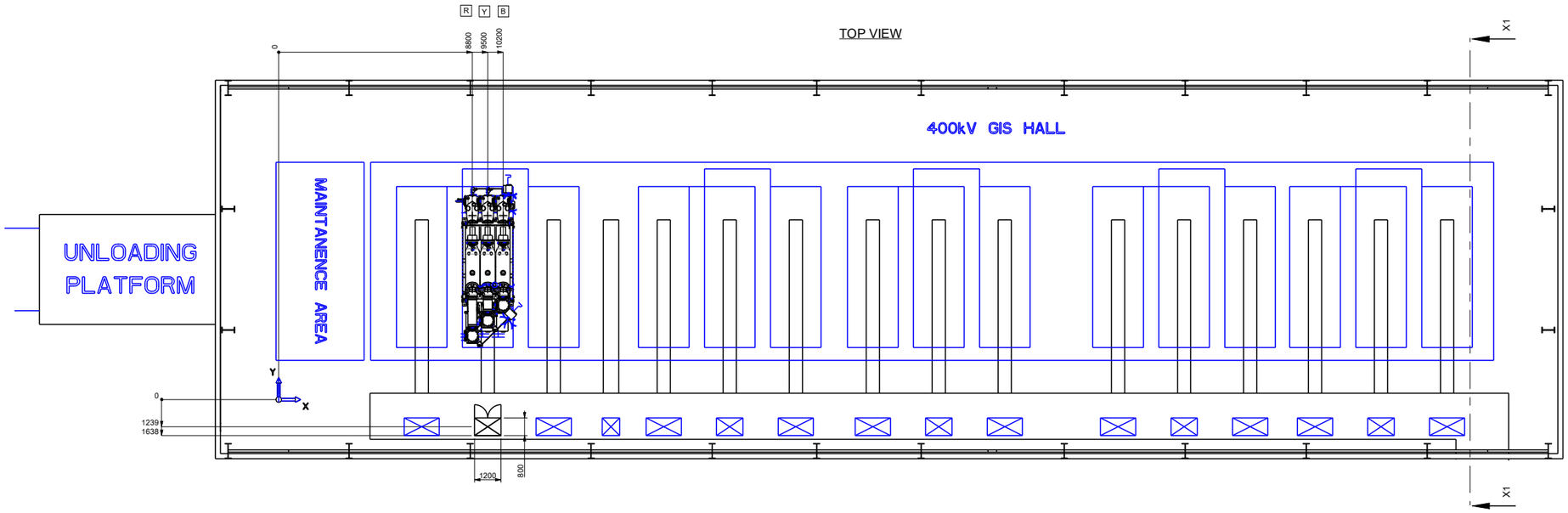
NTPC_THALCHAR 400kV_T155-3
SECTION & PLAN LAYOUT
GD378

GD53A000723 | Rev. 01

SECTION X1-X1
SCALE 1:50



TOP VIEW



VENDOR NAME	GE T&D INDIA LTD. 142, Vandalur-Walajabad Road Padappai, Chennai 601301 Tamilnadu, India
ग्राहक ड्राईंग संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-026
ग्राहक CUSTOMER	एन टी पी सी लिमिटेड N T P C LIMITED
परियोजना PROJECT	TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)
भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD.	TRANSMISSION BUSINESS GROUP नोएडा (उ.प्र.)/NOIDA (U.P.)

DEPT CODE: M

	नाम NAME	हस्ताक्षर SIGNATURE	दिनांक DATE
तैयारकर्ता/DSN	AK		
अनुमोदनकर्ता/DSEM	RN		
जांचकर्ता/CHD	MS		
अनुमोदनकर्ता/APPD	SR		

शीर्षक TITLE
SECTION & ELEVATION PLAN OF TALCHER 400 kV GIS SUB STATION

डिज़ाइन DEPT.	स्केल – SCALE–	ड्राईंग संख्या / DRAWING NO.	
हस्ताक्षर SIGN		GD53A000723	
दिनांक DATE		शीट SHEET 05 OF 22	संशोधन REV. 00

फ़ॉर्मेट साइज़ A0
FORMAT SIZE A0

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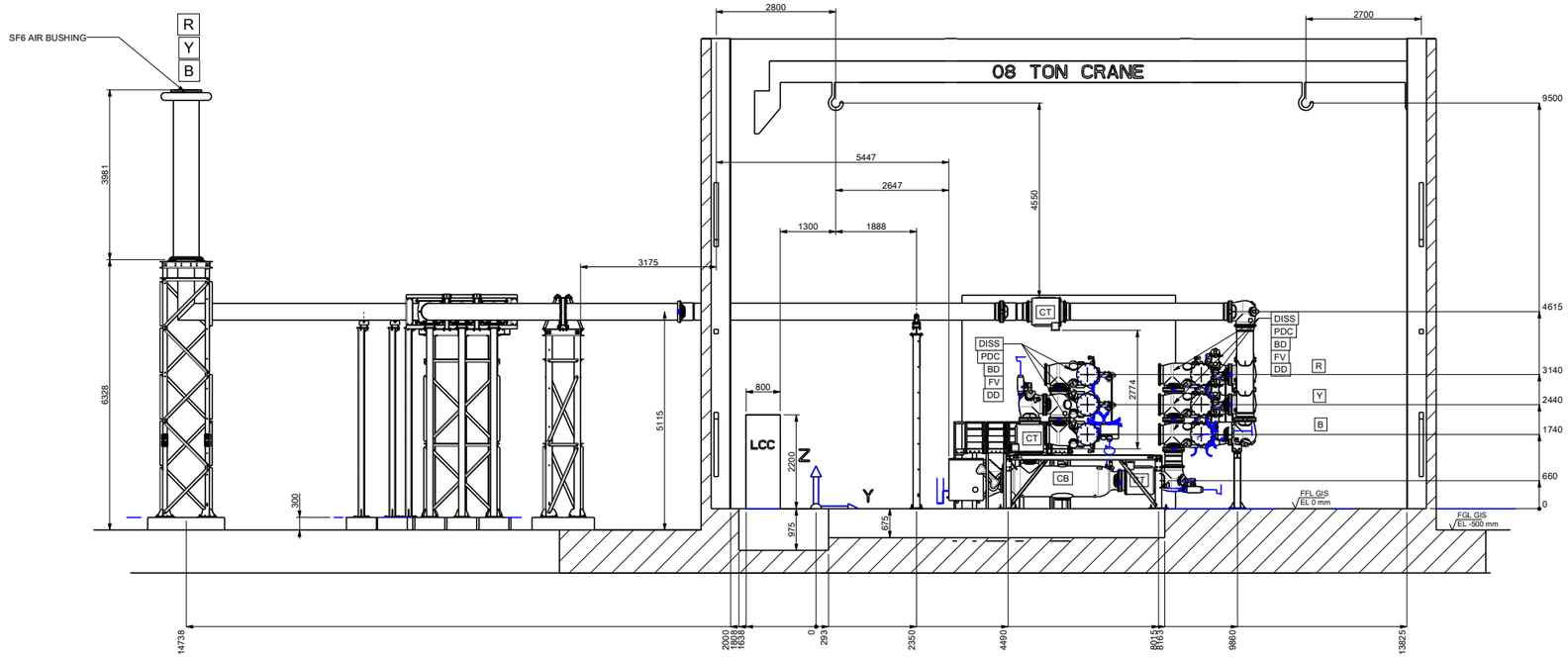
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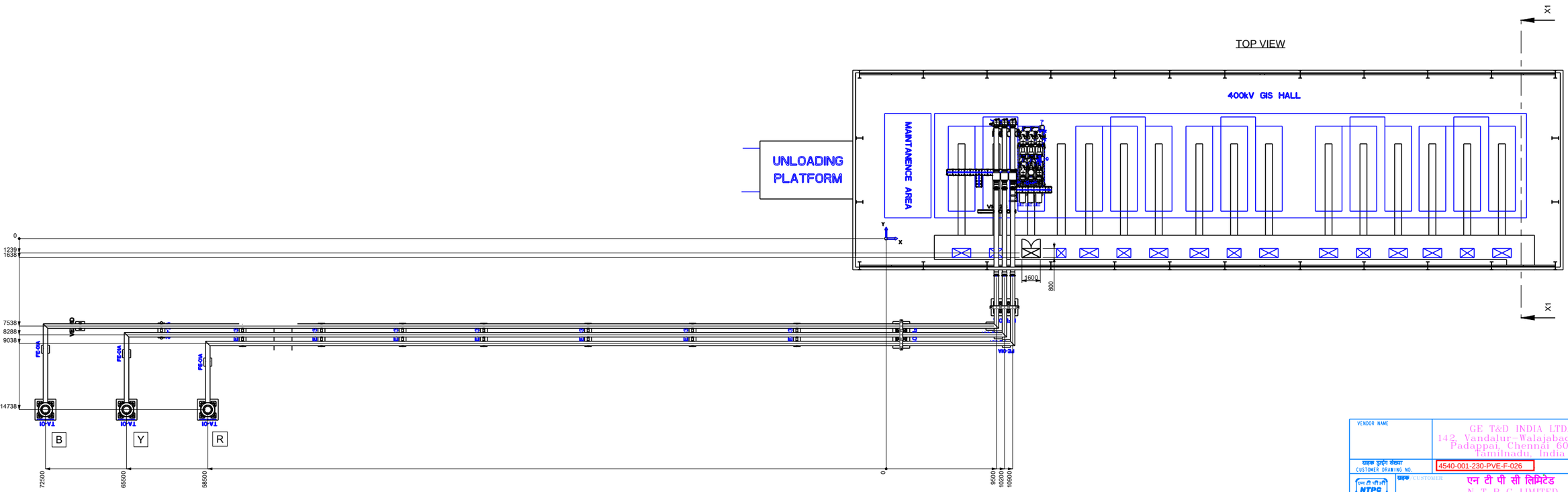
Bay-403 / LINE-1

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EC Nbr: ----	Q.Level: 3	Local Unit: CHT	SECTION & PLAN LAYOUT
Created: Logeshwar J		20/02/2024	GD378
Reviewed: ---			
Approved: Samikkannu Murugan		20/02/2024	/
T&D INDIA LTD	Sheet: 6/22		GD53A000723 Rev. 01
	Product type: T155-3		

SECTION X1-X1
SCALE 1:50



TOP VIEW



VENDOR NAME	GE T&D INDIA LTD. 142, Vandalur-Walajabad Road Padappai, Chennai 601301 Tamilnadu, India
ग्राहक ड्राईंग संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-026
ग्राहक CUSTOMER	एन टी पी सी लिमिटेड N. T. P. C. LIMITED
परियोजना PROJECT	TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)
भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP नोएडा (उ.प्र.)/NOIDA (U.P.)	DEPT/DIV: M तैयारकर्ता/DRN: AK डिजाइनकर्ता/DESN: RN जाँचकर्ता/CKD: MS अनुमोदनकर्ता/APPD: SR
शीर्षक/TITLE	SECTION & ELEVATION PLAN OF TALCHER 400 kV GIS SUB STATION
विभाग DEPT. / स्केल SCALE: --	ड्राईंग संख्या / DRAWING NO. GD53A000723
हस्ताक्षर SIGN / दिनांक DATE	शीट SHEET 06 OF 22 / पुनरीक्षण REV. 00

फॉर्मेट साइज़ A0
FORMAT SIZE A0

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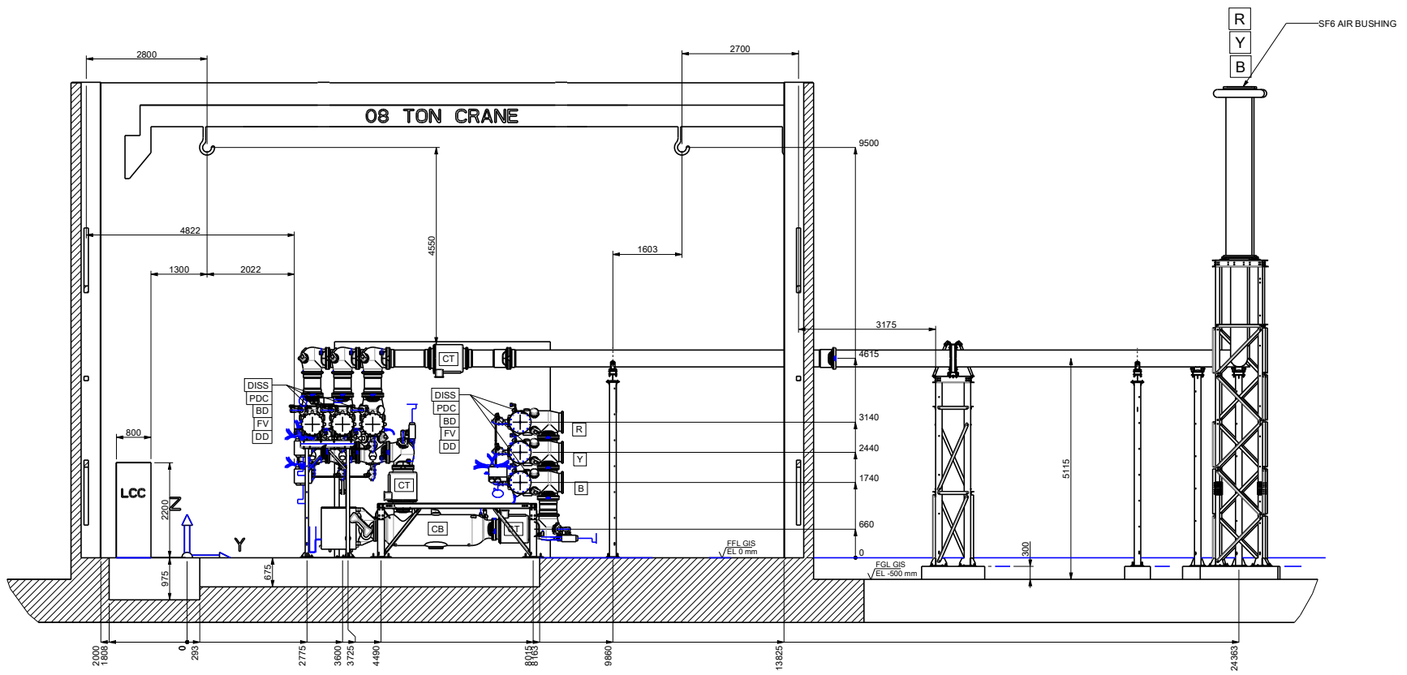
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Bay-404 / GT-1

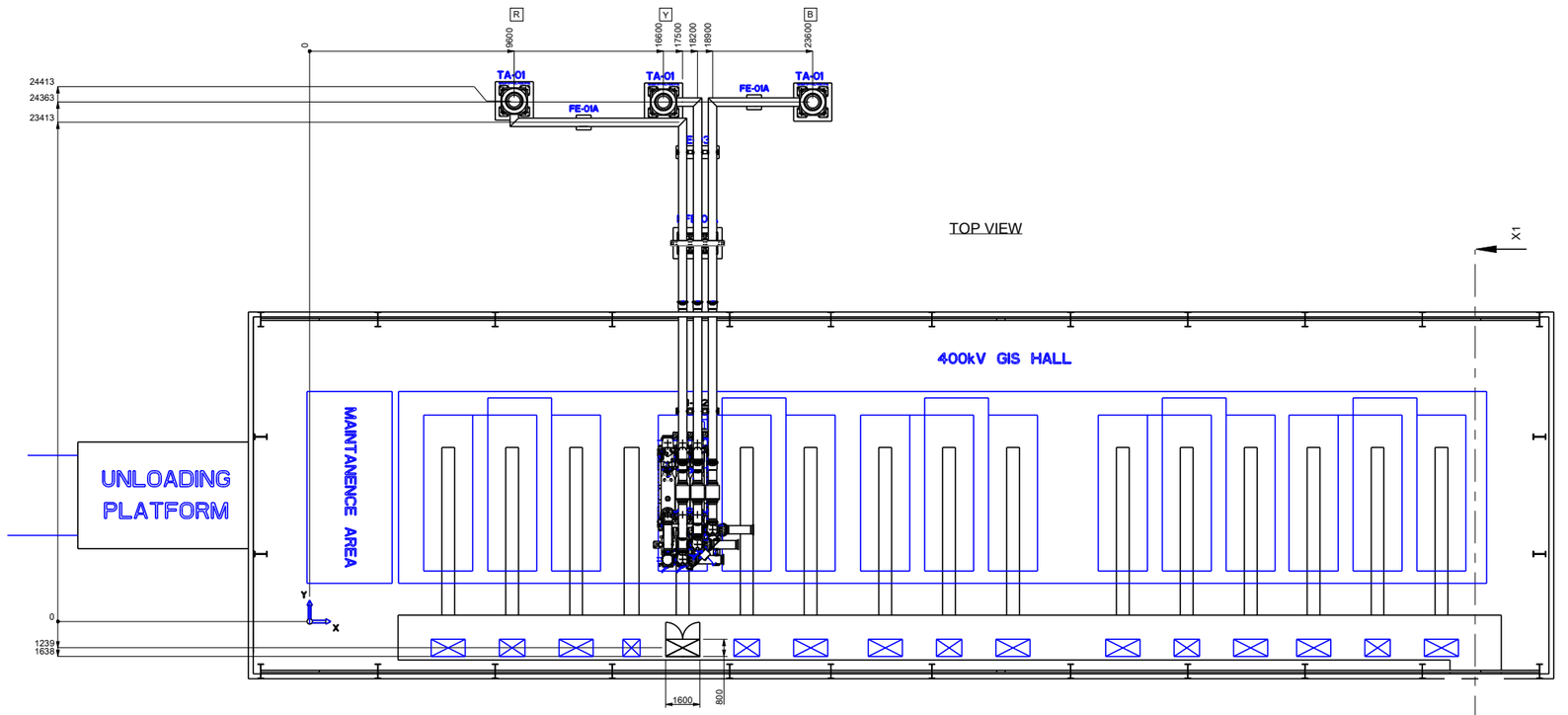
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Created: Logeshwar J			20/02/2024
Reviewed: ---			
Approved: Samikkannu Murugan			20/02/2024
T&D INDIA LTD		Sheet: 7/22	
		Product type: T155-3	GD53A000723 Rev. 01

NTPC_THALCHAR 400kV_T155-3
SECTION & PLAN LAYOUT
GD378

SECTION X1-X1
SCALE 1:50



TOP VIEW



VENDOR NAME	GE T&D INDIA LTD. 142, Vandalur-Walajabad Road Padappai, Chennai 601301 Tamilnadu, India
ग्राहक ड्राइंग संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-026
ग्राहक CUSTOMER	एन टी पी सी लिमिटेड N T P C LIMITED
परियोजना PROJECT	TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)
	भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION BUSINESS GROUP नोएडा (उ॰प्र॰)/NOIDA (U.P.)

