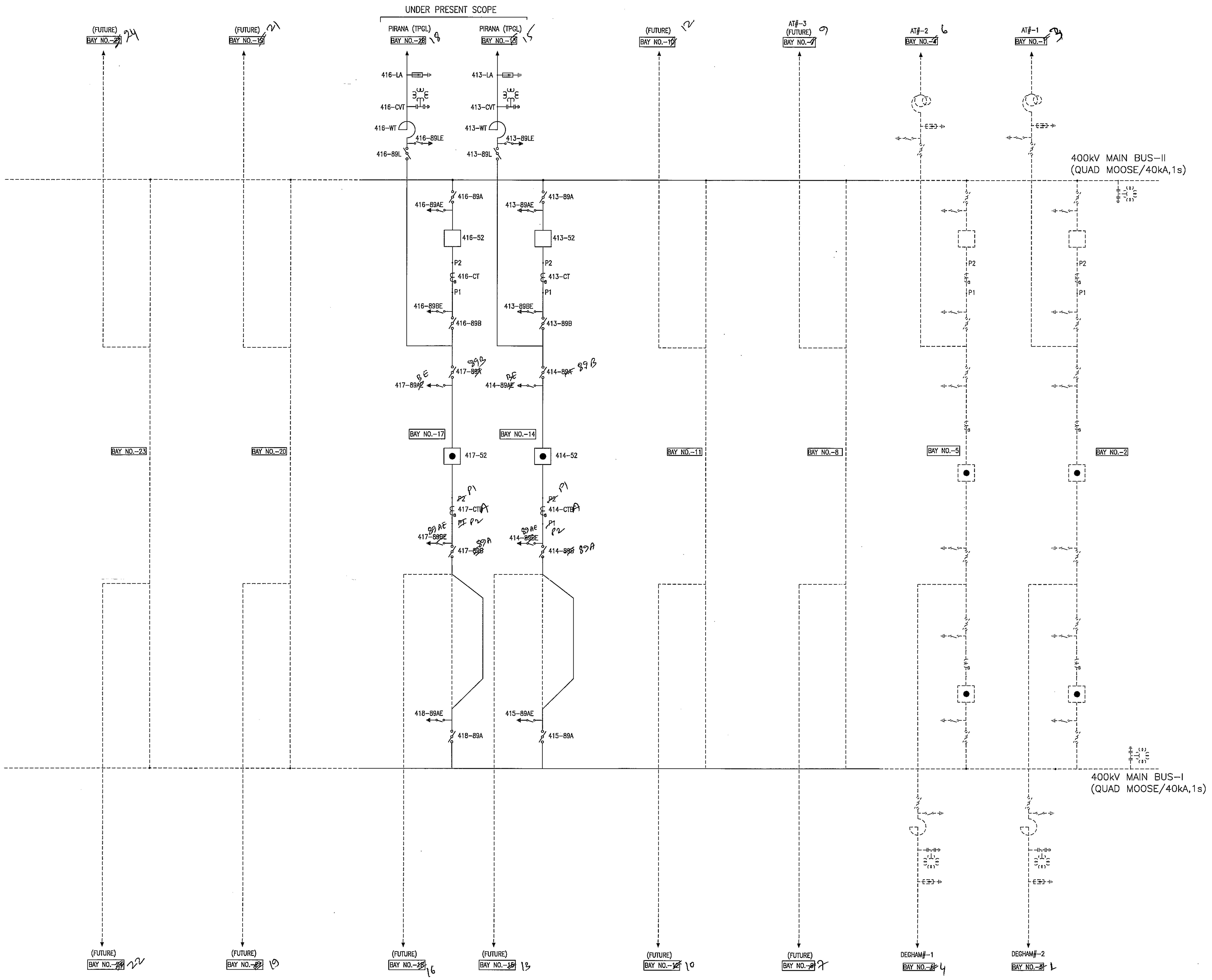
Appendix-A

Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part D



BILL OF QUANTITY – 400kV EQUIPMENTS, 40kA FOR 1 SEC.				
SYMBOL	LEGEND	DESCRIPTION	LOCATION	QUANTITY (Nos.)
	89	D.E.R. ISOLATOR WITH ONE E/S 2000A (3 PHASE)–MOTOR OPERATED	413–89L, 413–89A, 413–89B, 414–89A, 414–89B, 415–89A, 416–89L, 416–89A, 416–89B, 417–89A, 417–89B, 418–89A	12
	LA	390 kV, 10kA SURGE ARRESTOR (1 PHASE), CLASS–III	413–LA, 416–LA	06
	CT	CURRENT TRANSFORMER, 2000–1000–500/1A, 120 % EXTENDED CURRENT RATING, (1 PHASE)	413–CT, 414–CTA, 416–CT, 417–CTA,	12
	CVT	420 kV CVT, 4400 PF (1 PHASE) $\frac{400kV}{\sqrt{3}}/\frac{110V}{\sqrt{3}}/\frac{110V}{\sqrt{3}}/\frac{110V}{\sqrt{3}}$ CORES– 1,2 : CL3P, 50VA CORES– 3 : CL 0.2, 50VA	413–CVT, 416–CVT	06
	WT	WAVE TRAP 2000A, 1.0mH, 1–PHASE (NOT IN SIEMENS SCOPE OF SUPPLY)	413–WT, 416–WT	04
	52	CIRCUIT BREAKER WITH CLOSING RESISTOR 2000A (3 PHASE)	414–52, 417–52	02
	52	CIRCUIT BREAKER WITHOUT CLOSING RESISTOR 2000A (3 PHASE)	413–52, 416–52	02

