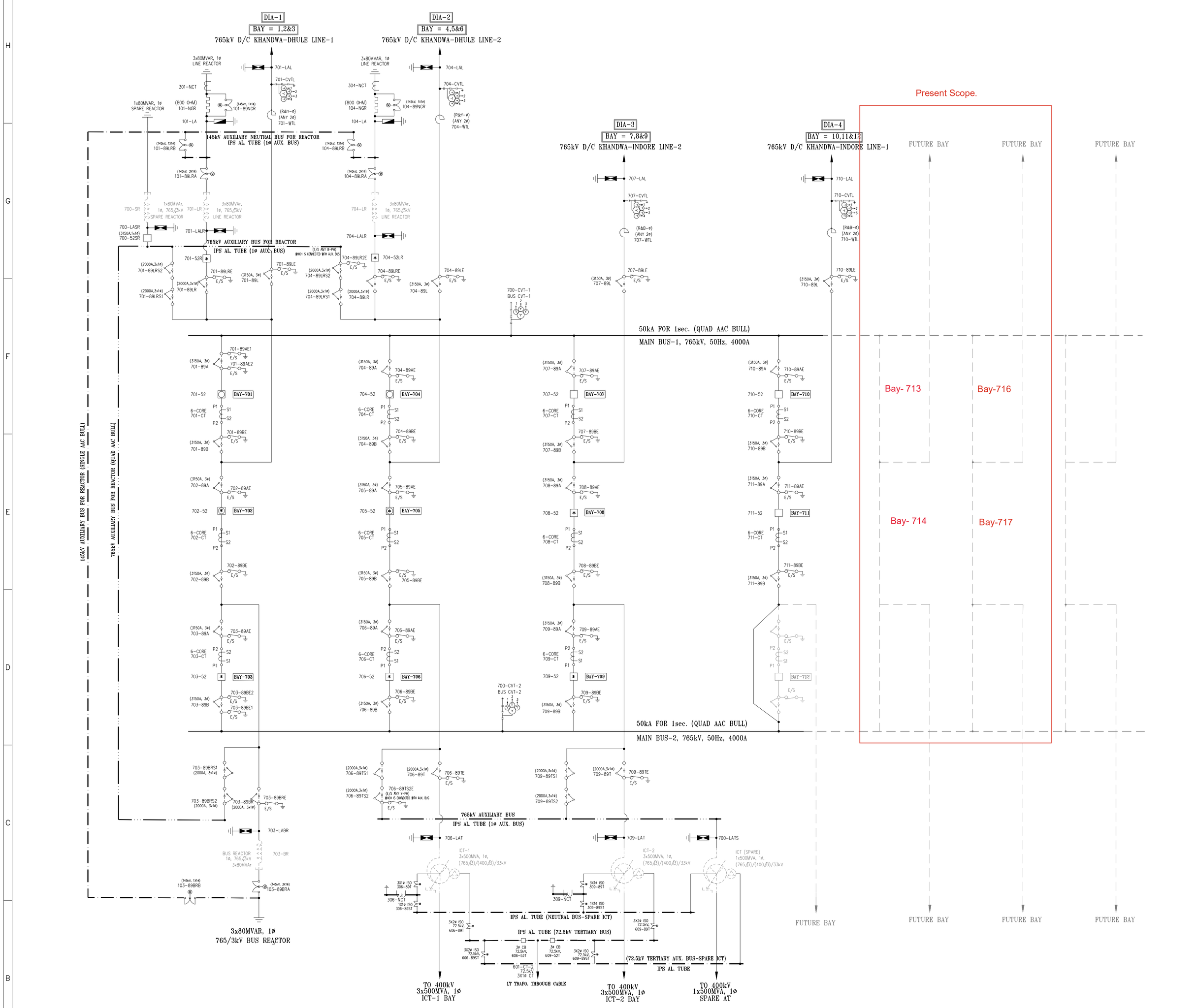
DRAWING No. (1)-G71770-AB963-S151-01



BOQ (765kV EQUIPMENTS):-

SL. NO.	SYMBOLS	DESCRIPTION	QTY.
1.		1x500MVA, (765/√3)/(400/√3), 1ø, AUTO TRANSFORMER (NOT IN SIEMENS SCOPE)	07 NOS.
2.		1x80MVAr, (765/√3), 1ø, LINE REACTOR (NOT IN SIEMENS SCOPE)	07 NOS.
3.		1x80MVAr, (765/√3), 1ø, BUS REACTOR	03 NOS.
4.		765kV, 3150A, 50kA FOR 1sec., 3ø, SF6 CIRCUIT BREAKER WITH CLOSING RESISTOR	04 Nos.
5.		765kV, 3150A, 50kA FOR 1sec., 3ø, SF6 CIRCUIT BREAKER WITHOUT CLOSING RESISTOR	09 Nos.
6.		765kV, 3150A, 50kA FOR 1sec., (1ø), SF6 CIRCUIT BREAKER WITHOUT CLOSING RESISTOR	01 Nos.
7.	*	CONTROL SWITCHING DEVICE OF SF6 CIRCUIT BREAKER (3ø)	08 Nos.
8.		765kV, 3000-2000-500/1A, 50kA FOR 1sec., CURRENT TRANSFORMER WITH 120% EXTENDED CURRENT RATING (1ø) (6-CORE)	33 Nos.
9.		765kV, 8800pF, 765kV/√3/0.11kV/√3, 4-WINDING (1ø) CAPACITOR VOLTAGE TRANSFORMER (FOR LINE FEEDERS)	12 Nos.
10.		765kV, 8800pF, 765kV/√3/0.11kV/√3, 3-WINDING (1ø) CAPACITOR VOLTAGE TRANSFORMER (FOR MAIN BUS-1 & 2)	06 Nos.
11.		765kV, 3150A, 50kA FOR 1sec., 3ø, MOTORISED AND ELECTRICALLY GANG OPERATED VERTICAL KNEE TYPE ISOLATOR WITH ONE EARTH SWITCH	24 Nos.