	NAME	SIGNATURE	DATE
तैयारकर्ता/DSN	AK		
डिजाइनकर्ता/DESN	RN		
जाँचकर्ता/CHD	MS		
अनुमोदनकर्ता/APPD	SR		

GROUP CODE: M

शीर्षक TITLE
SECTION & ELEVATION PLAN OF TALCHER 400 kV GIS SUB STATION

विभाग DEPT.	स्केल – SCALE–
हस्ताक्षर SIGN	
दिनांक DATE	
ड्राइंग संख्या / DRAWING NO.	GD53A000723
शीट SHEET	OF 22
पुनरीक्षण REV.	00

आकार साइज A0
FORMAT SIZE A0

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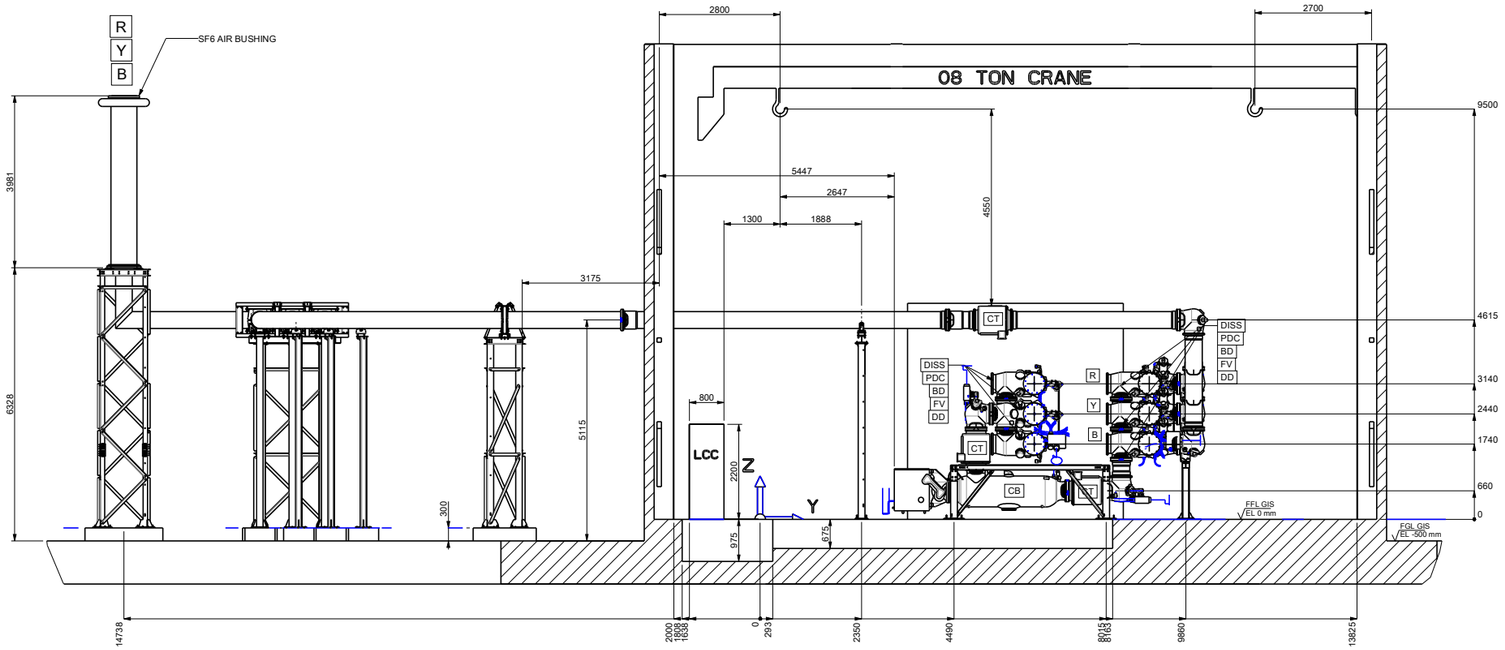
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सभी माप मि॰ मी॰ में हैं/ALL DIMENSIONS ARE IN MM

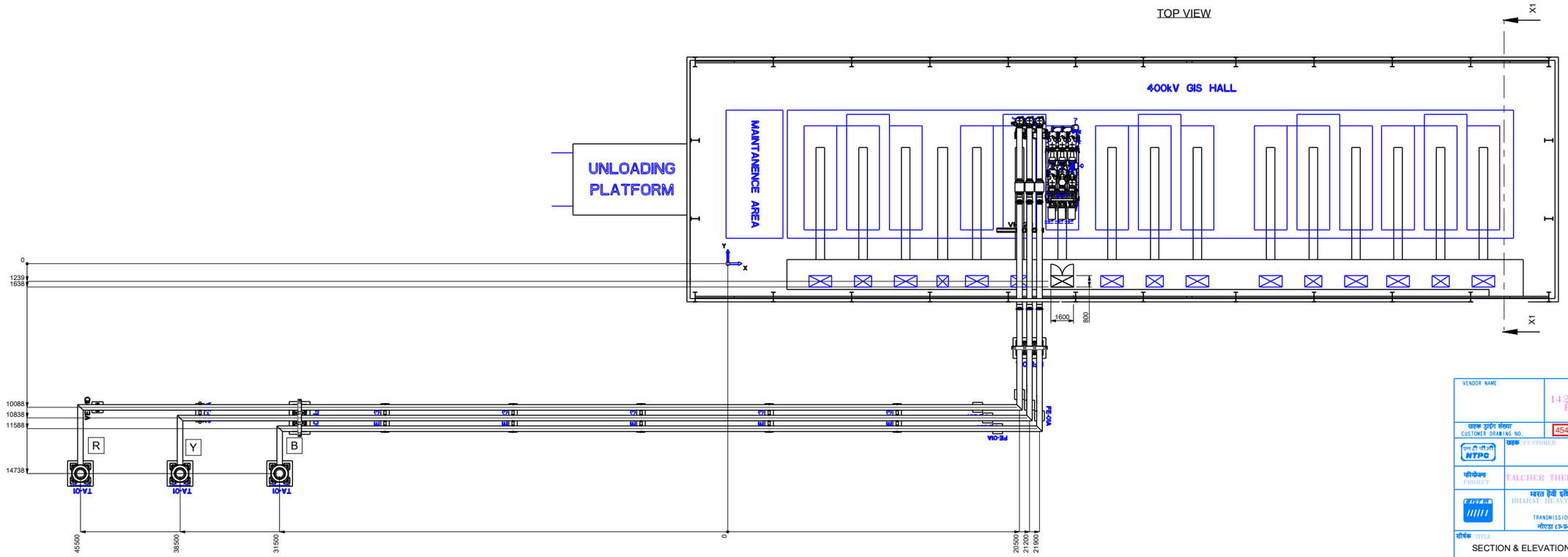
Bay-406 / LINE-2

Scale: NTS Unit:mm	Format: A0	Dr. Authority: CHT	NTPC_THALCHAR 400kV_T155-3
EC Nbr: ----	Q.Level: 3	Local Unit: CHT	SECTION & PLAN LAYOUT
Created: Logeshwar J		20/02/2024	GD378
Reviewed: ---			
Approved: Samikkannu Murugan		20/02/2024	/
T&D INDIA LTD	Sheet: 8/22		GD53A000723 Rev. 01
	Product type: T155-3		

SECTION X1-X1
SCALE 1:50



TOP VIEW



VENDOR NAME	GE T&D INDIA LTD. 142, Vandalur–Walajabad Road Padappai, Chennai 601301 Tamilnadu, India
ग्राहक ड्राईंग संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-026
ग्राहक CUSTOMER	एन टी पी सी लिमिटेड N T P C LIMITED
परियोजना PROJECT	TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)
	भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP नोएडा (उ॰प्र॰)/NOIDA (U.P.)

	नाम NAME	हस्ताक्षर SIGNATURE	दिनांक DATE
तैयारकर्ता/DRN	AK		
डिजाइनकर्ता/DESN	RN		
जाँचकर्ता/CHD	MS		
अनुमोदनकर्ता/APPD	SR		

शीर्षक TITLE
SECTION & ELEVATION PLAN OF TALCHER 400 kV GIS SUB STATION

विभाग DEPT.	स्केल SCALE –	ड्राईंग संख्या / DRAWING NO.
डिजाइनर SIGN		GD53A000723
दिनांक DATE		शीट SHEET OF 22 / पुनरीक्षण REV. 00

फॉर्मेट साइज़ A0
FORMAT SIZE A0

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सभी माप मि॰ मी॰ में है/ALL DIMENSIONS ARE IN MM

BAY-407 / ST-2

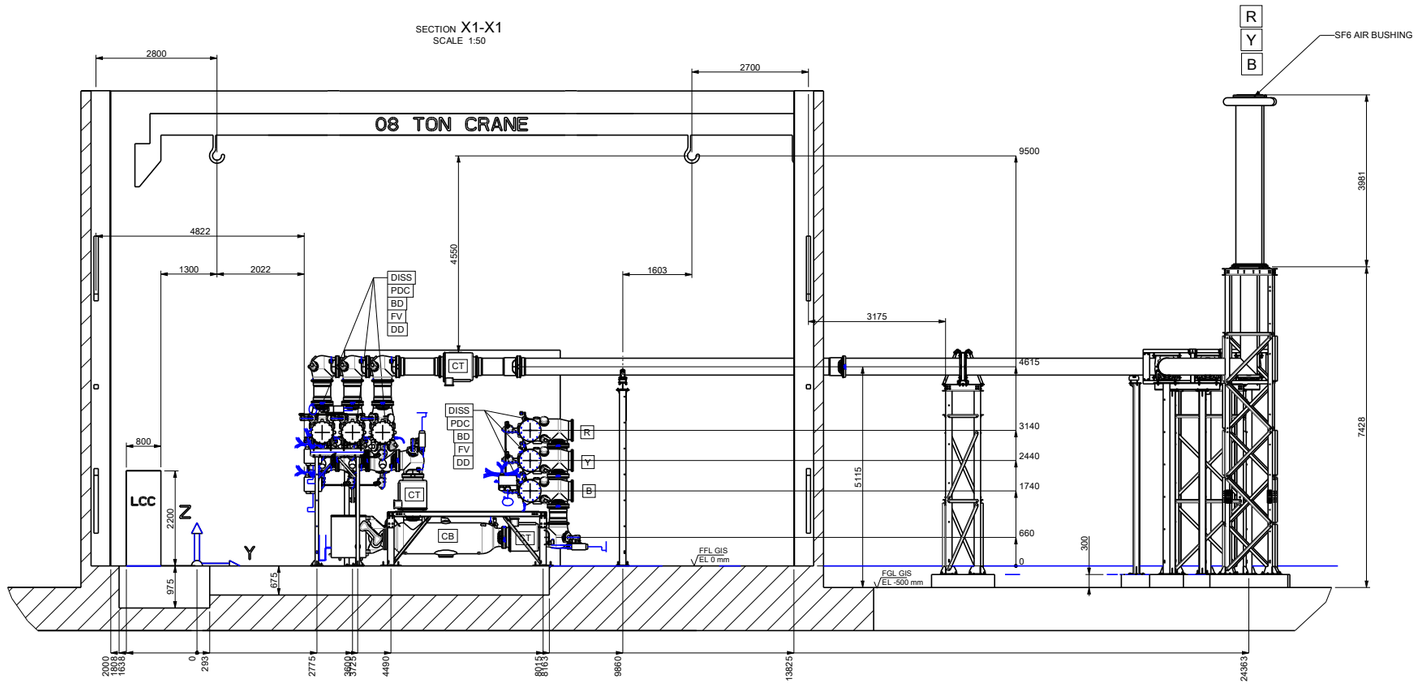
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Reviewed: ---	
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T&D INDIA LTD	Sheet: 9/22
	Product type: T155-3

D. Authority: CHT
Local Unit: CHT

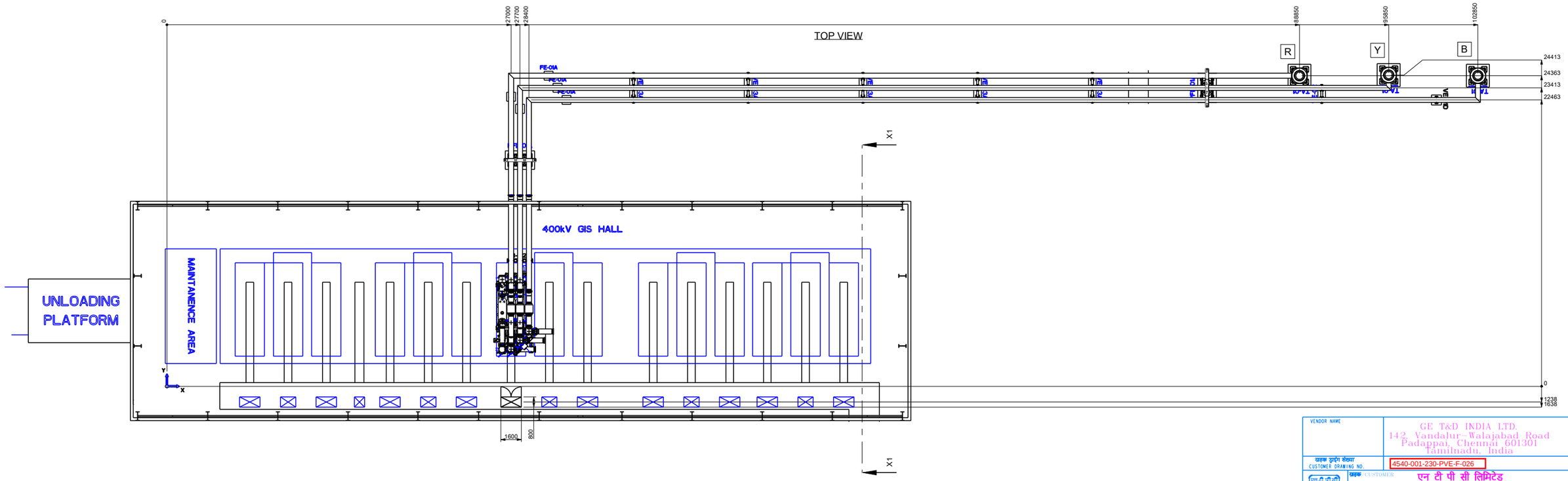
NTPC_THALCHAR 400kV_T155-3
SECTION & PLAN LAYOUT
GD378

GD53A000723 Rev. 01

SECTION X1-X1
SCALE 1:50



TOP VIEW



VENDOR NAME	GE T&D INDIA LTD. 142, Vandalur-Walajabad Road Padappai, Chennai 601301 Tamilnadu, India
ग्राहक ड्राईंग संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-026
ग्राहक CUSTOMER	एन टी पी सी लिमिटेड N T P C LIMITED
परियोजना PROJECT	TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)
	भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION BUSINESS GROUP नोएडा (उ॰प्र॰)/NOIDA (U.P.)