SYSTEM DESIGN PARAMETERS

SYSTEM OPERATING VOLTAGE	:	400kV
MAXIMUM OPERATING VOLTAGE OF THE SYSTEM	:	420kV
SYSTEM FAULT LEVEL	:	40kA/1Sec.
SWITCHING IMPULSE WITHSTAND VOLTAGE	:	1050 kVp (250/2500 micro sec.) (Dry & Wet)
FULL WAVE IMPULSE WITHSTAND VOLTAGE	:	1550 kVp (1.2/50 micro sec.) (Dry & Wet)
1 min. P.F. WITHSTAND VOLTAGE	:	630 kV (rms) (Dry & Wet)

LEGEND

————	PRESENT SCOPE
- - - - -	FUTURE/EXISTING

REFERENCE DRAWINGS

TENDER SINGLE LINE DIAGRAM	:	C/ENGG–SS/TORRENTCONSUL/PIRANA–X/SLD/01:REV0
TENDER ELECTRICAL LAYOUT PLAN	:	C/ENGG–SS/TORRENTCONSUL/PIRANA–X/LAY/01:REV0

* Bay numbering / Equipment numbering may pl. be corrected as marked in line with existing arrangement. May be verified at site also and corrected in As built drgs.

Siemens

PROJECT:–
EXTENSION BY TWO 400kV LINE BAYS FOR SUGEN OF 400kV PIRANA (PGCL) SUBSTATION AT VILLAGE KAMOD DIST. AHMEDABAD

PROJECT MANAGEMENT CONSULTANT:– POWER GRID CORPORATION OF INDIA LTD.

CLIENT:– TORRENT POWER GRID LIMITED

Rev.	Remarks	Date	Name		
0	FIRST ISSUE	23.04.10	S.M		
				Date	23.04.10
				Drawn	A.Y
				Appr.	S.M.
				Norm	S.J.