12.		765kV, 3150A, 50kA FOR 1sec., 3ø, MOTORISED AND ELECTRICALLY GANG OPERATED VERTICAL KNEE TYPE ISOLATOR WITH TWO EARTH SWITCH	02 Nos.
13.		765kV, 2000A, 50kA FOR 1sec., 1ø, MOTORISED AND ELECTRICALLY GANG OPERATED VERTICAL KNEE TYPE ISOLATOR WITH ONE EARTH SWITCH	17 Nos.
14.		765kV, 2000A, 50kA FOR 1sec., 1ø, MOTORISED AND ELECTRICALLY GANG OPERATED VERTICAL KNEE TYPE ISOLATOR WITHOUT EARTH SWITCH	28 Nos.
15.		765kV, 1.0mH, 3150A, 50kA FOR 1sec., (1ø) WAVE TRAP	08 Nos.
16.		624kV, 20kA, CLASS-5, (1ø) SURGE ARRESTER WITH SURGE COUNTER	29 Nos.
17.		DRY TYPE AIR CORE NGR 1ø (800 OHM)	02 Nos.

BOQ (72.5kV & 33kV FOR AUX. BUS. EQUIPMENTS):-

01.		120kV, 10kA, CLASS-3, (1ø) SURGE ARRESTER W/O SURGE COUNTER	03 Nos.
02.		36kV, 1-CORE, 25kA FOR 1sec., NEUTRAL CURRENT TRANSFORMER (NCT) WITH 120% EXTENDED CURRENT RATING (1ø)	04 Nos.
03.		145kV, 600A, 31.5kA FOR 1sec., 1ø, MOTORISED OPERATED HCB TYPE ISOLATOR W/O EARTH SWITCH	14 Nos.
04.		36kV, 1250A, 25KA FOR 1SEC., 1ø, MOTORISED OPERATED HCB TYPE ISOLATOR W/O EARTH SWITCH	08 Nos.
05.		72.5kV, 400A, 25KA FOR 1SEC., 2ø, SINGLE MOTORISED OPERATION, MECHANICALLY GANG OPERATION, HCB TYPE ISOLATOR W/O EARTH SWITCH	12 Nos.
06.		72.5kV, 1250A, 3ø, 50Hz, 25kA for 1 Sec. SF6 CIRCUIT BREAKER	02 Nos.