	नाम NAME	हस्ताक्षर SIGNATURE	दिनांक DATE
तैयारकर्ता/DRN	AK		
डिजाईनर्ता/DES	RN		
जाँचकर्ता/CHD	MS		
अनुमोदनकर्ता/APPD	SR		

SHEET CODE: M

शीर्षक TITLE
SECTION & ELEVATION PLAN OF TALCHER 400 kV GIS SUB STATION

विभाग DEPT.	स्केल – SCALE-	ड्राईंग संख्या / DRAWING NO.	
हस्ताक्षर SIGN		GD53A000723	
दिनांक DATE		शीट SHEET 22 OF	पुनरीक्षण REV. 00

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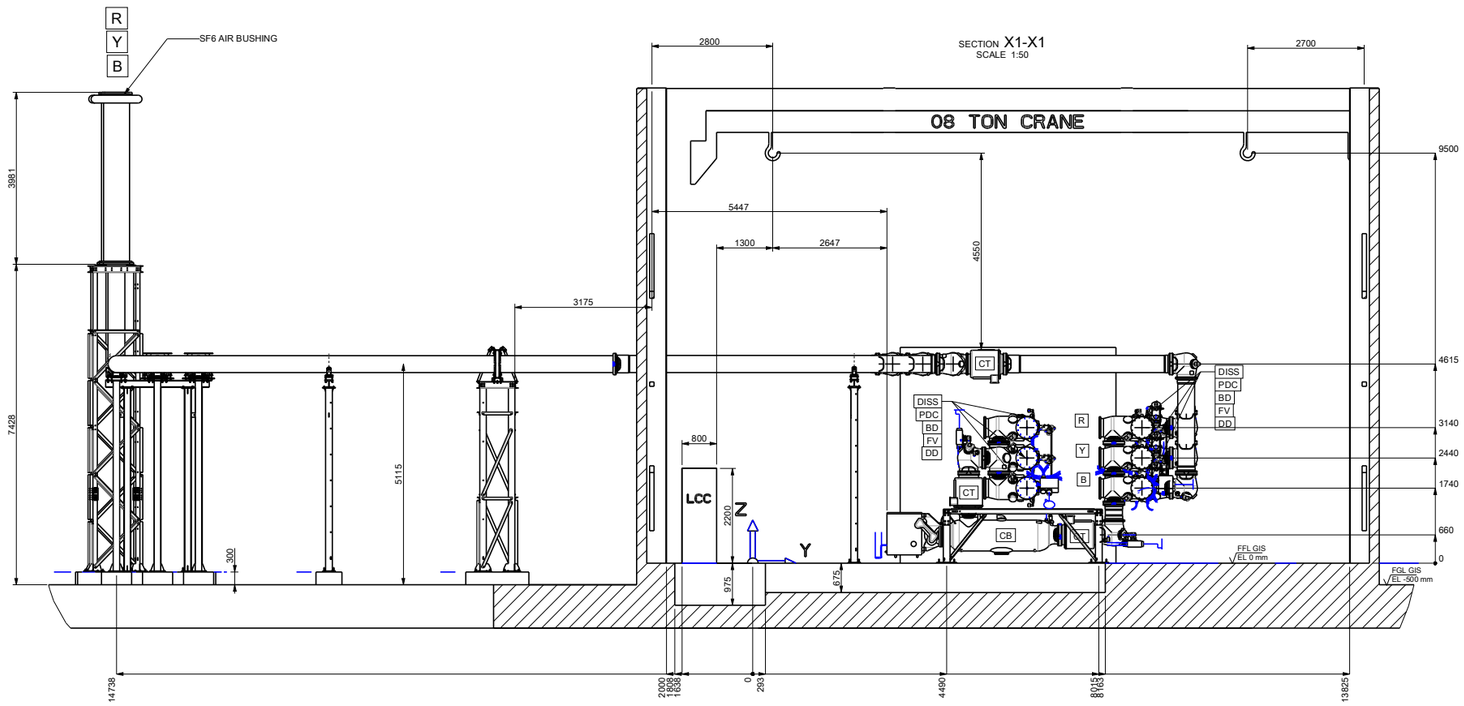
फॉर्मेट साइज़ A0
FORMAT SIZE A0

फर्स्ट एंगल प्रोजेक्शन/FIRST ANGLE PROJECTION सभी माप मि॰ मी॰ में हैं/ALL DIMENSIONS ARE IN MM

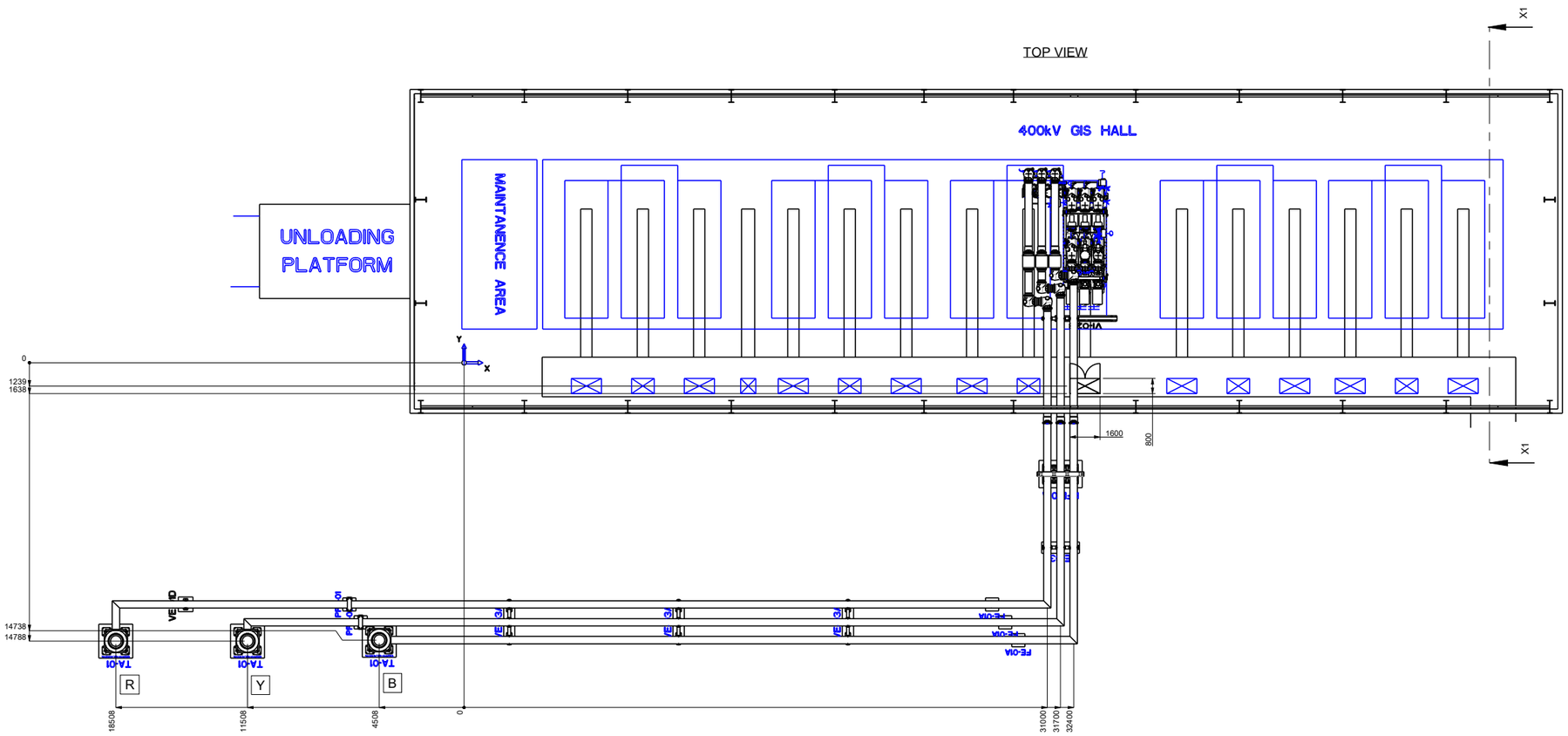
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Scale: NTS Unit:mm	Format: A0	Dr. Authority: CHT	NTPC_THALCHAR 400kV_T155-3
EC Nbr: ----	Q.Level: 3	Local Unit: CHT	SECTION & PLAN LAYOUT
Created: Logeshwar J		20/02/2024	GD378
Reviewed: ---			
Approved: Samikkannu Murugan		20/02/2024	/
T&D INDIA LTD	Sheet: 10/22		GD53A000723 Rev. 01
	Product type: T155-3		

SECTION X1-X1
SCALE 1:50



TOP VIEW



VENDOR NAME	GE T&D INDIA LTD. 142, Vandalur-Walajabad Road Padappai, Chennai 601301 Tamilnadu, India
ग्राहक ड्राईंग संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-026
ग्राहक CUSTOMER	एन टी पी सी लिमिटेड N T P C LIMITED
परियोजना PROJECT	TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)
भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP नोएडा (उ॰प्र॰)/NOIDA (U.P.)	DEPT. CODE M निरूपणकर्ता/DSN AK डीजाइनकर्ता/DSN RN जाँचकर्ता/CHD MS अनुमोदनकर्ता/APPD SR
शीर्षक / TITLE	SECTION & ELEVATION PLAN OF TALCHER 400 kV GIS SUB STATION
विभाग DEPT.	सेक्टर -- SCALE-
ड्राईंग संख्या / DRAWING NO.	GD53A000723
शीट SHEET	OF 22
पुनरीक्षण REV.	00

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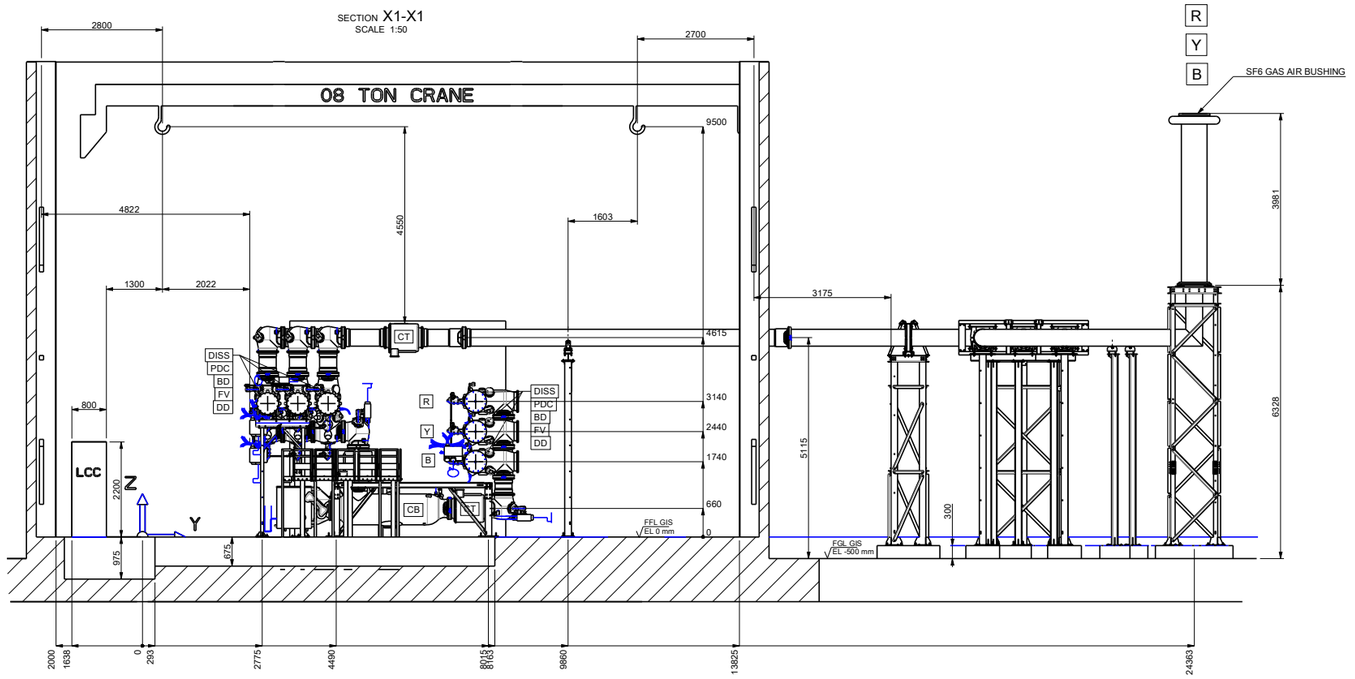
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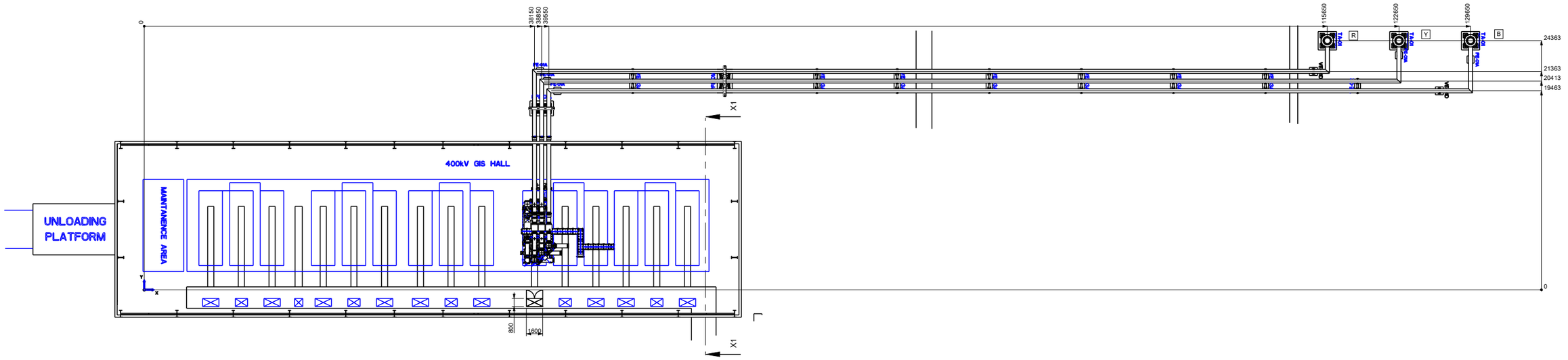
Bay- 410

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EC Nbr: ----	Q.Level: 3	Local Unit: CHT	SECTION & PLAN LAYOUT
Created: Logeshwar J		20/02/2024	GD378
Reviewed: ---			
Approved: Samikkannu Murugan		20/02/2024	/
T&D INDIA LTD	Sheet: 11/22		GD53A000723 Rev. 01
	Product type: T155-3		

SECTION X1-X1
SCALE 1:50



TOP VIEW



VENDOR NAME	GE T&D INDIA LTD. 142, Vandalur–Walajabad Road Padappai, Chennai 601301 Tamilnadu, India
ग्राहक पुर्जा संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-026
ग्राहक CUSTOMER	एन टी पी सी लिमिटेड N T P C LIMITED
परियोजना PROJECT	TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)
भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP नोएडा (उ.प्र.)/NOIDA (U.P.)	DEPT. CODE: M

	नाम NAME	हस्ताक्षर SIGNATURE	दिनांक DATE
तैयारकर्ता/DRN	AK		
डिजाइनकर्ता/DESN	RN		
जाँचकर्ता/CHD	MS		
अनुमोदनकर्ता/APPD	SR		

शीर्षक TITLE
SECTION & ELEVATION PLAN OF TALCHER 400 kV GIS SUB STATION

विभाग DEPT. | स्केल SCALE: – | ड्राइंग संख्या / DRAWING NO. GD53A000723
डिजाइनर SIGN | दिनांक DATE
शीट SHEET 11 OF 22 | पुनरीक्षण REV. 00

फॉर्मेट साइज़ A0 FORMAT SIZE A0

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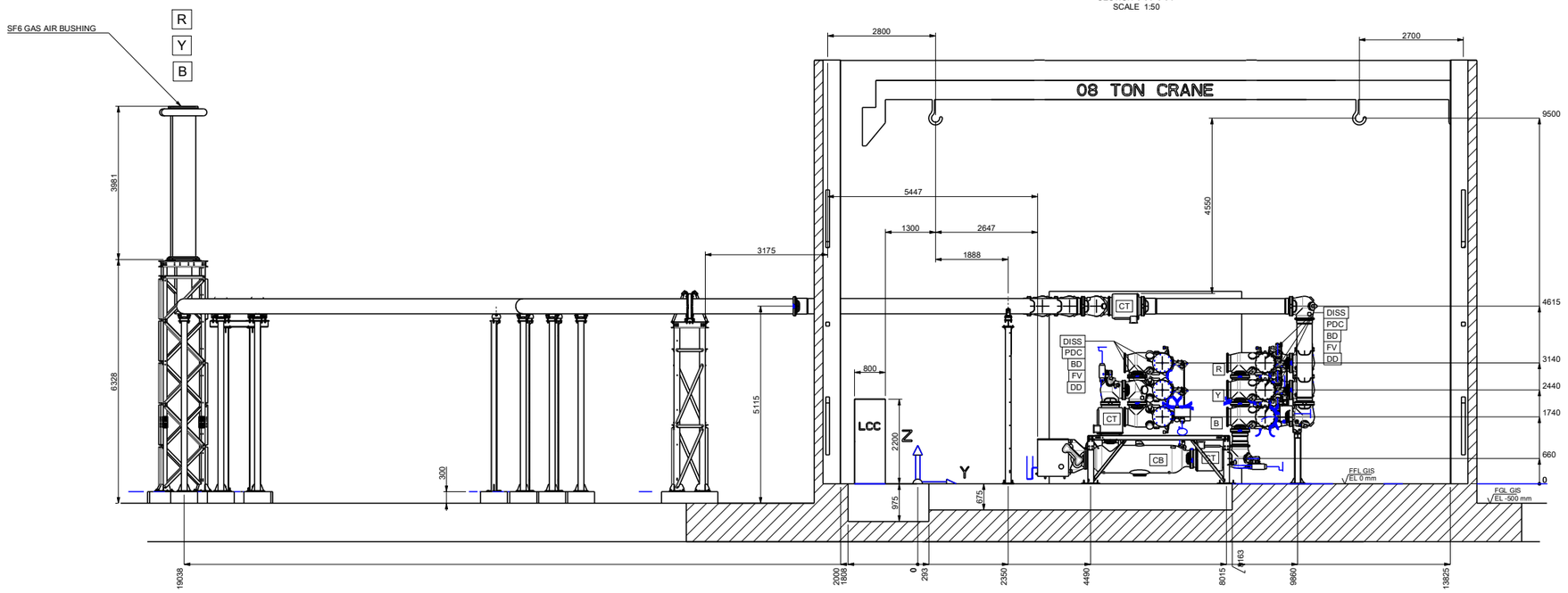
फर्स्ट एंगल प्रोजेक्शन/FIRST ANGLE PROJECTION