Siemens Ltd Gurgaon

LOA REF– TPGL/CE/2100001&2 DT.05.04.10

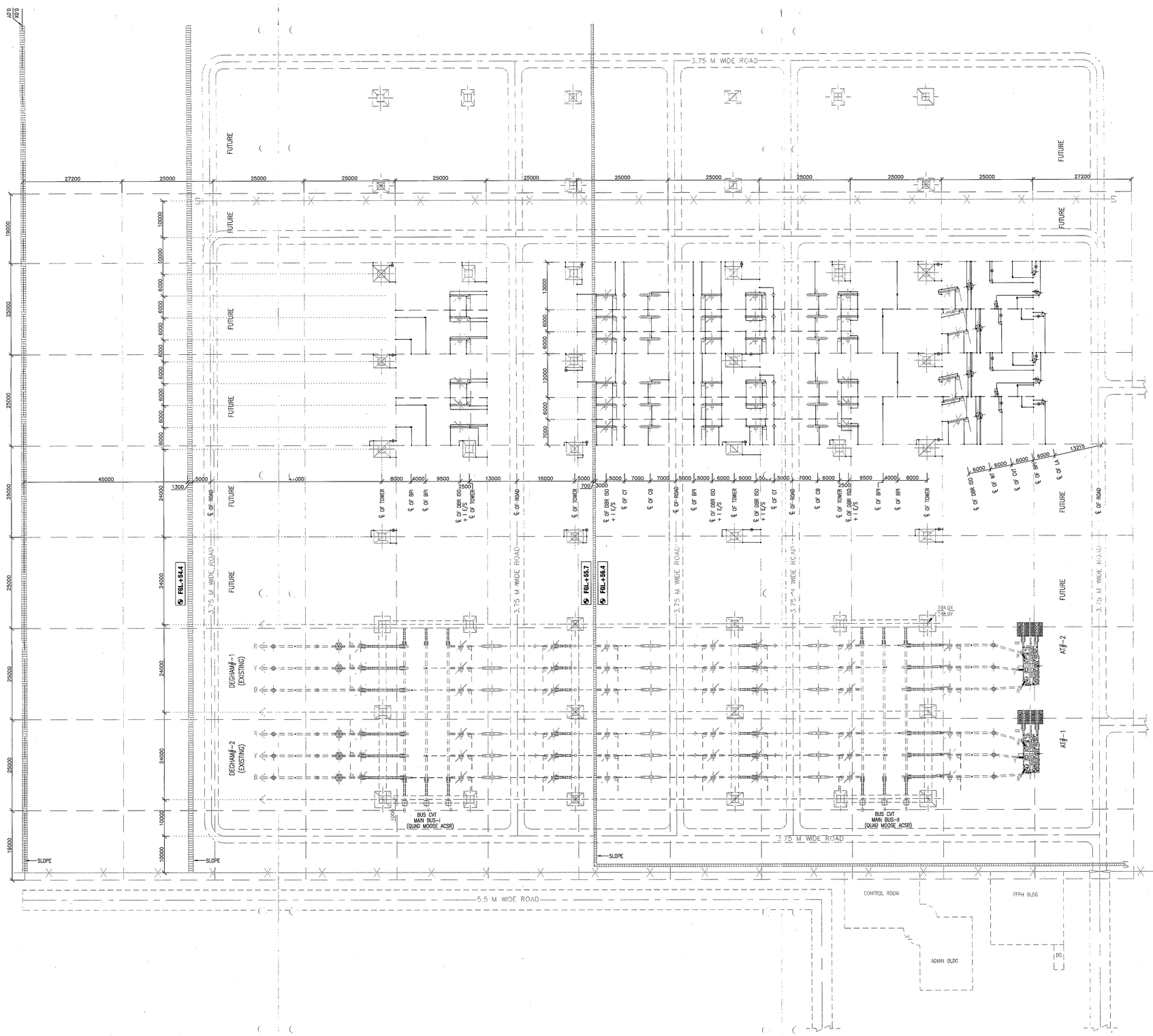
REV NO 0

SINGLE LINE DIAGRAM

Scale 1 : 1

Sheet 1

(1)–G71770–AC151–S151–001–0



W
S N
E

NOTES:–

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. MAIN EARTHMAT CONDUCTOR WILL BE LAID 600M BELOW FROM THE GROUND LEVEL.
3. EARTHING CONDUCTOR RUNNING ALONG CABLE TRENCHES, DRAINS & RAIL WILL BE LAID 300MM BELOW THEM.
4. THIS DRAWING IS ONLY SYMBOLIC REPRESENTATION OF EARTHING CONDUCTOR LAYOUT. AT ACTUAL SITE CONDITION CONDUCTOR WILL BE ROUTED IN SUCH MANNER SO THAT IT DOESNOT FOUL WITH ANY FOUNDATION.
5. EARTHMAT WILL BE LAID 2000MM BEYOND THE FENCE.
6. CABLE TRENCH EARTHING WILL BE DONE WITH 50X6 GS FLAT AND RUN ALONG THE CABLE SUPPORTING STRUCTURE EARTH FLAT OF CABLE TRENCH WILL BE CONNECTED TO THE MAIN EARTHING AT 10MTS. INTERVAL.
7. EQUIPMENT EARTHING CONNECTION ARE DIAGRAMATIC ONLY AND WILL BE DONE AS PER SITE CONDITION.
8. FENCE WILL BE EARTHED AT ALTERNATE POST. RAIL TRACK WILL BE EARTHED AT EVERY 10MTS. INTERVAL AND AT BOTH ENDS.
9. ALL EARTHING WILL BE DONE IN ACCORDANCE WITH IS:3043 UNLESS OTHERWISE SPECIFIED IN THE TECHNICAL SPECIFICATION.
10. AUXILARY EARTHMAT 1500X1500 WITH GRID SPACING 300MM WILL BE PLACED BELOW ISOLATOR MOM & EOM AT 300MM DEPTH FROM GROUNDING LEVEL. THIS WILL BE DONE AS PER THE ACTUAL LOCATION OF MOM & EOM BOX AT SITE FOR DETAILS OF CONNECTION OF AUX EARTHMATS TO MAIN EARTHMAT REFER GROUNDING NOTES & DETAILS (DETAIL NO.–241)
11. ROD EARTH ELECTRODE DETAILS:
    - FOR LA : 06 NOS.
    - FOR CVT : 06 NOS.
    - FOR TOWER WITH PEAK : 16 NOS.
12. EACH INDIVIDUAL STRUCTURE/EQUIPMENT SHOULD BE EARTHED AND CONNECTED TO TWO DIFFERENT GRID.
13. AC KIOSK LOCATION SHOWN IS INDICATIVE ONLY. FOR ACTUAL LOCATION, CABLE TRENCH LAYOUT SHALL BE REFERRED.

LEGEND:–

- MAIN EARTHING GRID–40mm. MS ROD
- RISER INTER CONNECTIONS–40 DIA.MS ROD BELOW GROUND LEVEL
- ROD EARTH ELECTRODE.
- FENCE
- FUTURE/NOT IN SIEMENS SCOPE OF SUPPLY
- UNDER PRESENT SCOPE
- LIGHTNING ARRESTER
- CAPACITIVE VOLTAGE TRANSFORMER (CVT)
- WAVE TRAP
- CURRENT TRANSFORMER
- DBR ISOLATOR WITH 1E/S
- CIRCUIT BREAKER
- BPI

REFERENCE DRAWINGS:–

1. (0)–G71770–AC151–L152–001 : LAYOUT PLAN
2. C/ENG/STD/EARTHINGS (24 Sheets) : STANDARD EARTHING DETAILS GIVEN WITH SECTION : SWITCHYARD ERECTION, Rev.07 OF TECH. SPECIFICATION.

Cat-I

PROJECT:–
EXTENSION BY TWO 400kV LINE BAYS FOR SUGEN OF 400kV PIRANA (PGCL) SUBSTATION AT VILLAGE KAMOD DIST. AHMEDABAD

PROJECT MANAGEMENT CONSULTANT:–
POWER GRID CORPORATION OF INDIA LTD.

CLIENT:–
TORRENT POWER GRID LIMITED

Rev.	Remarks	Date	Name
0	FIRST ISSUE	08.07.10	A.Y.

Date 08.07.10 | Draw A.Y | Appr. S.M. | Norm S.M.