SYSTEM PARAMETER DETAILS

SL. No.	DESCRIPTION OF PARAMETERS	765kV SYSTEM
1	SYSTEM OPERATING VOLTAGE	765 kV
2	MAX. OPERATING VOLTAGE (RMS)	800 kV
3	RATED FREQUENCY	50 Hz
4	IMPULSE WITHSTAND VOLTAGE (FOR 1.2/50 microsec) a). FOR TRANSFORMERS AND REACTORS b). FOR OTHER EQUIPMENTS	 1950 kVp 2100 kVp
5	SWITCHING IMPULSE WITHSTAND VOLTAGE (FOR 250/2500 microsec) DRY & WET	1550 kVp
6	ONE MIN. POWER FREQUENCY WITHSTAND VOLTAGE DRY (RMS)	830 kV
7	CORONA EXTINCTION VOLTAGE	508 kV
8	MIN. CREEPAGE DISTANCE (25mm/kV)	20000 mm
9	MAX. FAULT CURRENT WITH DURATION	50 kA FOR 1sec.

BUS CONFIGURATION

Sl.No.	DESCRIPTION	CONTINUOUS CURRENT RATING	SHORT TIME CURRENT RATING	CONDUCTOR TYPES
1.	765kV MAIN BUS-1 & 2	4000Amp	50kA/1Sec	QUAD AAC BULL
2.	765kV LINE JACK BUS CIRCUIT	3150Amp	50kA/1Sec	QUAD AAC BULL
3.	765kV EQUIPMENT TO EQUIPMENT CONNECTION BUS	3150Amp	50kA/1Sec	IPS AL TUBE
4.	765kV DROPPER & JUMPER SIZES	3150Amp	50kA/1Sec	QUAD AAC BULL
5.	765kV DROPPER FOR REACTORS	2000Amp	50kA/1Sec	QUAD AAC BULL

LINE CAPACITOR VOLTAGE TRANSFORMER(4CORE), 765kV, 8800pF

LOCATION	CORE NO.	RATIO	PROTECTION TYPE	BURDEN	ACCURACY CLASS
7-01-CVTL 7-04-CVTL 7-07-CVTL 7-10-CVTL	1	765kV/√3 , 110kV/√3	PROTECTION	50	3P / 0.5
	2	765kV/√3 , 110kV/√3	PROTECTION	50	3P / 0.5
	3	765kV/√3 , 110kV/√3	METERING/BCU	50	0.2
	4	765kV/√3 , 110kV/√3	TARIFF METERING	50	0.2

BUS CAPACITOR VOLTAGE TRANSFORMER(4CORE), 765kV, 8800pF

LOCATION	CORE NO.	RATIO	PROTECTION TYPE	BURDEN	ACCURACY CLASS
7-00-CVT-1 7-09-CVT-2	1	765kV/√3 , 110kV/√3	PROTECTION	50	3P / 0.5
	2	765kV/√3 , 110kV/√3	PROTECTION	50	3P / 0.5
	3	765kV/√3 , 110kV/√3	METEERING/BCU	50	0.2