सभी माप मि॰ मी॰ में हैं/ALL DIMENSIONS ARE IN MM

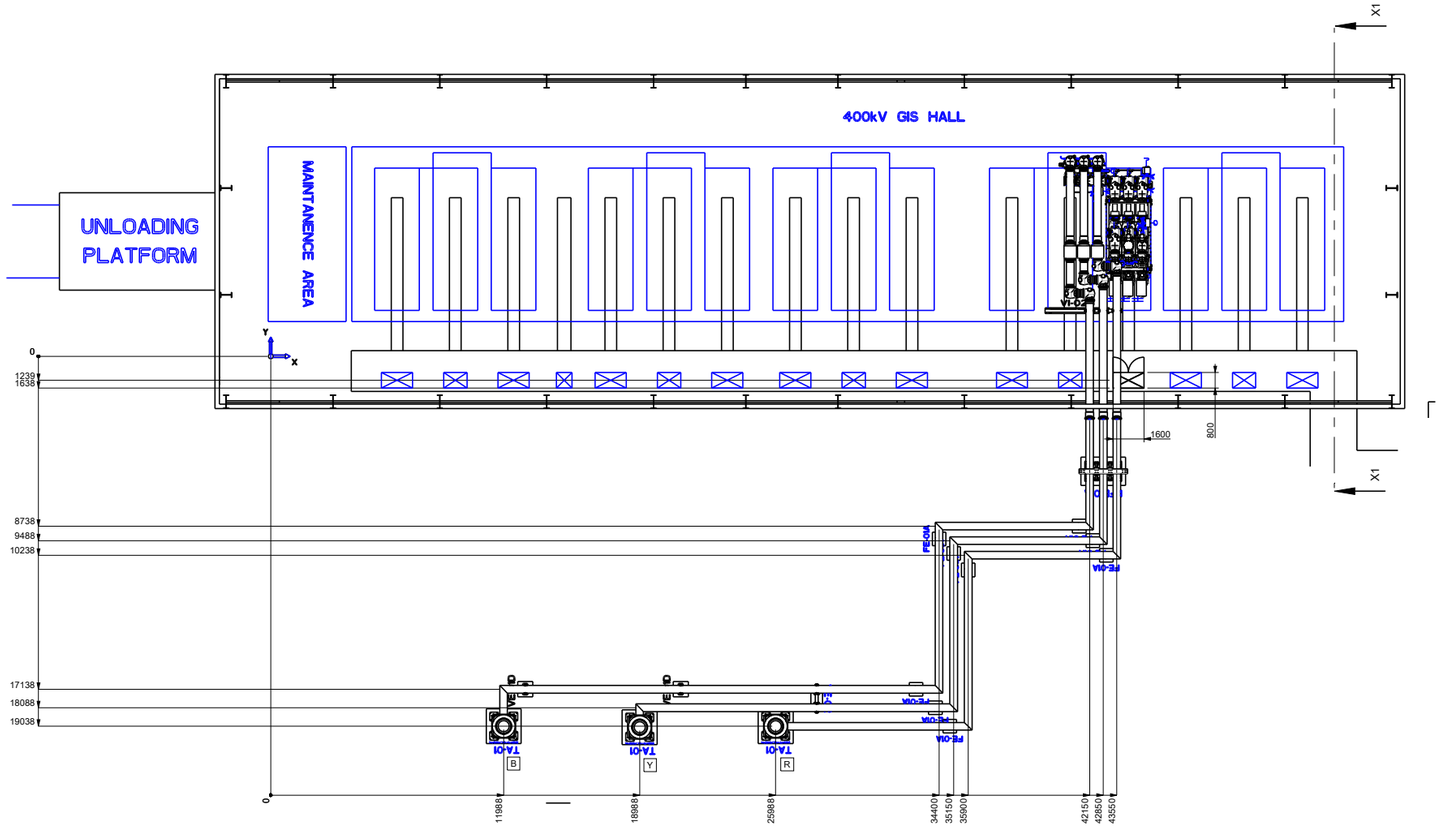
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Created: Logeshwar J		20/02/2024	GD378
Reviewed: ---			
Approved: Samikkannu Murugan		20/02/2024	/
T&D INDIA LTD	Sheet: 12/22		GD53A000723 Rev. 01
	Product type: T155-3		

SECTION X1-X1
SCALE 1:50



TOP VIEW



VENDOR NAME	GE T&D INDIA LTD. 142, Vandalur–Walajabad Road Padappai, Chennai 601301 Tamilnadu, India
ग्राहक ड्राइंग संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-026
ग्राहक CUSTOMER	एन टी पी सी लिमिटेड N T P C LIMITED
परियोजना PROJECT	TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)
	भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP नोएडा (उ॰प्र॰)/NOIDA (U.P.)

	नाम NAME	हस्ताक्षर SIGNATURE	दिनांक DATE
तैयारकर्ता/DRN	AK		
डिजाइनकर्ता/DESN	RN		
जाँचकर्ता/CHD	MS		
अनुमोदनकर्ता/APPD	SR		

शीर्षक TITLE
SECTION & ELEVATION PLAN OF TALCHER 400 kV GIS SUB STATION

विभाग DEPT. | स्केल SCALE: – | ड्राइंग संख्या / DRAWING NO. GD53A000723

डिजाइनर SIGN | दिनांक DATE | शीट SHEET 12 OF 22 | पुनरीक्षण REV. 00

फॉर्मेट साइज़ A0
FORMAT SIZE A0

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फर्स्ट एंगल प्रोजेक्शन/FIRST ANGLE PROJECTION

सभी माप मि॰ मी॰ मे है/ALL DIMENSIONS ARE IN MM

Bay-413

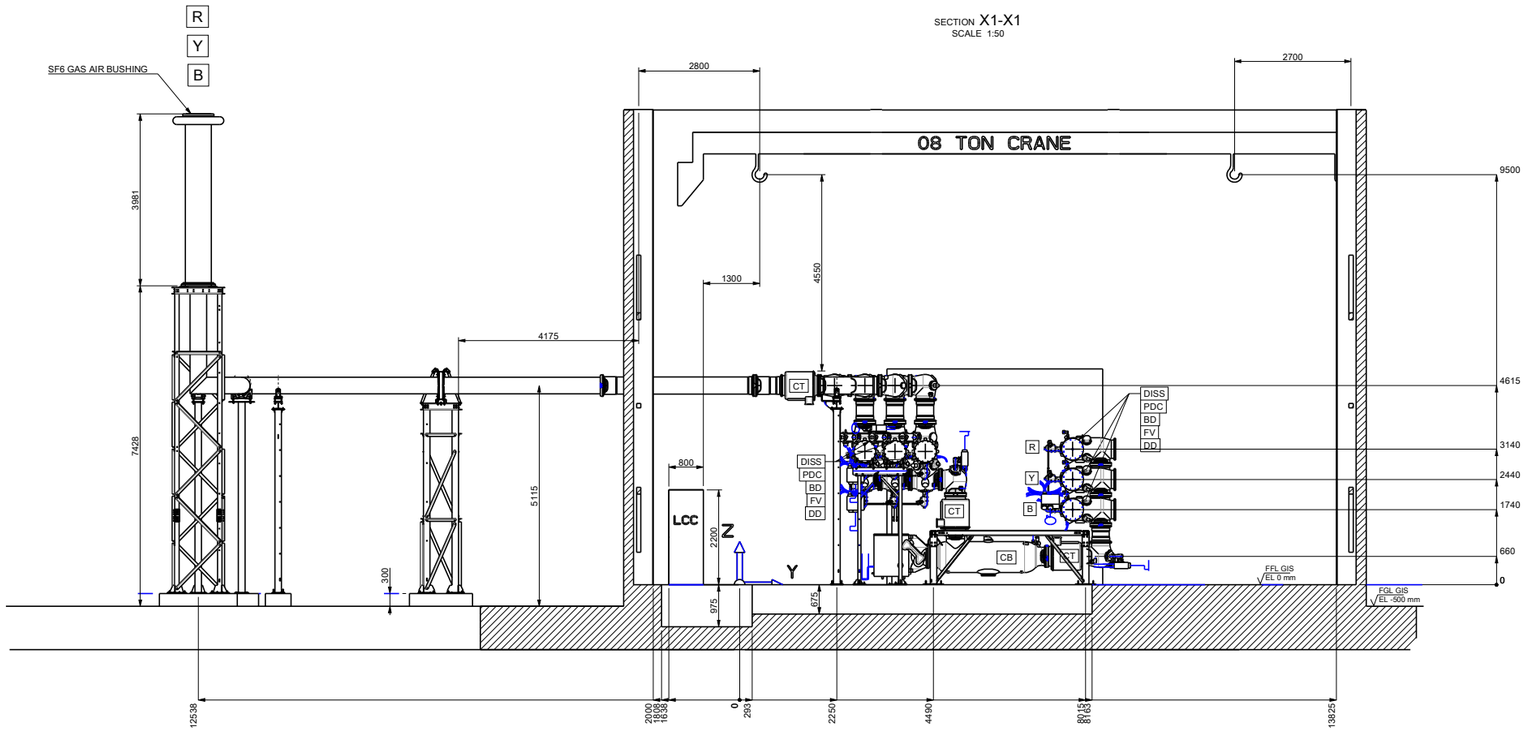
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Reviewed: ---	
Approved: Samikkannu Murugan	20/02/2024
T&D INDIA LTD	Sheet: 13/22
	Product type: T155-3

Q. Authority: CHT
Local Unit: CHT

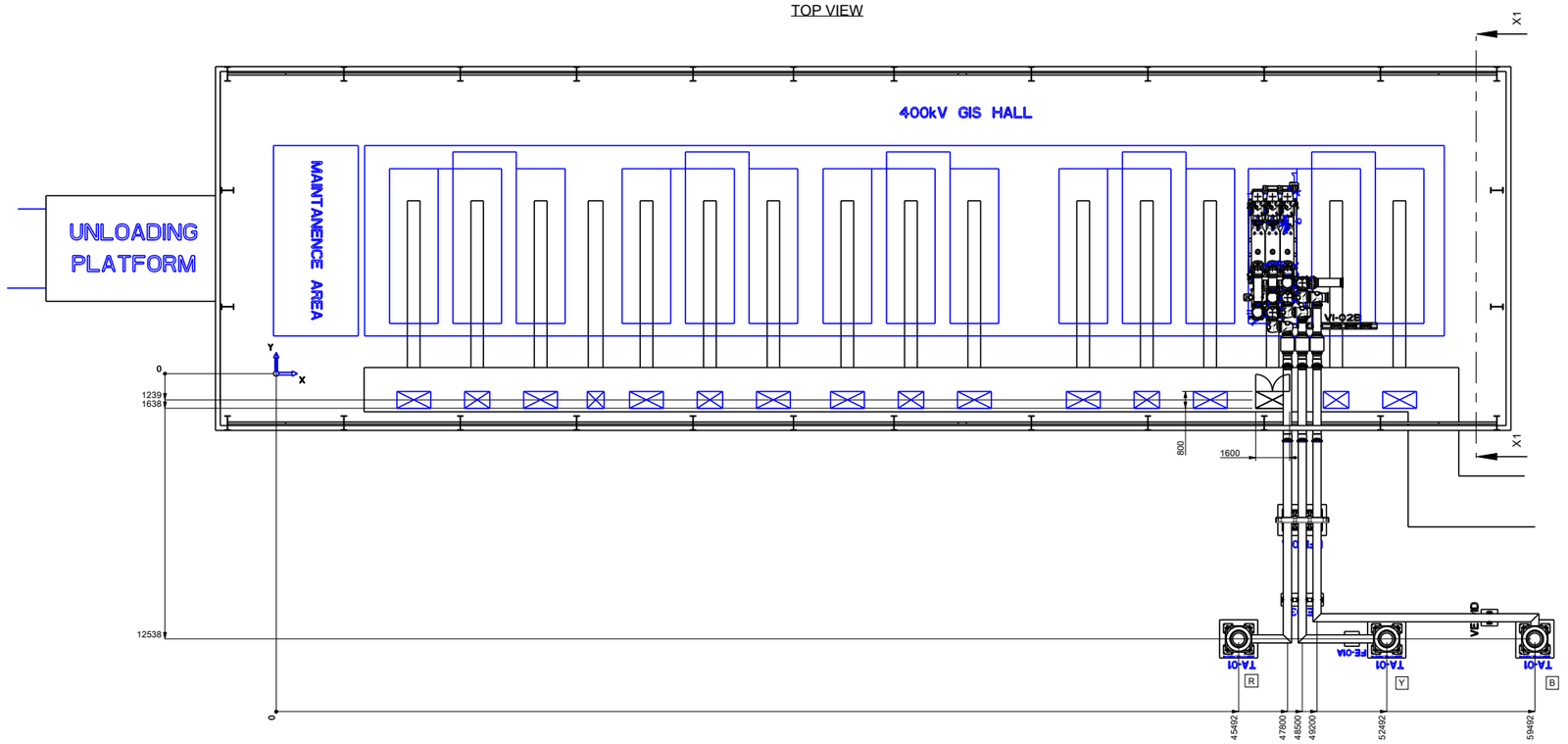
NTPC_THALCHAR 400kV_T155-3
SECTION & PLAN LAYOUT
GD378

GD53A000723 Rev. 01

SECTION X1-X1
SCALE 1:50



TOP VIEW



VENDOR NAME	GE T&D INDIA LTD. 142, Vandalur–Walajabad Road Padappai, Chennai 601301 Tamilnadu, India
ग्राहक दृष्टांत संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-026
ग्राहक CUSTOMER	एन टी पी सी लिमिटेड N T P C LIMITED
परियोजना PROJECT	TALCHER THERMAL POWER PROJECT STAGE–III (2X660MW)
	भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP नोएडा (उ॰प्र॰)/NOIDA (U.P.)
शीर्षक TITLE	SECTION & ELEVATION PLAN OF TALCHER 400 kV GIS SUB STATION
विभाग DEPT. / डिजाइन SIGN / दिनांक DATE	स्केल – SCALE –
दृष्टांत संख्या / DRAWING NO.	GD53A000723
शीट SHEET	13 OF 22
पुनरीक्षण REV.	00

	नाम NAME	हस्ताक्षर SIGNATURE	दिनांक DATE
तैयार किया/DRN	AK		
डिजाइन किया/DES'N	RN		
जाँचकर्ता/CHD	MS		
अनुमोदनकर्ता/APPD	SR		

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FORMAT SIZE A0

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फर्स्ट एंगल प्रोजेक्शन/FIRST ANGLE PROJECTION सभी माप मि॰ मी॰ में हैं/ALL DIMENSIONS ARE IN MM

Bay-415

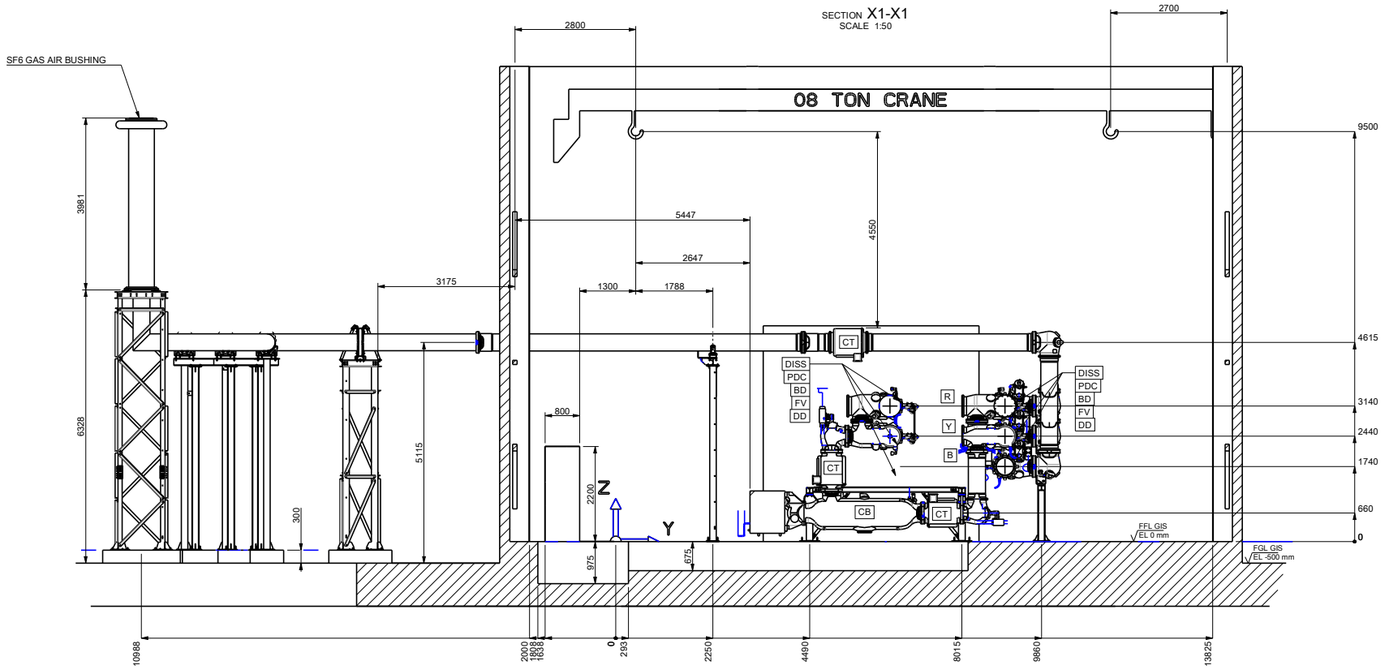
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Reviewed: ---	
Approved: Samikkannu Murugan	20/02/2024
T&D INDIA LTD	Sheet: 14/22
	Product type: T155-3

D. Authority: CHT
Local Unit: CHT

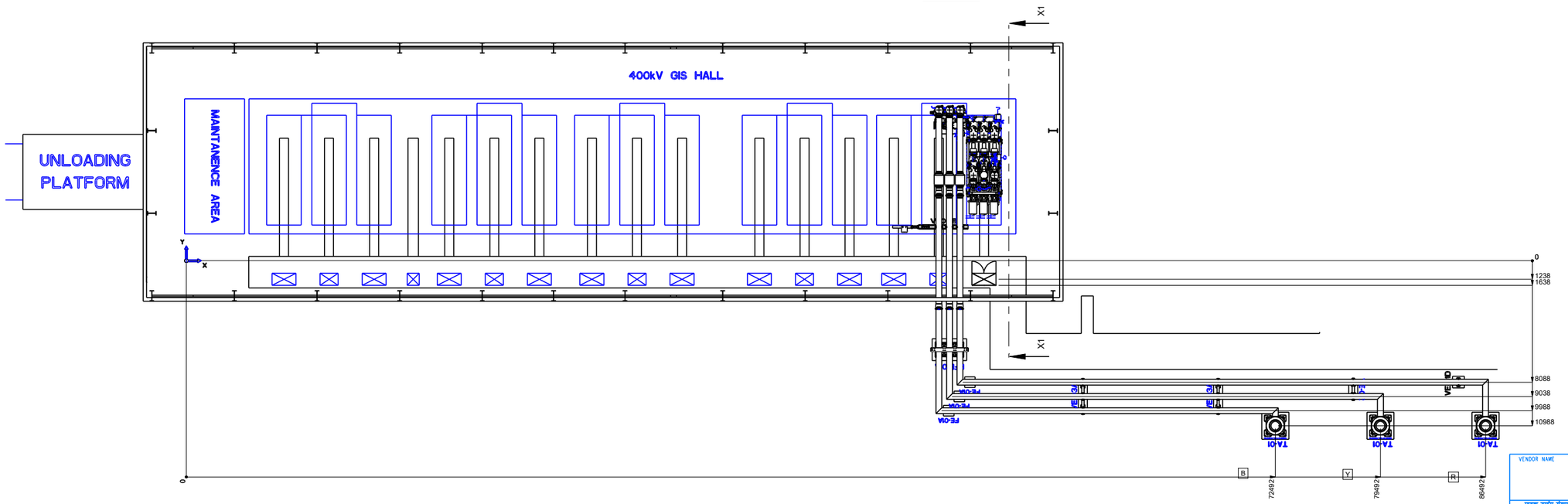
NTPC_THALCHAR 400kV_T155-3
SECTION & PLAN LAYOUT
GD378