Siemens Ltd Gurgaon

LOA REF– TPGL/CE/2100001&2 DT.05.04.10

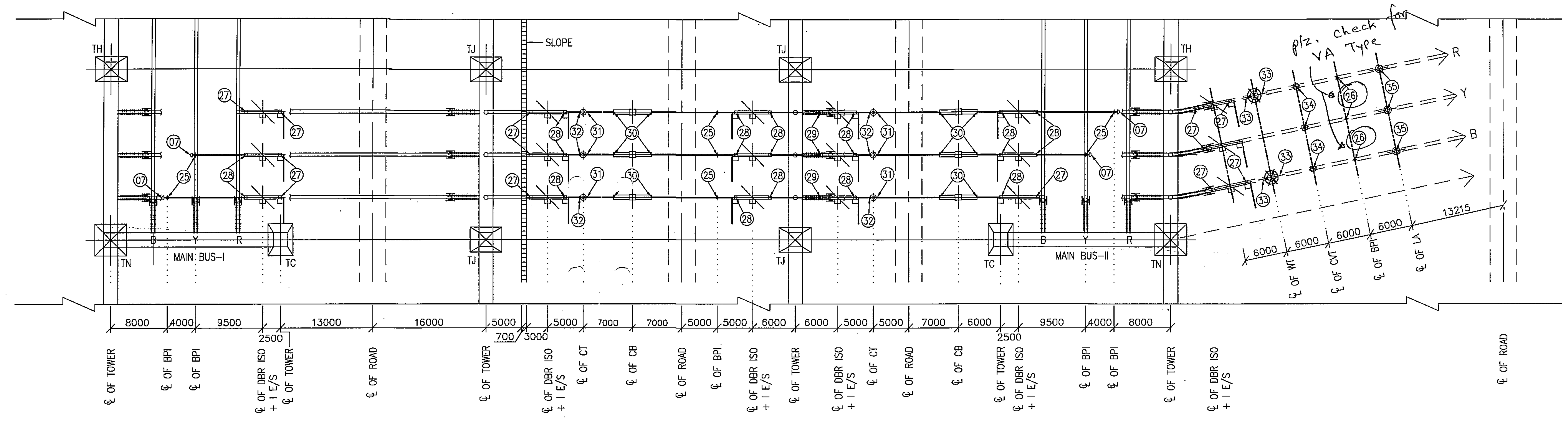
REV NO 0

EARTHING LAYOUT PLAN

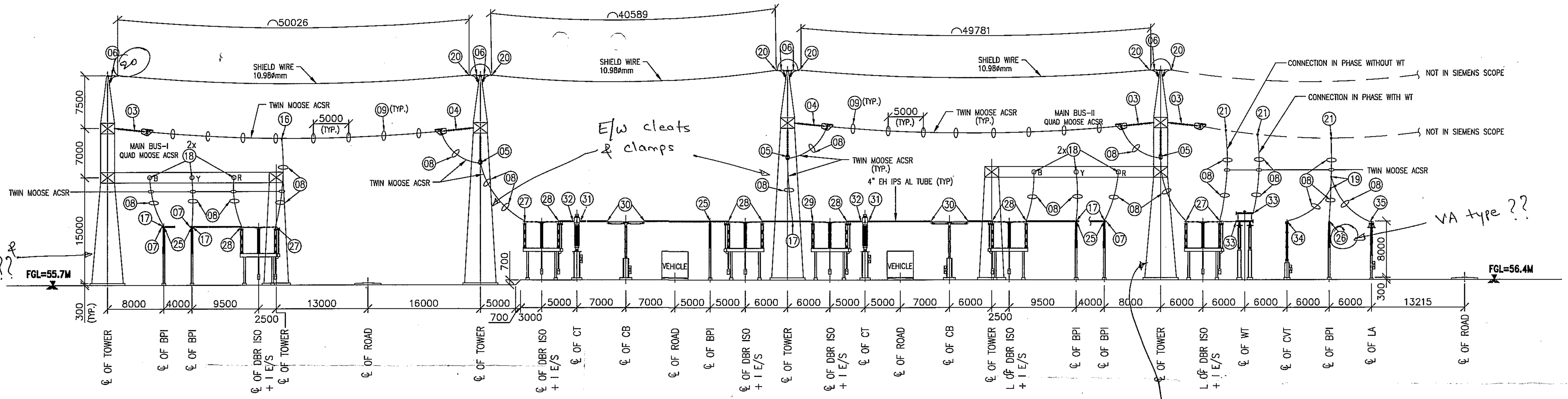
Scale 1 : 400

Sheet 1