GD53A000723 Rev. 01

SECTION X1-X1
SCALE 1:50



TOP VIEW



VENDOR NAME	GE T&D INDIA LTD. 142, Vandalur-Walajabad Road Padappai, Chennai 601301 Tamilnadu, India
ग्राहक ड्राईंग संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-026
ग्राहक CUSTOMER	एन टी पी सी लिमिटेड N T P C LIMITED
परियोजना PROJECT	TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)
भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP नोएडा (उ॰प्र॰)/NOIDA (U.P.)	DEPT/DRN M नाम/NAME: DRN AK, CHK RN, APP MS, APP SR हस्ताक्षर/SIGNATURE दिनांक/DATE
शीर्षक/TITLE	SECTION & ELEVATION PLAN OF TALCHER 400 kV GIS SUB STATION
विभाग DEPT.	स्केल -- SCALE:-
हस्ताक्षर SIGN	
दिनांक DATE	
ड्राईंग संख्या / DRAWING NO.	GD53A000723
शीट SHEET	14 OF 22
पुनरीक्षण REV.	00

फॉर्मेट साइज़ A0
FORMAT SIZE A0

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फर्स्ट एंगल प्रोजेक्शन/FIRST ANGLE PROJECTION

सभी माप मि॰ मी॰ में हैं/ALL DIMENSIONS ARE IN MM

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Scale: NTS	Unit: mm	Format: A0	Q. Authority: CHT
EC Nbr: ----		Q.Level: 3	Local Unit: CHT
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Reviewed: ---			
Approved: Samikkannu Murugan			20/02/2024

T&D INDIA LTD

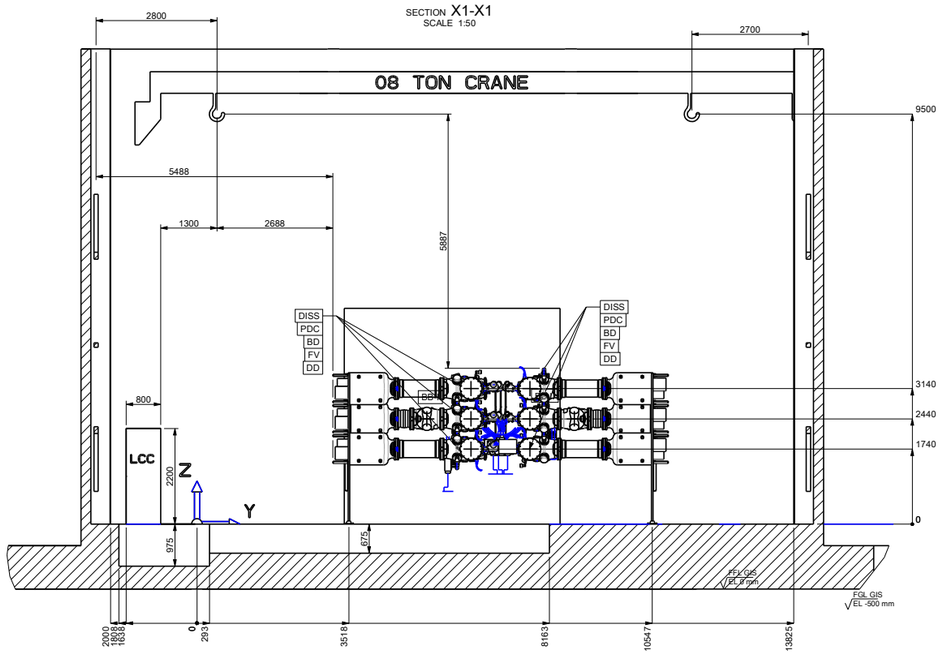
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Product type: T155-3

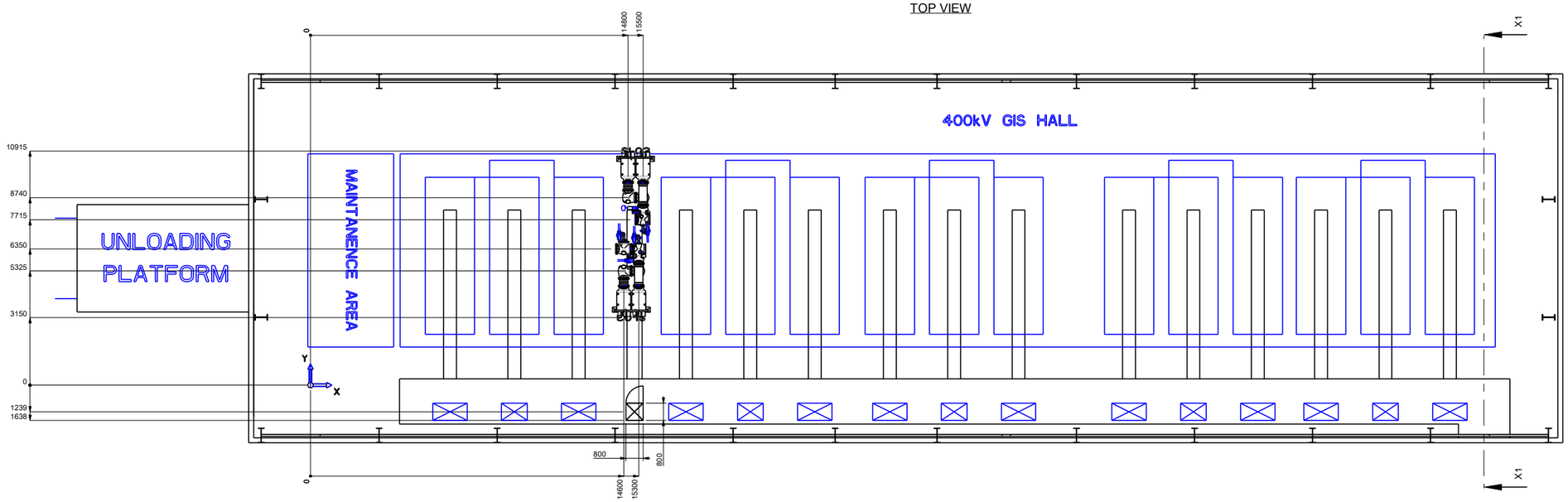
NTPC_THALCHAR 400kV_T155-3
SECTION & PLAN LAYOUT
GD378

GD53A000723 Rev. 01

SECTION X1-X1
SCALE 1:50



TOP VIEW



VENDOR NAME	GE T&D INDIA LTD. 142, Vandalur–Walajabad Road Padappai, Chennai 601301 Tamilnadu, India
ग्राहक दृष्टांत संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-026
ग्राहक CUSTOMER	एन टी पी सी लिमिटेड N T P C LIMITED
परियोजना PROJECT	TALCHER THERMAL POWER PROJECT STAGE–III (2X660MW)
	भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP नोएडा (उ॰प्र॰)/NOIDA (U.P.)

	नाम NAME	हस्ताक्षर SIGNATURE	दिनांक DATE
तैयारकर्ता/DRN	AK		
डिजाइनकर्ता/DESN	RN		
जाँचकर्ता/CHD	MS		
अनुमोदनकर्ता/APPD	SR		

शीर्षक TITLE
SECTION & ELEVATION PLAN OF TALCHER 400 kV GIS SUB STATION

विभाग DEPT.	स्केल SCALE –	दृष्टांत संख्या / DRAWING NO. GD53A000723
डिजाइनर SIGN		
दिनांक DATE		शीट SHEET 15 OF 22 / पुनरीक्षण REV. 00

फॉर्मेट साइज़ A0
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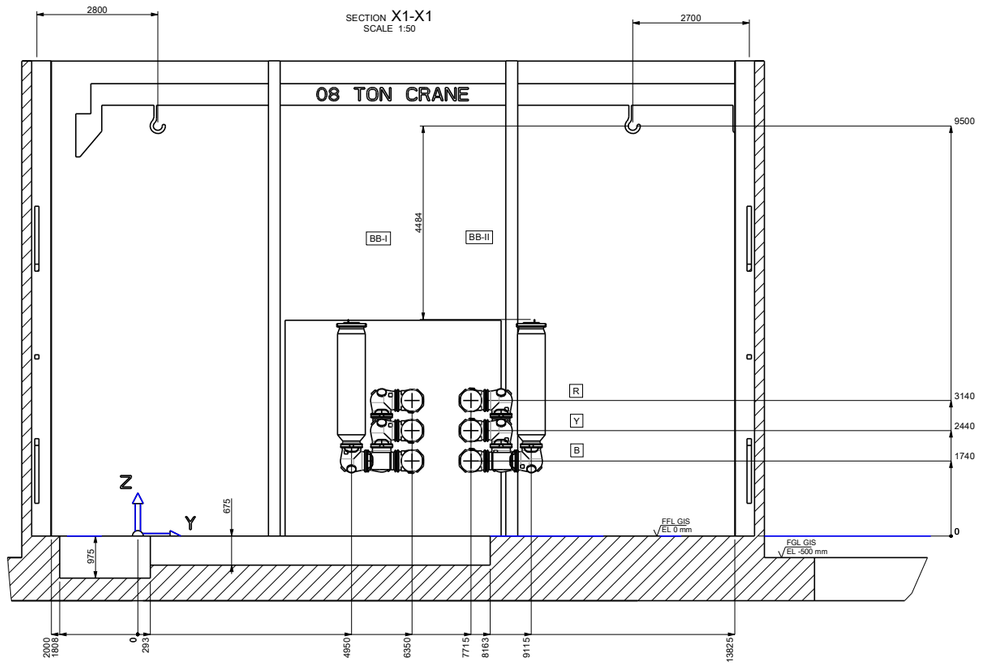
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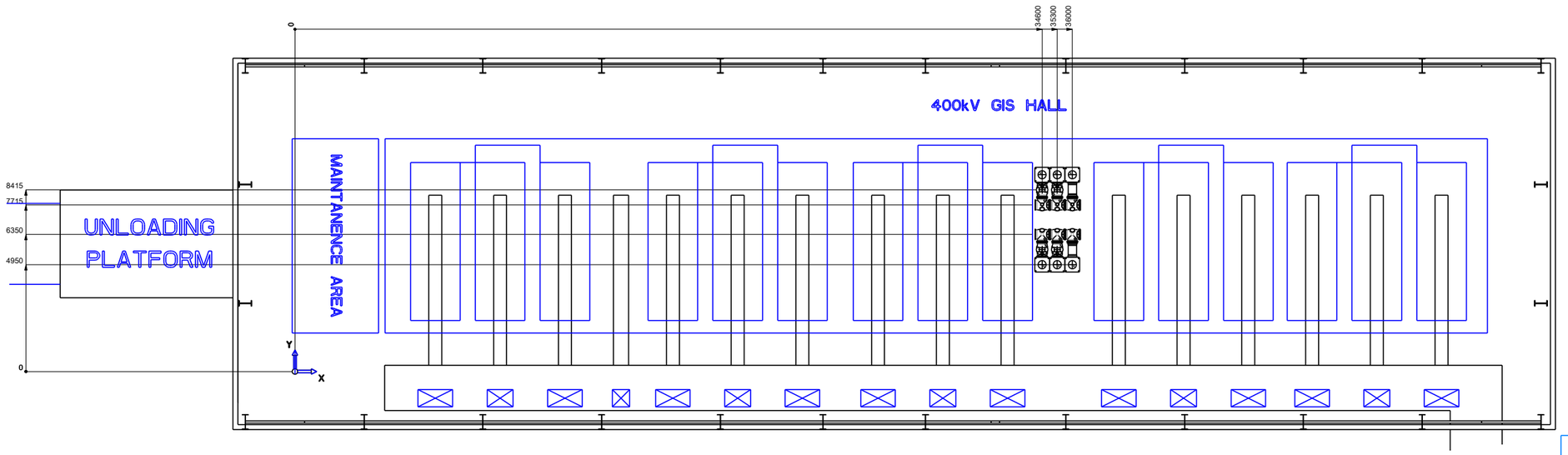
सभी माप मि॰ मी॰ में हैं/ALL DIMENSIONS ARE IN MM

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EC Nbr: ----	Q.Level: 3	Local Unit: CHT	SECTION & PLAN LAYOUT
Created: Logeshwar J		20/02/2024	GD378
Reviewed: ---			
Approved: Samikkannu Murugan		20/02/2024	/
T&D INDIA LTD	Sheet: 16/22		GD53A000723 Rev. 01
	Product type: T155-3		

SECTION X1-X1
SCALE 1:50





VENDOR NAME	GE T&D INDIA LTD. 142, Vandalur–Walajabad Road Padappai, Chennai 601301 Tamilnadu, India
ग्राहक दृष्टांत संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-026
NTPC ग्राहक CUSTOMER	एन टी पी सी लिमिटेड N T P C LIMITED
परियोजना PROJECT	TALCHER THERMAL POWER PROJECT STAGE–III (2X660MW)
भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP नोएडा (उ॰प्र॰)/NOIDA (U.P.)	DEPT. CODE: M नाम NAME / हस्ताक्षर SIGNATURE / दिनांक DATE निरूपणकर्ता/DRN: AK डिजाइनकर्ता/DES: RN परीक्षक/CHD: MS अनुमोदनकर्ता/APPD: SR
शीर्षक TITLE	SECTION & ELEVATION PLAN OF TALCHER 400 kV GIS SUB STATION
विभाग DEPT. / स्केल SCALE: – / हस्ताक्षर SIGN / दिनांक DATE	दृष्टांत संख्या / DRAWING NO. GD53A000723 शीट SHEET 16 OF 22 / पुनरीक्षण REV. 00

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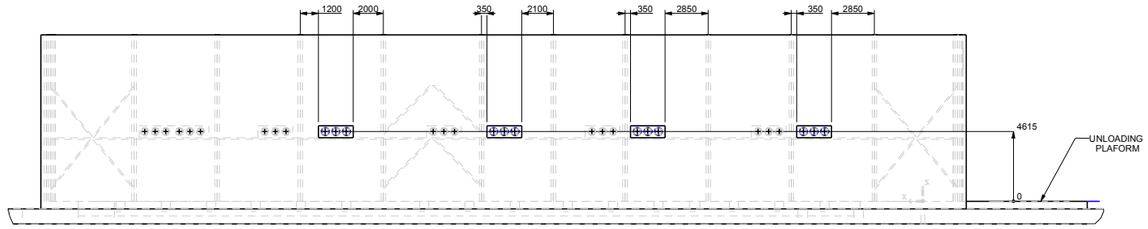
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फर्स्ट एंगल प्रोजेक्शन/FIRST ANGLE PROJECTION | सभी माप मि॰ मी॰ में है/ALL DIMENSIONS ARE IN MM

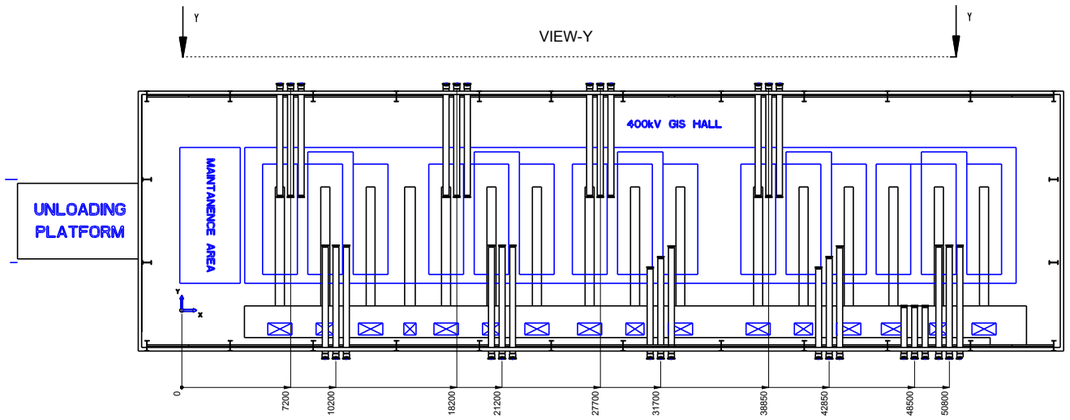
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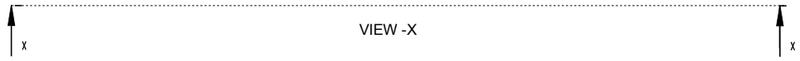
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Approved: Samikkannu Murugan		20/02/2024	/
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	Product type: T155-3		

VIEW-Y

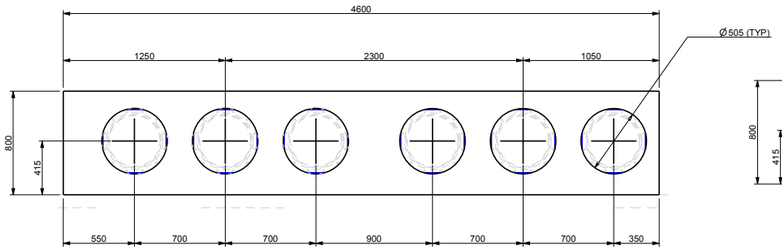


TOP VIEW

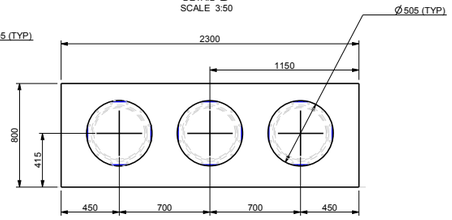




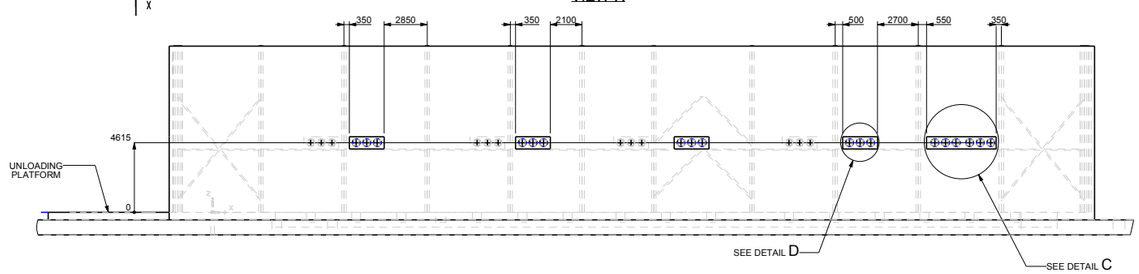
DETAIL C
SCALE 3:50



DETAIL D
SCALE 3:50



VIEW-X



VENDOR NAME	GE T&D INDIA LTD. 142, Vandalur-Walajabad Road Padappai, Chennai 601301 Tamilnadu, India
ग्राहक ड्राईंग संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-026
ग्राहक/CUSTOMER	एन टी पी सी लिमिटेड N T P C LIMITED
परियोजना PROJECT	TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)
भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP नोएडा (उ॰प्र॰)/NOIDA (U.P.)	DEPT CODE: M तैयारकर्ता/DSN: AK जाँचकर्ता/DCHK: RN परीक्षक/CHD: MS अनुमोदक/APPD: SR
शीर्षक/TITLE	SECTION & ELEVATION PLAN OF TALCHER 400 kV GIS SUB STATION
ड्राईंग संख्या / DRAWING NO.	GD53A000723
शीट SHEET 17 OF 22	पुनरीक्षण REV. 00

फार्मेट साइज़ A0
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फर्स्ट एंगल प्रोजेक्शन/FIRST ANGLE PROJECTION

सभी माप मि॰ मी॰ में हैं/ALL DIMENSIONS ARE IN MM

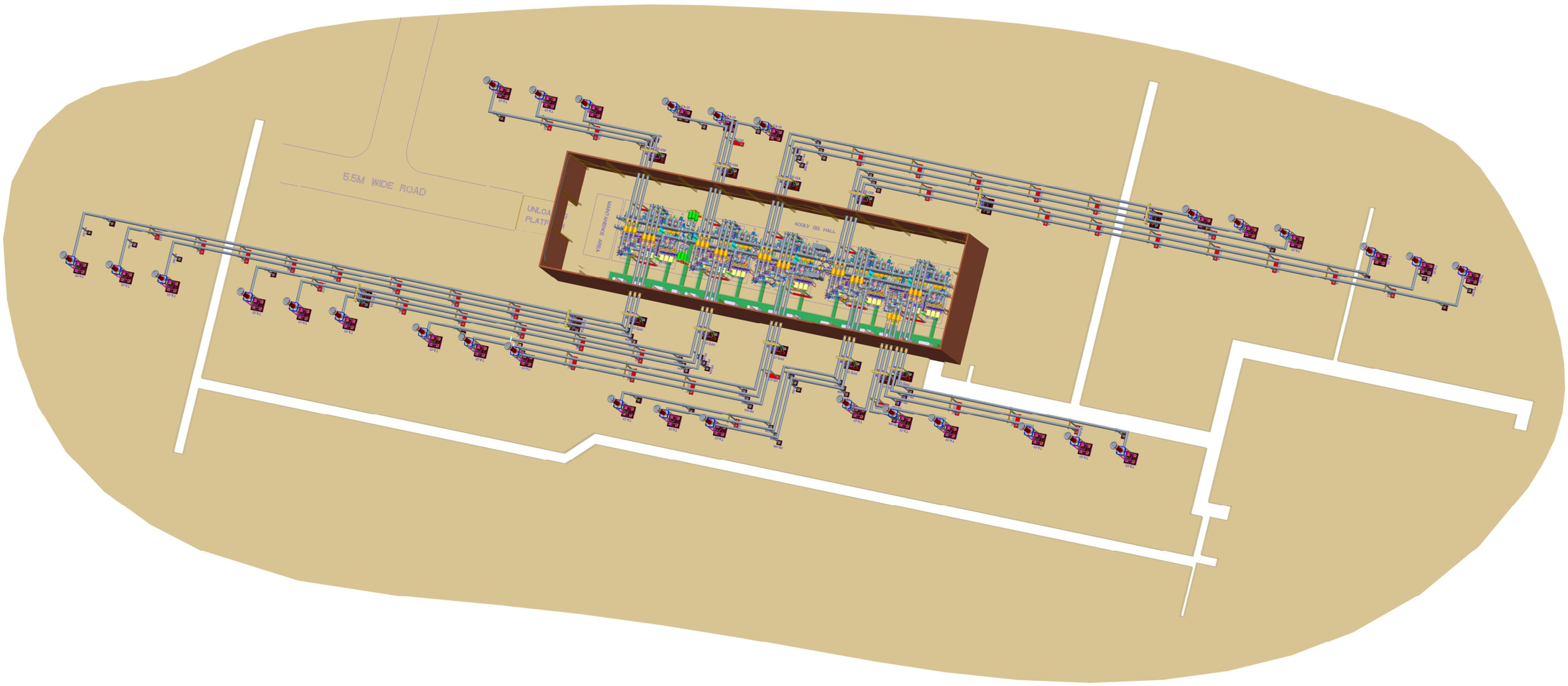
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3D VIEW

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Created: Logeshwar J			20/02/2024
Reviewed: ---			
Approved: Samikkannu Murugan			20/02/2024
T&D INDIA LTD		Sheet: 18/22	
		Product type: T155-3	

NTPC_THALCHAR 400kV_T155-3
SECTION & PLAN LAYOUT
GD378

GD53A000723 | Rev. 01



VENDOR NAME	GE T&D INDIA LTD. 142, Vandalur-Walajabad Road Padappai, Chennai 601301 Tamilnadu, India
ग्राहक ड्राइंग संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-026
NTPC ग्राहक/CUSTOMER	एन टी पी सी लिमिटेड N T P C LIMITED
परियोजना PROJECT	TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)
भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP नोएडा (उ॰प्र॰)/NOIDA (U.P.)	DEPT CODE: M

	NAME	SIGNATURE	DATE
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डिजाइनकर्ता/DESN	RN		
जाँचकर्ता/CHD	MS		
अनुमोदनकर्ता/APPD	SR		

शीर्षक/TITLE
SECTION & ELEVATION PLAN OF TALCHER 400 kV GIS SUB STATION

विभाग DEPT. | स्केल – SCALE – | ड्राइंग संख्या / DRAWING NO. GD53A000723

हस्ताक्षर SIGN | दिनांक DATE | शीट SHEET 18 OF 22 | पुनरीक्षण REV. 00

फॉर्मेट साइज़ A0
FORMAT SIZE A0

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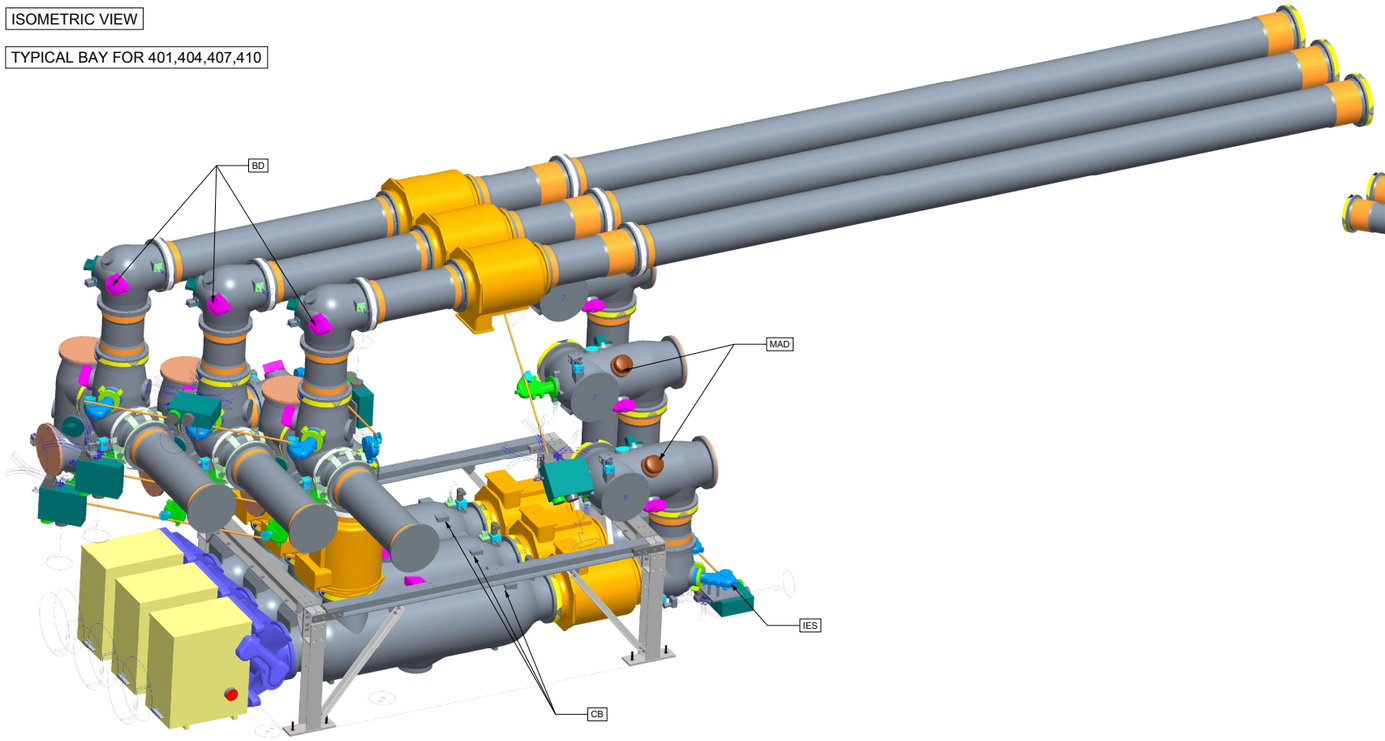
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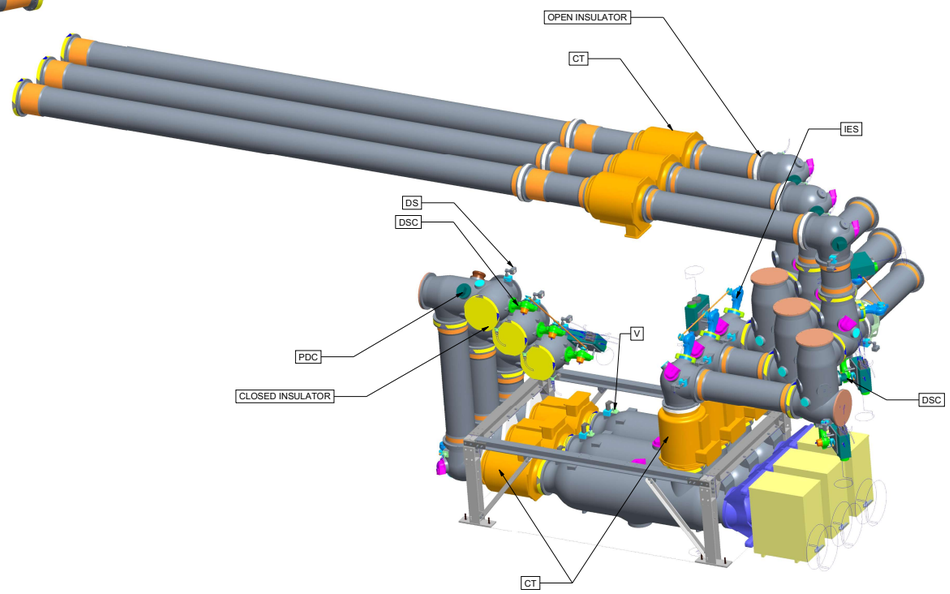
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EC Nbr: ----	Q.Level: 3	Local Unit: CHT	SECTION & PLAN LAYOUT
Created: Logeshwar J		20/02/2024	GD378
Reviewed: ---			
Approved: Samikkannu Murugan		20/02/2024	/
T&D INDIA LTD	Sheet: 19/22		GD53A000723 Rev. 01
	Product type: T155-3		

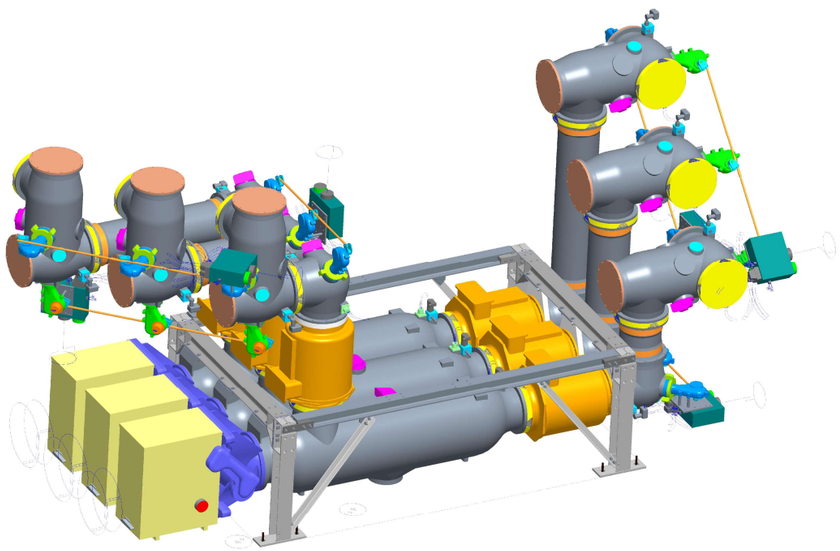
ISOMETRIC VIEW

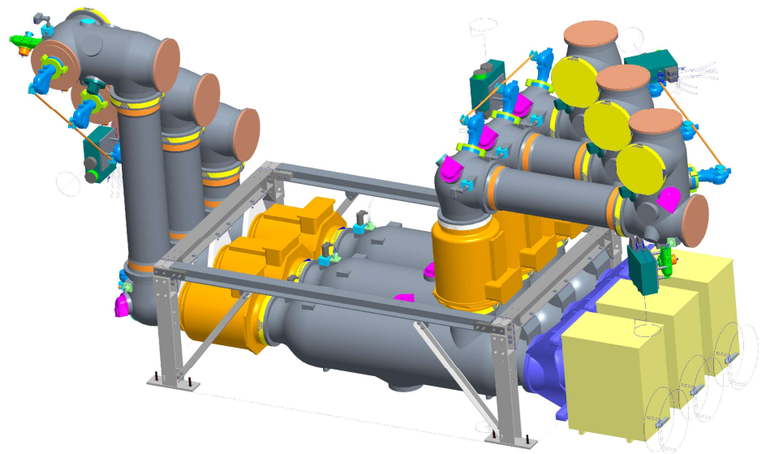
TYPICAL BAY FOR 401,404,407,410





TYPICAL BAY FOR 402,405,408,411,414





VENDOR NAME	GE T&D INDIA LTD. 142, Vandalur–Walajabad Road Padappai, Chennai 601301 Tamilnadu, India
ग्राहक दृष्टांत संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-026
ग्राहक CUSTOMER	एन टी पी सी लिमिटेड N T P C LIMITED
परियोजना PROJECT	TALCHER THERMAL POWER PROJECT STAGE–III (2X660MW)
	भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP नोएडा (उ॰प्र॰)/NOIDA (U.P.)