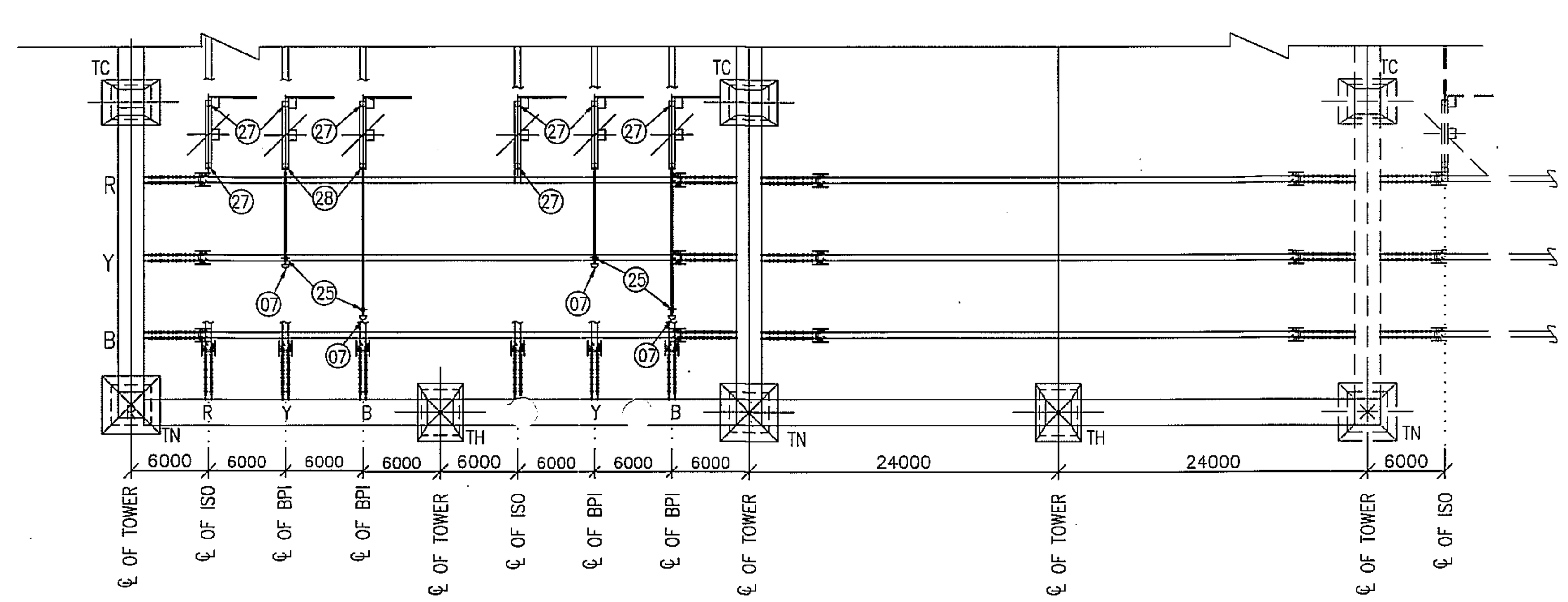
(0)–G71770–AC151–L163–001–0



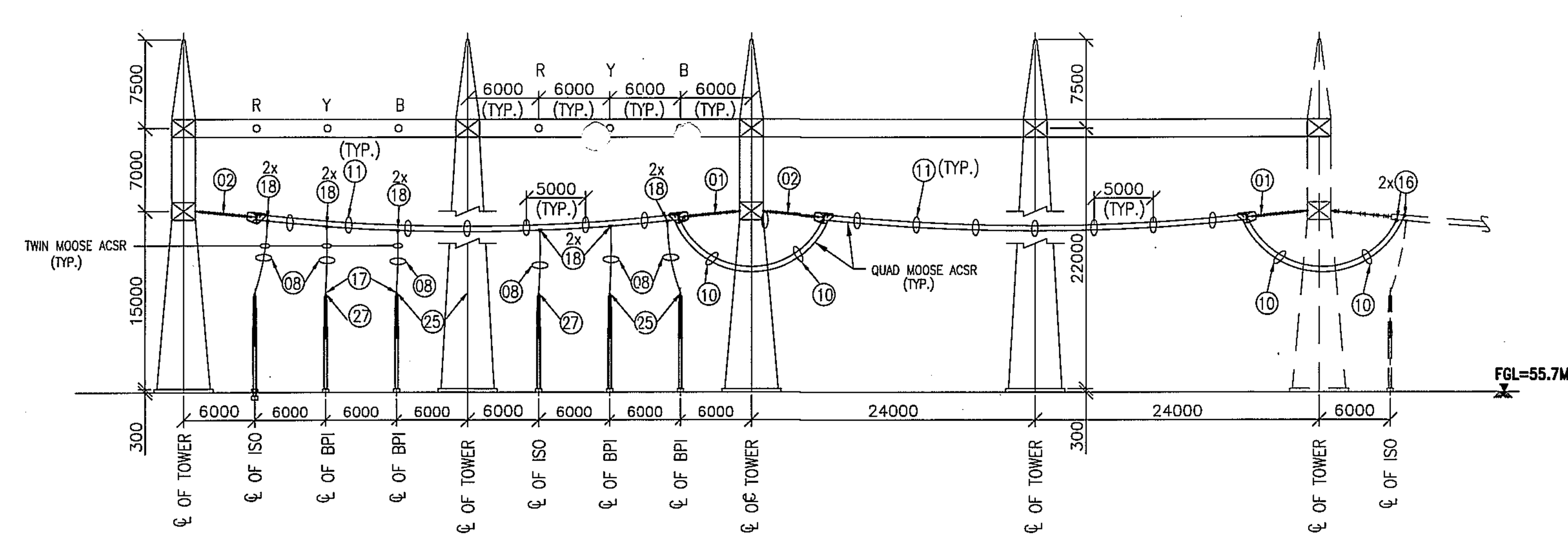
PLAN VIEW – (FUTURE BAY-TIE BAY-LINE BAY)



SECTION VIEW – (FUTURE BAY-TIE BAY-LINE BAY)(B PHASE)