	नाम NAME	हस्ताक्षर SIGNATURE	दिनांक DATE
तैयारकर्ता/DRN	AK		
डिजाइनकर्ता/DESN	RN		
जाँचकर्ता/CHD	MS		
अनुमोदनकर्ता/APPD	SR		

शीर्षक TITLE

SECTION & ELEVATION PLAN OF TALCHER 400 kV GIS SUB STATION

विभाग DEPT.	स्केल SCALE –	ड्राइंग संख्या / DRAWING NO.	
डिजाइनर SIGN		GD53A000723	
दिनांक DATE		शीट SHEET OF 22	पुनरीक्षण REV. 00

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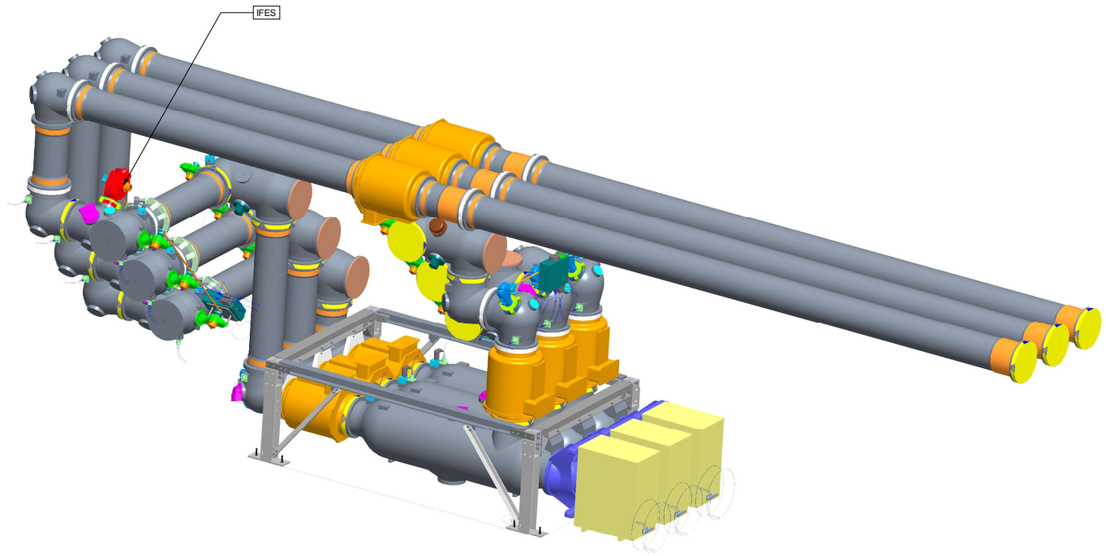
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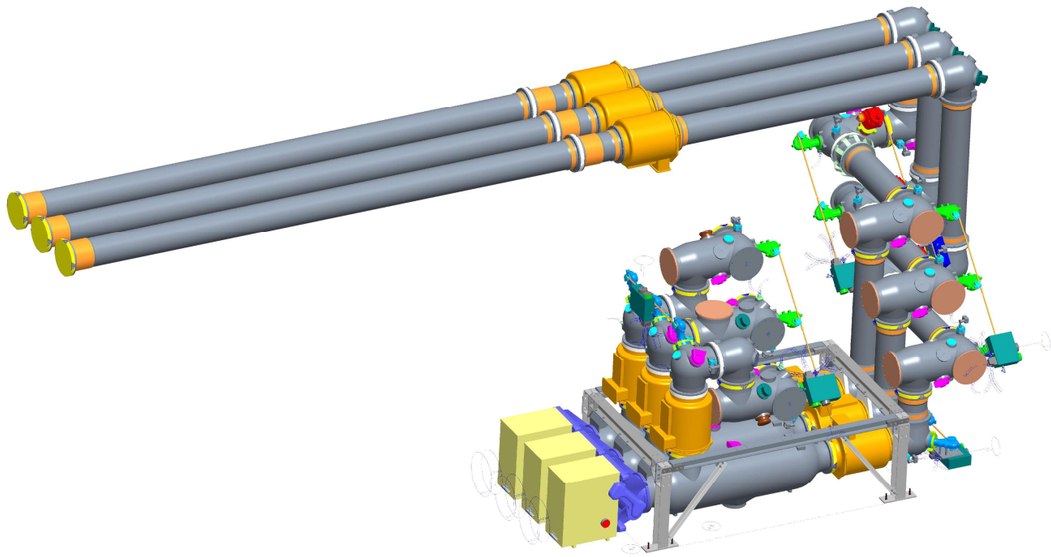
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EC Nbr: ----	Q.Level: 3	Local Unit: CHT	SECTION & PLAN LAYOUT
Created: Logeshwar J		20/02/2024	GD378
Reviewed: ---			
Approved: Samikkannu Murugan		20/02/2024	/
T&D INDIA LTD	Sheet: 20/22		
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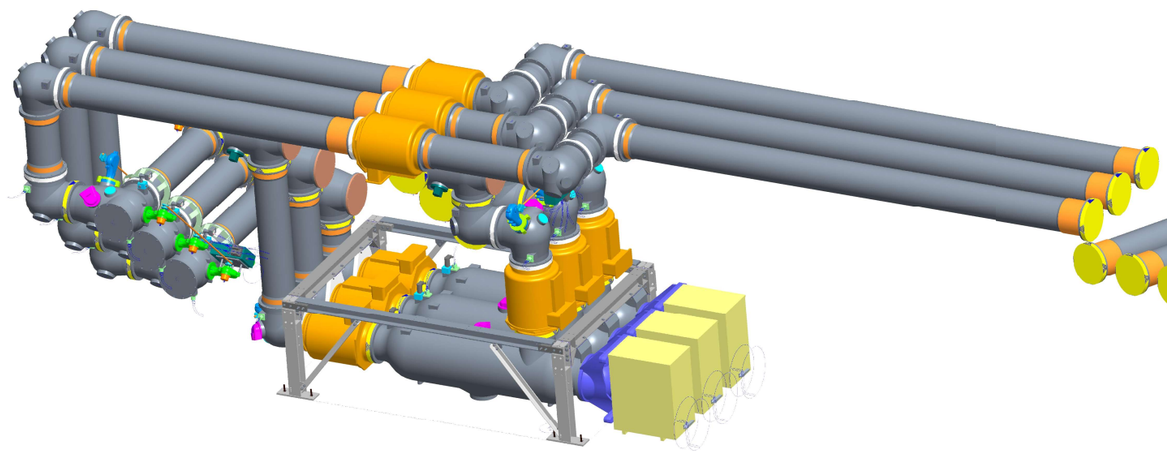
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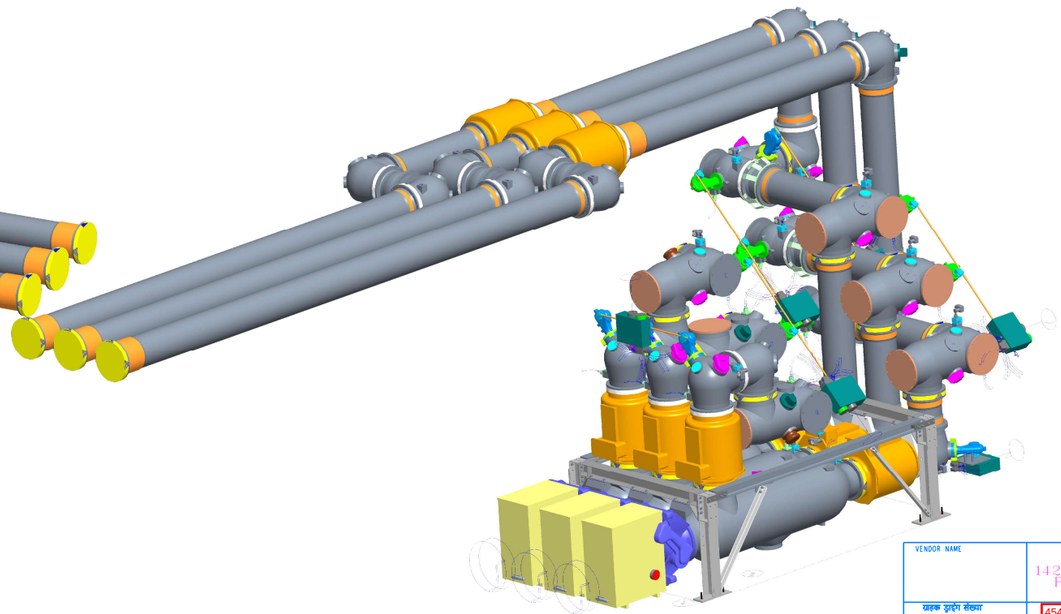
TYPICAL BAY FOR 403,406,409





BAY-412





VENDOR NAME	GE T&D INDIA LTD. 142, Vandalur–Walajabad Road Padappai, Chennai 601301 Tamilnadu, India
ग्राहक द्वारा संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-026
NTPC ग्राहक CUSTOMER	एन टी पी सी लिमिटेड N T P C LIMITED
परियोजना PROJECT	TALCHER THERMAL POWER PROJECT STAGE–III (2X660MW)
भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP नोएडा (उ॰प्र॰)/NOIDA (U.P.)	DEPT. CODE: M

	नाम NAME	हस्ताक्षर SIGNATURE	दिनांक DATE
तैयारकर्ता/DRN	AK		
डिजाइनकर्ता/DESN	RN		
जाँचकर्ता/CHD	MS		
स्वीकृतिकर्ता/APPD	SR		

शीर्षक TITLE

SECTION & ELEVATION PLAN OF TALCHER 400 kV GIS SUB STATION

विभाग DEPT.	स्केल SCALE: –	ड्राइंग संख्या / DRAWING NO. GD53A000723
डिजाइनर SIGN		
दिनांक DATE		
शीट SHEET OF 22		पुनरीक्षण REV. 00

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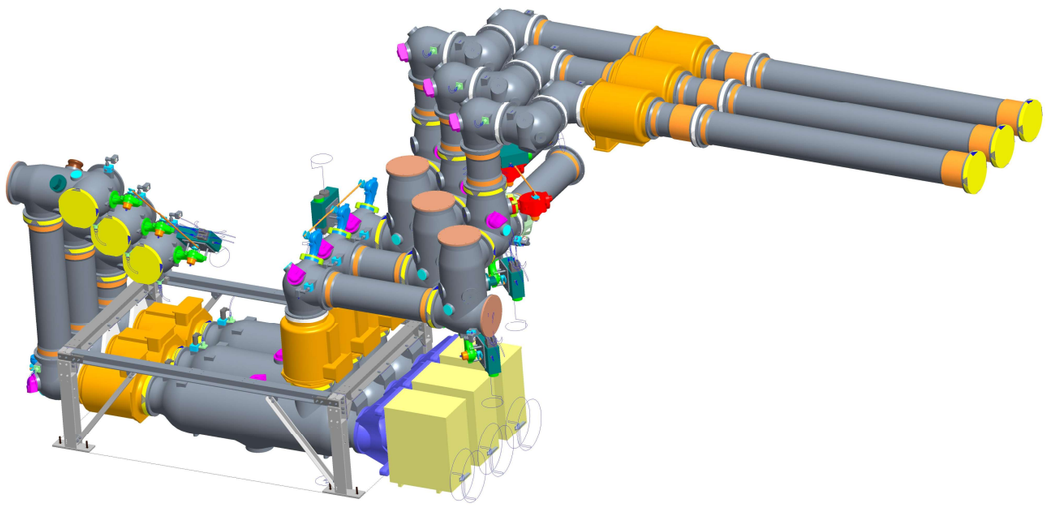
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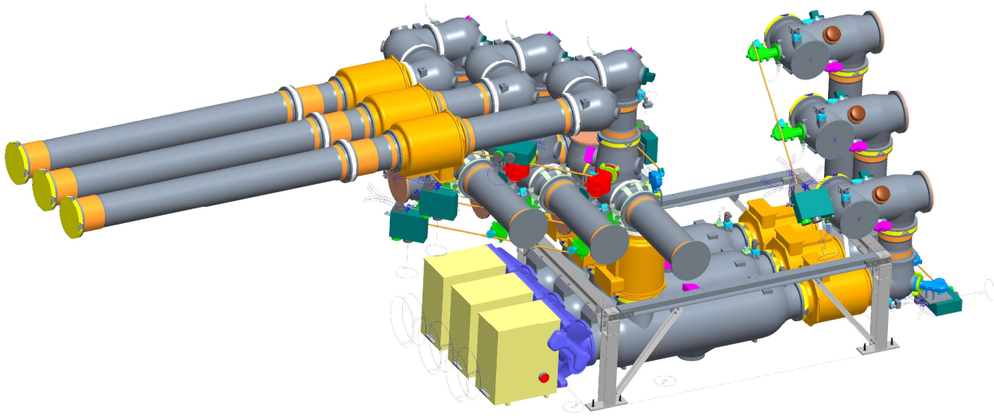
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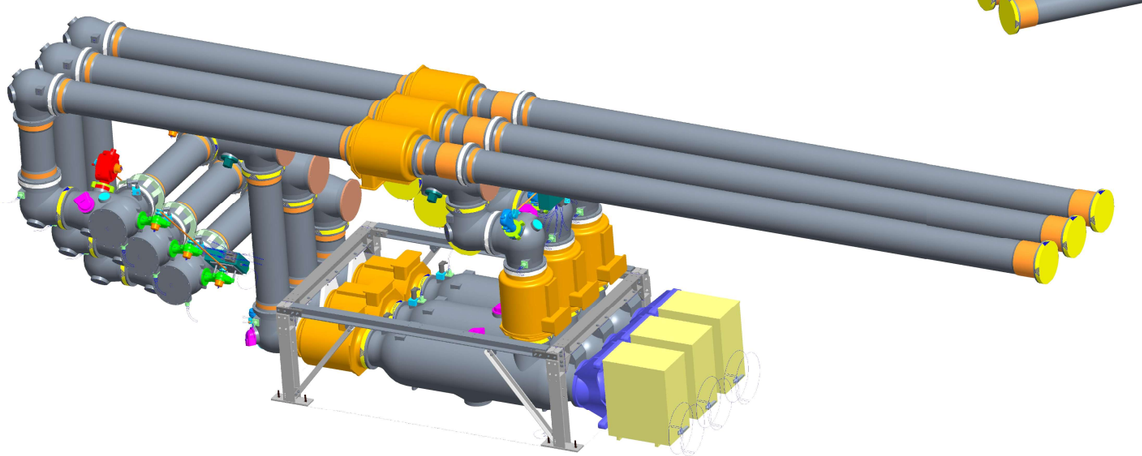
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Created: Logeshwar J		20/02/2024	GD378
Reviewed: ---			
Approved: Samikkannu Murugan		20/02/2024	/
T&D INDIA LTD	Sheet: 21/22		GD53A000723 Rev. 01
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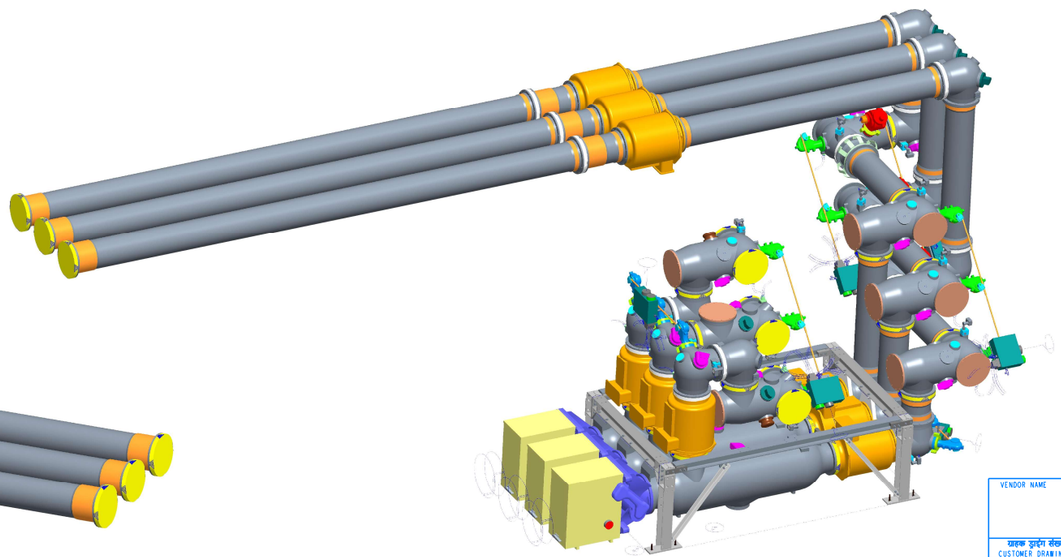
BAY-413





BAY-415





VENDOR NAME	GE T&D INDIA LTD. 142, Vandalur–Walajabad Road Padappai, Chennai 601301 Tamilnadu, India			
ग्राहक ड्राइंग संख्या CUSTOMER DRAWING NO.	4540-001-230-PVE-F-026			
NTPC ग्राहक CUSTOMER	एन टी पी सी लिमिटेड N T P C LIMITED			
परियोजना PROJECT	TALCHER THERMAL POWER PROJECT STAGE–III (2X660MW)			
BHEL	भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP नोएडा (उ॰प्र॰)/NOIDA (U.P.)	DEPT CODE M		नाम NAME / हस्ताक्षर SIGNATURE / दिनांक DATE
			तैयारकर्ता/DRN	AK
			डिजाइनकर्ता/DESN	RN
			जाँचकर्ता/CHKD	MS
			अनुमोदनकर्ता/APPD	SR
शीर्षक TITLE	SECTION & ELEVATION PLAN OF TALCHER 400 kV GIS SUB STATION			
		विभाग DEPT.	स्केल – SCALE –	ड्राइंग संख्या / DRAWING NO. GD53A000723
		डिजाइनर SIGN / दिनांक DATE		शीट SHEET OF 22 / पुनरीक्षण REV. 00

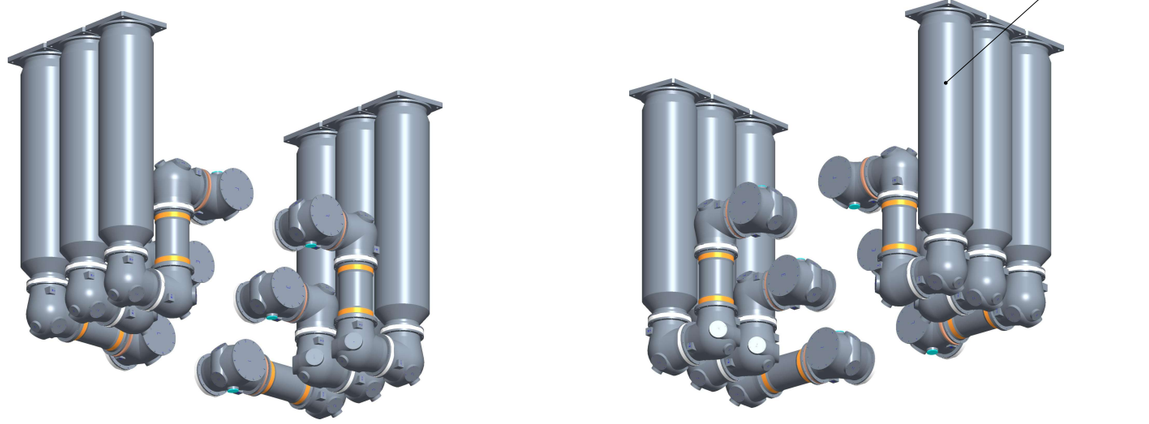
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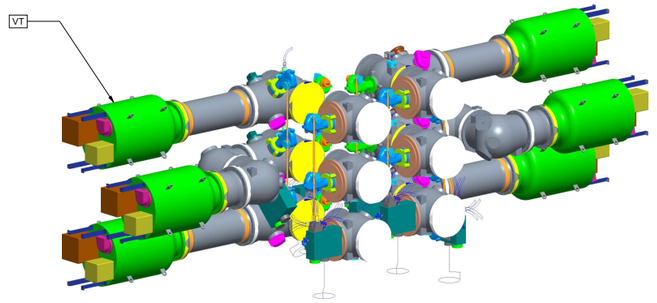
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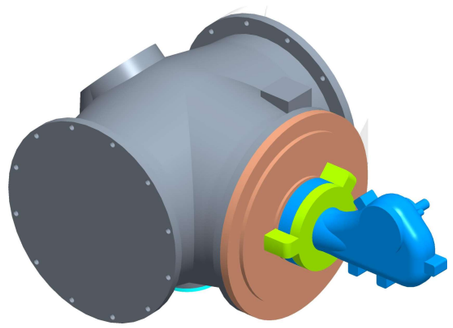
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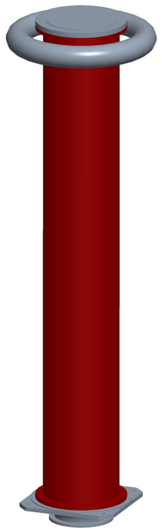
BUS VT



BUS INSULATED EARTHING SWITCH



BUSHING



Unit: 1890000 Unit:mm	Format: A0
EC Nbr: ----	Q.Level: 3
Created: Logeshwar J	20/02/2024
Reviewed: ---	
Approved: Samikkannu Murugan	20/02/2024
T&D INDIA LTD	Sheet: 22/22
	Product type: T155-3

Cr. Authority: CHT
Local Unit: CHT
NTPC_THALCHAR 400kV_T155-3
SECTION & PLAN LAYOUT
GD378
/
GD53A000723
Rev. 01

VENDOR NAME: GE T&D INDIA LTD.
142, Vandalur-Walajabad Road
Padappai, Chennai 601301
Tamilnadu, India

ग्राहक ड्राइंग संख्या CUSTOMER DRAWING NO.: 4540-001-230-PVE-F-026

ग्राहक CUSTOMER: एन टी पी सी लिमिटेड / N T P C LIMITED

परियोजना PROJECT: TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)

भारत हेवी इलेक्ट्रिकल्स लिमिटेड
BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP
नोएडा (उ॰प्र॰)/NOIDA (U.P.)

	नाम NAME	हस्ताक्षर SIGNATURE	दिनांक DATE
तैयारकर्ता/DSN	AK		
डिजाइनकर्ता/DESN	RN		
जाँचकर्ता/CHD	MS		
अनुमोदनकर्ता/APPD	SR		

शीर्षक TITLE: SECTION & ELEVATION PLAN OF TALCHER 400 kV GIS SUB STATION

ड्राइंग संख्या / DRAWING NO.: GD53A000723

विभाग DEPT. | स्केल - SCALE- | शीट SHEET: OF 22 | पुनरीक्षण REV.: 00

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GD378_BHEL_NTPC_THALCHAR_400kV_T155-3

BAYS	COMPARTMENT	PHASE	VOLUME (dm^3)	MASSE (kg)
BAY-401	G41	Phase 1	1016	49
		Phase 2	939	45
		Phase 3	862	41
		Total compartiment	2816	136
	G31	Phase 1	226	11
		Phase 2	303	15
		Phase 3	380	18
		Total compartiment	908	44
	G01	Phase 1	781	38
		Phase 2	781	38
		Phase 3	781	38
		Total compartiment	2343	113
	G21	Phase 1	184	9
		Phase 2	261	13
		Phase 3	338	16
		Total compartiment	783	38
	G11	Phase 1	163	8
		Phase 2	163	8
		Phase 3	163	8
		Total compartiment	489	24
	G51	Phase 1	334	16
		Phase 2	334	16
		Phase 3	334	16
		Total compartiment	1001	48
	G61	Phase 1	1284	62
		Phase 2	1361	66
		Phase 3	1438	69
		Total compartiment	4083	197
	G71	Phase 1	4551	219
		Phase 2	3858	186
		Phase 3	3165	152
		Total compartiment	11575	557
	G10	Phase 1	113	5
		Phase 2	190	9
		Phase 3	267	13
		Total compartiment	569	27
BAY-402	G42	Phase 1	163	8
		Phase 2	163	8
		Phase 3	163	8
		Total compartiment	489	24
	G32	Phase 1	184	9
		Phase 2	261	13
		Phase 3	338	16
		Total compartiment	783	38
	G02	Phase 1	781	38
		Phase 2	781	38
		Phase 3	781	38
		Total compartiment	2343	113
	G22	Phase 1	226	11
		Phase 2	303	15
		Phase 3	380	18
		Total compartiment	908	44
	G12	Phase 1	163	8
		Phase 2	163	8
		Phase 3	163	8
		Total compartiment	489	24
BAY-403	G20	Phase 1	113	5
		Phase 2	113	5

BAYS	COMPARTMENT	PHASE	VOLUME (dm^3)	MASSE (kg)
		Phase 3	113	5
		Total compartiment	338	16
	G13	Phase 1	823	40
		Phase 2	900	43
		Phase 3	977	47
		Total compartiment	2700	130
	G23	Phase 1	276	13
		Phase 2	184	9
		Phase 3	276	13
		Total compartiment	736	35
	G03	Phase 1	781	38
		Phase 2	781	38
		Phase 3	781	38
		Total compartiment	2343	113
	G33	Phase 1	226	11
		Phase 2	303	15
		Phase 3	380	18
		Total compartiment	908	44
	G43	Phase 1	163	8
		Phase 2	163	8
		Phase 3	163	8
		Total compartiment	489	24
	G53	Phase 1	334	16
		Phase 2	334	16
		Phase 3	334	16
		Total compartiment	1001	48
	G63	Phase 1	1841	89
		Phase 2	1764	85
		Phase 3	1687	81
		Total compartiment	5291	255
	G73	Phase 1	10024	482
		Phase 2	10717	516
		Phase 3	11410	549
		Total compartiment	32150	1547
BUS VT-1	G55	Phase 1	477	23
		Phase 2	661	32
		Phase 3	631	30
		Total compartiment	1768	85
	G65	Phase 1	300	14
		Phase 2	300	14
		Phase 3	300	14
		Total compartiment	900	43
BUS VT-2	G35	Phase 1	543	26
		Phase 2	727	35
		Phase 3	697	34
		Total compartiment	1966	95
	G45	Phase 1	300	14
		Phase 2	300	14
		Phase 3	300	14
		Total compartiment	900	43
BAY-404	G41	Phase 1	1131	54
		Phase 2	1131	54
		Phase 3	1131	54
		Total compartiment	3393	163
	G31	Phase 1	226	11
		Phase 2	303	15
		Phase 3	380	18
		Total compartiment	908	44
	G04	Phase 1	781	38
		Phase 2	781	38
		Phase 3	781	38
		Total compartiment	2343	113
	G21	Phase 1	184	9

BAYS	COMPARTMENT	PHASE	VOLUME (dm^3)	MASSE (kg)
		Phase 2	261	13
		Phase 3	338	16
		Total compartiment	783	38
	G11	Phase 1	163	8
		Phase 2	163	8
		Phase 3	163	8
		Total compartiment	489	24
	G51	Phase 1	334	16
		Phase 2	334	16
		Phase 3	334	16
		Total compartiment	1001	48
	G61	Phase 1	1284	62
		Phase 2	1361	66
		Phase 3	1438	69
		Total compartiment	4083	197
	G71	Phase 1	3138	151
		Phase 2	2445	118
		Phase 3	2786	134
		Total compartiment	8368	403
BAY-405	G42	Phase 1	163	8
		Phase 2	163	8
		Phase 3	163	8
		Total compartiment	489	24
	G32	Phase 1	184	9
		Phase 2	261	13
		Phase 3	338	16
		Total compartiment	783	38
	G05	Phase 1	781	38
		Phase 2	781	38
		Phase 3	781	38
		Total compartiment	2343	113
	G22	Phase 1	226	11
		Phase 2	303	15
		Phase 3	380	18
		Total compartiment	908	44
	G12	Phase 1	163	8
		Phase 2	163	8
		Phase 3	163	8
		Total compartiment	489	24
BAY-406	G13	Phase 1	950	46
		Phase 2	1027	49
		Phase 3	1104	53
		Total compartiment	3080	148
	G23	Phase 1	276	13
		Phase 2	184	9
		Phase 3	276	13
		Total compartiment	736	35
	G06	Phase 1	781	38
		Phase 2	781	38
		Phase 3	781	38
		Total compartiment	2343	113
	G33	Phase 1	226	11
		Phase 2	303	15
		Phase 3	380	18
		Total compartiment	908	44
	G43	Phase 1	163	8
		Phase 2	163	8
		Phase 3	163	8
		Total compartiment	489	24
	G53	Phase 1	334	16
		Phase 2	334	16
		Phase 3	334	16
		Total compartiment	1001	48

BAYS	COMPARTMENT	PHASE	VOLUME (dm^3)	MASSE (kg)
	G63	Phase 1	1841	89
		Phase 2	1764	85
		Phase 3	1687	81
		Total compartiment	5291	255
	G73	Phase 1	8264	398
		Phase 2	8957	431
		Phase 3	9650	464
		Total compartiment	26870	1293
BAY-407	G41	Phase 1	1005	48
		Phase 2	1005	48
		Phase 3	1005	48
		Total compartiment	3014	145
	G31	Phase 1	226	11
		Phase 2	303	15
		Phase 3	380	18
		Total compartiment	908	44
	G07	Phase 1	781	38
		Phase 2	781	38
		Phase 3	781	38
		Total compartiment	2343	113
	G21	Phase 1	184	9
		Phase 2	261	13
		Phase 3	338	16
		Total compartiment	783	38
	G11	Phase 1	163	8
		Phase 2	163	8
		Phase 3	163	8
		Total compartiment	489	24
	G51	Phase 1	334	16
		Phase 2	334	16
		Phase 3	334	16
		Total compartiment	1001	48
	G61	Phase 1	1284	62
		Phase 2	1361	66
		Phase 3	1438	69
		Total compartiment	4083	197
	G71	Phase 1	9072	437
		Phase 2	9771	470
		Phase 3	10458	503
		Total compartiment	29301	1410
BAY-408	G42	Phase 1	163	8
		Phase 2	163	8
		Phase 3	163	8
		Total compartiment	489	24
	G32	Phase 1	184	9
		Phase 2	261	13
		Phase 3	338	16
		Total compartiment	783	38
	G08	Phase 1	781	38
		Phase 2	781	38
		Phase 3	781	38
		Total compartiment	2343	113
	G22	Phase 1	226	11
		Phase 2	303	15
		Phase 3	380	18
		Total compartiment	908	44
	G12	Phase 1	163	8
		Phase 2	163	8
		Phase 3	163	8
		Total compartiment	489	24
BAY-409	G13	Phase 1	1131	54
		Phase 2	1131	54
		Phase 3	1131	54

BAYS	COMPARTMENT	PHASE	VOLUME (dm^3)	MASSE (kg)
		Total compartiment	3393	163
	G23	Phase 1	276	13
		Phase 2	184	9
		Phase 3	276	13
		Total compartiment	736	35
	G09	Phase 1	781	38
		Phase 2	781	38
		Phase 3	781	38
		Total compartiment	2343	113
	G33	Phase 1	226	11
		Phase 2	303	15
		Phase 3	380	18
		Total compartiment	908	44
	G43	Phase 1	163	8
		Phase 2	163	8
		Phase 3	163	8
		Total compartiment	489	24
	G53	Phase 1	334	16
		Phase 2	334	16
		Phase 3	334	16
		Total compartiment	1001	48
	G63	Phase 1	1981	95
		Phase 2	1904	92
		Phase 3	1827	88
		Total compartiment	5711	275
	G73	Phase 1	6571	316
		Phase 2	7264	350
		Phase 3	7935	382
		Total compartiment	21769	1048
BUS SA-1	G15	Phase 1	1443	69
		Phase 2	1366	66
		Phase 3	1259	61
		Total compartiment	4068	196
BUS SA-2	G25	Phase 1	2103	101
		Phase 2	2026	98
		Phase 3	1919	92
		Total compartiment	6048	291
BAY-410	G41	Phase 1	1071	52
		Phase 2	1071	52
		Phase 3	1071	52
		Total compartiment	3212	155
	G31	Phase 1	226	11
		Phase 2	303	15
		Phase 3	380	18
		Total compartiment	908	44
	G10	Phase 1	781	38
		Phase 2	781	38
		Phase 3	781	38
		Total compartiment	2343	113
	G21	Phase 1	184	9
		Phase 2	261	13
		Phase 3	338	16
		Total compartiment	783	38
	G11	Phase 1	163	8
		Phase 2	163	8
		Phase 3	163	8
		Total compartiment	489	24
	G51	Phase 1	334	16
		Phase 2	334	16
		Phase 3	334	16
		Total compartiment	1001	48
	G61	Phase 1	1284	62
		Phase 2	1361	66

BAYS	COMPARTMENT	PHASE	VOLUME (dm^3)	MASSE (kg)
		Phase 3	1438	69
		Total compartiment	4083	197
	G71	Phase 1	10673	514
		Phase 2	11366	547
		Phase 3	12059	580
		Total compartiment	34097	1641
BAY-411	G42	Phase 1	163	8
		Phase 2	163	8
		Phase 3	163	8
		Total compartiment	489	24
	G32	Phase 1	184	9
		Phase 2	261	13
		Phase 3	338	16
		Total compartiment	783	38
	G11	Phase 1	781	38
		Phase 2	781	38
		Phase 3	781	38
		Total compartiment	2343	113
	G22	Phase 1	226	11
		Phase 2	303	15
		Phase 3	380	18
		Total compartiment	908	44
	G12	Phase 1	163	8
		Phase 2	163	8
		Phase 3	163	8
		Total compartiment	489	24
BAY-412	G13	Phase 1	1071	52
		Phase 2	1071	52
		Phase 3	1071	52
		Total compartiment	3212	155
	G23	Phase 1	276	13
		Phase 2	184	9
		Phase 3	276	13
		Total compartiment	736	35
	G12	Phase 1	781	38
		Phase 2	781	38
		Phase 3	781	38
		Total compartiment	2343	113
	G33	Phase 1	226	11
		Phase 2	303	15
		Phase 3	380	18
		Total compartiment	908	44
	G43	Phase 1	163	8
		Phase 2	163	8
		Phase 3	163	8
		Total compartiment	489	24
	G53	Phase 1	334	16
		Phase 2	334	16
		Phase 3	334	16
		Total compartiment	1001	48
	G63	Phase 1	1981	95
		Phase 2	1904	92
		Phase 3	1827	88
		Total compartiment	5711	275
	G73	Phase 1	4795	231
		Phase 2	5493	264
		Phase 3	6181	297
		Total compartiment	16468	793
BAY-413	G41	Phase 1	983	47
		Phase 2	983	47
		Phase 3	983	47
		Total compartiment	2948	142
	G31	Phase 1	226	11

BAYS	COMPARTMENT	PHASE	VOLUME (dm^3)	MASSE (kg)
		Phase 2	303	15
		Phase 3	380	18
		Total compartiment	908	44
	G13	Phase 1	781	38
		Phase 2	781	38
		Phase 3	781	38
		Total compartiment	2343	113
	G21	Phase 1	184	9
		Phase 2	261	13
		Phase 3	338	16
		Total compartiment	783	38
	G11	Phase 1	163	8
		Phase 2	163	8
		Phase 3	163	8
		Total compartiment	489	24
	G51	Phase 1	334	16
		Phase 2	334	16
		Phase 3	334	16
		Total compartiment	1001	48
	G61	Phase 1	885	43
		Phase 2	962	46
		Phase 3	1039	50
		Total compartiment	2886	139
	G71	Phase 1	3401	164
		Phase 2	2708	130
		Phase 3	2523	121
		Total compartiment	8631	415
	G30	Phase 1	113	5
		Phase 2	113	5
		Phase 3	113	5
		Total compartiment	338	16
BAY-414	G42	Phase 1	163	8
		Phase 2	163	8
		Phase 3	163	8
		Total compartiment	489	24
	G32	Phase 1	184	9
		Phase 2	261	13
		Phase 3	338	16
		Total compartiment	783	38
	G14	Phase 1	781	38
		Phase 2	781	38
		Phase 3	781	38
		Total compartiment	2343	113
	G22	Phase 1	226	11
		Phase 2	303	15
		Phase 3	380	18
		Total compartiment	908	44
	G12	Phase 1	163	8
		Phase 2	163	8
		Phase 3	163	8
		Total compartiment	489	24
BAY-415	G13	Phase 1	317	15
		Phase 2	240	12
		Phase 3	163	8
		Total compartiment	720	35
	G23	Phase 1	276	13
		Phase 2	184	9
		Phase 3	276	13
		Total compartiment	736	35
	G15	Phase 1	781	38
		Phase 2	781	38
		Phase 3	781	38
		Total compartiment	2343	113

BAYS	COMPARTMENT	PHASE	VOLUME (dm^3)	MASSE (kg)
	G33	Phase 1	226	11
		Phase 2	303	15
		Phase 3	380	18
		Total compartiment	908	44
	G43	Phase 1	163	8
		Phase 2	163	8
		Phase 3	163	8
		Total compartiment	489	24
	G53	Phase 1	334	16
		Phase 2	334	16
		Phase 3	334	16
		Total compartiment	1001	48
	G63	Phase 1	2025	97
		Phase 2	1948	94
		Phase 3	1871	90
		Total compartiment	5843	281
	G73	Phase 1	5771	278
		Phase 2	5078	244
		Phase 3	4385	211
		Total compartiment	15235	733
	G40	Phase 1	113	5
		Phase 2	113	5
		Phase 3	113	5
		Total compartiment	338	16
		CUMUL EXACT sur le poste:	377316	18161

10% Additon on Total gas as per PO condition	1816
Total Gas Qty in kg	19977