PLAN VIEW (MAIN BUS)~~I (TYP.)~~



SECTION VIEW (MAIN BUS)~~I (TYP.)~~

BILL OF MATERIAL (400 kV) :-

CONNECTOR NO.	ITEM DESCRIPTION
	TENSION/SUSPENSION HARDWARES
01	400kV DOUBLE TENSION STRING INSULATOR HARDWARE ASSEMBLY WITH TURN BUCKLE SUITABLE FOR QUAD MOOSE ACSR CONDUCTOR
02	400kV DOUBLE TENSION STRING INSULATOR HARDWARE ASSEMBLY WITHOUT TURN BUCKLE SUITABLE FOR QUAD MOOSE ACSR CONDUCTOR
03	400kV DOUBLE TENSION STRING INSULATOR HARDWARE ASSEMBLY WITH TURN BUCKLE SUITABLE FOR TWIN MOOSE ACSR CONDUCTOR
04	400kV DOUBLE TENSION STRING INSULATOR HARDWARE ASSEMBLY WITHOUT TURN BUCKLE SUITABLE FOR TWIN MOOSE ACSR CONDUCTOR
05	400kV DOUBLE SUSPENSION STRING INSULATOR HARDWARE ASSEMBLY DROP TYPE SUITABLE FOR TWIN MOOSE ACSR CONDUCTOR
06	TENSION HARDWARES SUITABLE FOR SHIELD WIRE
07	CORONA BELL FOR 4" EHIPS AL. TUBE
08	SPACER SUITABLE FOR TWIN MOOSE ACSR CONDUCTOR RIGID TYPE
09	SPACER SUITABLE FOR TWIN MOOSE ACSR CONDUCTOR FLEXIBLE TYPE
10	SPACER SUITABLE FOR QUAD MOOSE ACSR CONDUCTOR RIGID TYPE
11	SPACER SUITABLE FOR QUAD MOOSE ACSR CONDUCTOR FLEXIBLE TYPE
	CLAMPS
16	T CLAMPS SUITABLE FOR TWIN MOOSE ACSR CONDUCTOR ON RUN & TAP
17	T CLAMPS SUITABLE FOR 4" EHIPS AL. TUBE ON RUN & TWIN MOOSE ACSR CONDUCTOR ON TAP
18	T CLAMPS SUITABLE FOR TWIN MOOSE CONDUCTOR ON RUN & SINGLE MOOSE ACSR CONDUCTOR ON TAP
19	PG CLAMPS SUITABLE FOR SINGLE MOOSE ACSR CONDUCTOR ON RUN & TAP
20	PG CLAMPS SUITABLE FOR SHIELD WIRE
21	T CLAMPS SUITABLE FOR X TYPE OF CONDUCTOR ON RUN & TWIN MOOSE ACSR CONDUCTOR ON TAP

CONNECTOR NO.	ITEM DESCRIPTION	TAKE OFF	SYSTEM VOLTAGE
	EQUIPMENT TERMINALS CONNECTOR SUITABLE FOR		
25	TERMINAL CONNECTOR FOR BPI TO RECEIVE 4" EHIPS AL. TUBE SLIDING TYPE	H	420kV
26	TERMINAL CONNECTOR FOR BPI TO RECEIVE TWIN MOOSE ACSR CONDUCTOR	H	420kV
27	TERMINAL CONNECTOR FOR ISOLATOR TO RECEIVE TWIN MOOSE ACSR CONDUCTOR	H	420kV
28	TERMINAL CONNECTOR FOR ISOLATOR TO RECEIVE 4" EHIPS AL. TUBE – FIXED TYPE	H	420kV
29	TERMINAL CONNECTOR FOR ISOLATOR TO RECEIVE 4" EHIPS AL. TUBE – EXPANSION TYPE	H	420kV
30	TERMINAL CONNECTOR FOR CB TO RECEIVE 4" EHIPS AL. TUBE – EXPANSION TYPE	H	420kV
31	TERMINAL CONNECTOR FOR CT TO RECEIVE 4" EHIPS AL. TUBE – FIXED TYPE	H	420kV
32	TERMINAL CONNECTOR FOR CT TO RECEIVE 4" EHIPS AL. TUBE – EXPANSION TYPE	H	420kV
33	TERMINAL CONNECTOR FOR WT TO RECEIVE TWIN MOOSE ACSR CONDUCTOR	H	420kV
34	TERMINAL CONNECTOR FOR CVT TO RECEIVE TWIN MOOSE ACSR CONDUCTOR	H	420kV
35	TERMINAL CONNECTOR FOR LA TO RECEIVE TWIN MOOSE ACSR CONDUCTOR	H	420kV

Cat – I*

GENERAL NOTES:-

1) ALL DIMENSIONS ARE IN MM. UNLESS OTHERWISE SPECIFIED.
2) CONTINUOUS CURRENT RATING FOR ALL CLAMPS/CONNECTOR SHALL BE 2000A

LEGEND :-

———— – PRESENT SCOPE

– – – – – FUTURE

REFERENCE DRAWINGS :-

(0)-G71770-AC151-L152-001-0 – LAYOUT PLAN
(1)-G71770-AC151-L153-001-0 – LAYOUT SECTION
(2)-G71770-AC151-L157-002-0 – AL. TUBE CUTTING SCHEDULE

PROJECT:- EXTENSION BY TWO 400kV LINE BAYS FOR SUGEN OF 400kV PIRANA (PGCL) SUBSTATION AT VILLAGE KAMOD DIST. AHMEDABAD

PROJECT MANAGEMENT CONSULTANT:- POWER GRID CORPORATION OF INDIA LTD.

CLIENT:- TORRENT POWER GRID LIMITED

Rev.	Remarks	Date	Name		
0	FIRST ISSUE	28.05.10	A.Y.	Date	28.05.10
				Drawn	A.Y
				Appr.	S.M.
				Norm	S.J.

Siemens Ltd Gurgaon

LOA REF– TPGL/CE/2100001&2 DT.05.04.10

ERECTION KEY DIAGRAM

REV NO: 0

Scale 1 : 300

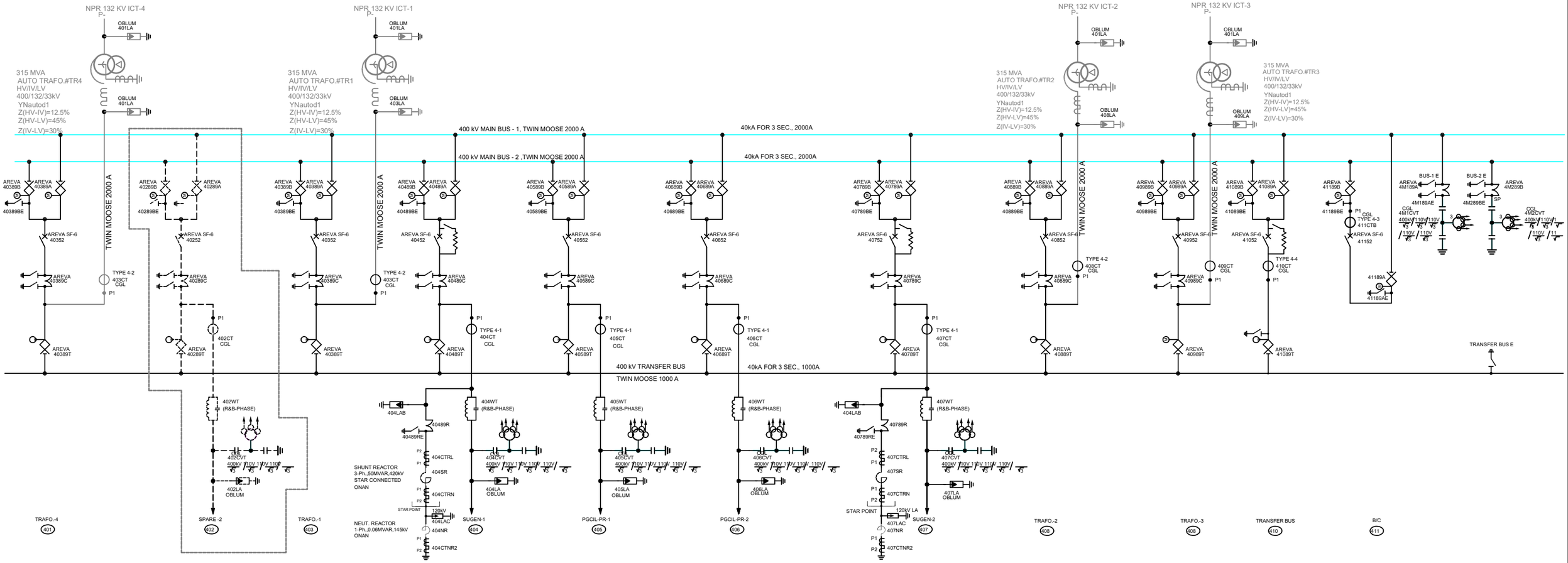
Sheet 1

(0)-G71770-AC151-L157-001-0

220V DC SUPPLY
2 NOS OF ELE SYSTEM FLOAT CUM BOOST CHARGEI
2 SET EXIDE LOW MINT BATTERY
YKP-35 CAP AT-10HR,RATE-325 AH

48V DC SUPPLY
2 NOS OF ELE SYSTEM FLOAT CUM BOOST CHARGEI
2 SET EXIDE LOW MINT BATTERY
YKP-21 CAP AT-10HR,RATE-250 AH

SINGLE LINE DIAGRAM OF 400KV NEW PIRANA S/S

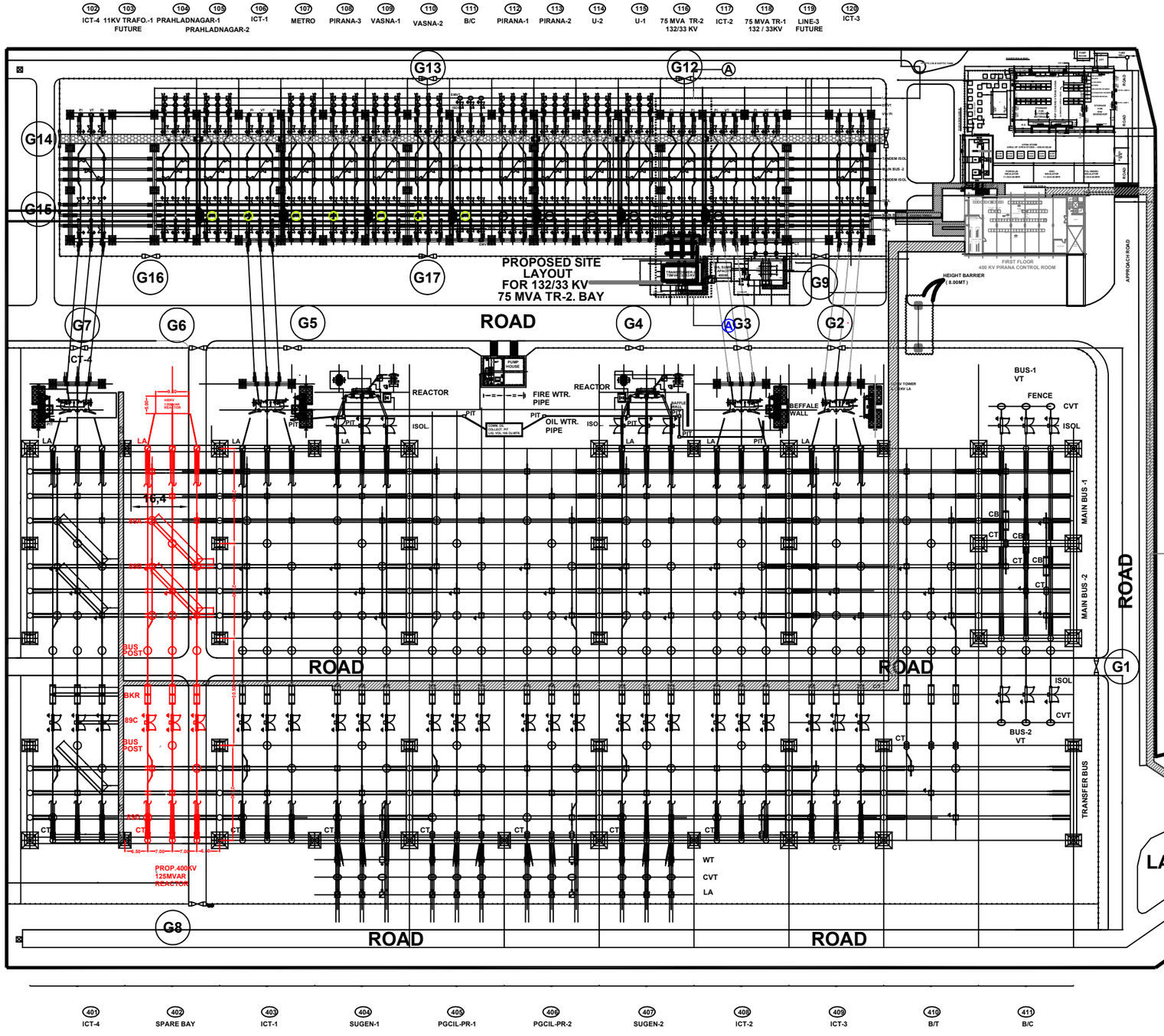


GJP	EHV-S/S	MPP	MRP	N.T.S	02.02.2019
DRN BY	SECTION	CHECKED BY	APPROVED BY	SCALE	DATE

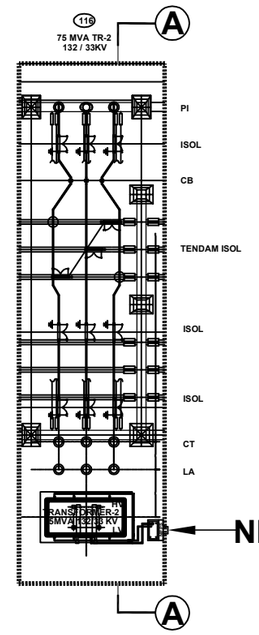
TORRENT POWER LIMITED
MAINS DEPT., JUBILEE HOUSE, SHAHPUR, AHMEDABAD-380001

DRG NO: R-
400KV NPR AU1

SINGLE LINE DIAGRAM OF 400KV NEW PIRANA S/S



ALTERNATE-1



SCALE=1:2

PROP. 2.0 M WIDE
33 KV CABLE TRENCH
LENGTH:-400.0 MTR

PLANT NORTH
TRUE NORTH

400 KV SWITCHYARD GATE DETAILS		
SR.NO	REMARK	LENGTH
G-1	MAIN GATE	AS PER SIT
G-2	MAIN GATE WITH VICKET GATE	AS PER SIT
G-3	MAIN GATE WITH VICKET GATE	AS PER SIT
G-4	MAIN GATE	AS PER SIT
G-5	MAIN GATE WITH VICKET GATE	AS PER SIT
G-6	MAIN GATE	AS PER SIT
G-7	MAIN GATE WITH VICKET GATE	AS PER SIT
G-8	MAIN GATE	AS PER SIT

132 KV SWITCHYARD GATE DETAILS		
SR.NO	REMARK	LENGTH
G-9	MAIN GATE	AS PER SIT
G-10	MAIN GATE	AS PER SIT
G-11	MAIN GATE	AS PER SIT
G-12	MAIN GATE	AS PER SIT
G-13	MAIN GATE	AS PER SIT
G-14	MAIN GATE	AS PER SIT
G-15	MAIN GATE	AS PER SIT
G-16	VICKET GATE	1 M
G-17	VICKET GATE	1 M
G-18	VICKET GATE	1 M

LEGEND

EXISTING WORK SHOWN ——

PROP.400KV 125 MVAR REACTOR SHOWN ——

PROJECT
PROP.400KV 125 MVAR REACTOR
AT 400 / 132KV PIRANA S/S

TITLE
SITE LAYOUT PLAN

OWNER
TORRENT POWER LTD.

DRAWN :	CBP/BKP	CHECKED : SRK	SCALE : N.T.S
REVIEWED :	MBD		DATE : 21/08/2019
APPROVED :	PKP		JOB NO : K8B03
DWG. NO.	NPR-1		REV. 0