CURRENT TRANSFORMER RATING, 765kV

LOCATION	CORE NO.	RATIO (A)	PROTECTION TYPE	1SF AT ALL TAPS	BURDEN (VA) AT ALL TAPS	ACCURACY CLASS AT ALL TAPS	KNEE POINT VOLTAGE (V)	MAGNETIZING CURRENT I_e @ V_k (mA)	RESISTANCE @75 (Ω)
765 LINE BAY	1	3000-2000-500/1	DISTANCE PROTECTION		-	PX	3000-2000-500	20-30-120	15-10-2
	2	3000-2000-500/1	DISTANCE PROTECTION		-	PX	3000-2000-500	20-30-120	15-10-2
7-01-CT, 7-04-CT, 7-07-CT, 7-10-CT.	3	3000-2000-500/1	TARIFF METERING	<10-10-10	20	0.25	-	-	-
	4	3000-2000-500/1	METERING/BCU	<10-10-10	20	0.25	-	-	-
	5	3000-2000-500/1	BUS BAR PROTECTION		-	PX	3000-2000-500	20-30-120	15-10-2
	6	3000-2000-500/1	BUS BAR PROTECTION		-	PX	3000-2000-500	20-30-120	15-10-2
TIE BAY	1	3000-2000-500/1	TRIBR PROTECTION		-	PX	3000-2000-500	20-30-120	15-10-2
7-02-CT, 7-05-CT, 7-08-CT, 7-11-CT.	2	3000-2000-500/1	TRIBR PROTECTION + LBB		-	PX	3000-2000-500	20-30-120	15-10-2
	3	3000-2000-500/1	TARIFF METERING	<10-10-10	20	0.25			
	4	3000-2000-500/1	METERING/BCU	<10-10-10	20	0.25	-	-	-
	5	3000-2000-500/1	DISTANCE PROTECTION		-	PX	3000-2000-500	20-30-120	15-10-2
	6	3000-2000-500/1	DISTANCE PROTECTION		-	PX	3000-2000-500	20-30-120	15-10-2

CURRENT TRANSFORMER RATING, 765kV

LOCATION	CORE NO.	RATIO (A)	PROTECTION TYPE	1SF AT ALL TAPS	BURDEN (VA) AT ALL TAPS	ACCURACY CLASS AT ALL TAPS	KNEE POINT VOLTAGE (V)	MAGNETIZING CURRENT I_e @ V_k (mA)	RESISTANCE @75 (Ω)
765 TRAFO. & BUS REAC. BAY.	1	3000-2000-500/1	TRIBR PROTECTION		-	PX	3000-2000-500	20-30-120	15-10-2
	2	3000-2000-500/1	TRIBR PROTECTION		-	PX	3000-2000-500	20-30-120	15-10-2
7-03-CT, 7-06-CT, 7-09-CT.	3	3000-2000-500/1	METERING/BCU	<10-10-10	20	0.25	-	-	-
	4	3000-2000-500/1	METERING/SPARE	<10-10-10	20	0.25	-	-	-
	5	3000-2000-500/1	BUS BAR PROTECTION		-	PX	3000-2000-500	20-30-120	15-10-2
	6	3000-2000-500/1	BUS BAR PROTECTION		-	PX	3000-2000-500	20-30-120	15-10-2

NUTRAL CURRENT TRANSFORMER RATING, 36kV

LOCATION	CORE NO.	RATIO (A)	PROTECTION TYPE	1SF AT ALL TAPS	BURDEN (VA) AT ALL TAPS	ACCURACY CLASS AT ALL TAPS	KNEE POINT VOLTAGE (V)	MAGNETIZING CURRENT I_e @ V_k (mA)	RESISTANCE @75 (Ω)
765 LINE REAC. & TRAFO. BAY No.-301, 304, 306 & 309.	1	300/1	PROTECTION		-	PS	≥300	≤40	≤1.0

EQUIPMENT IDENTIFICATION:-

701-89AE

- EQUIPMENT ID
  - E REPRESENTS EARTH SWITCH
  - A,B,C FOR SIMILAR EQP. ON SAME BAY
- EQUIPMENT ID
  - L FOR LINE BAY
  - R FOR REACTOR BAY
  - T FOR TRANSFORMER BAY
  - S FOR SPARE TRANSFORMER/REACTOR BAY
- STANDARD EQUIPMENT NO.
  - 52 FOR CIRCUIT BREAKER
  - 89 FOR ISOLATOR
  - CT FOR CURRENT TRANSFORMER
  - CVT FOR CAPACITIVE VOLTAGE TRANSFORMER
  - LA FOR LIGHTNING ARRESTOR
  - WT FOR WAVE TRAP
  - LAN/R FOR LIGHTNING ARRESTOR OF REACTOR
  - 52B FOR CIRCUIT BREAKER (BYEPASS OF NGR)
- BAY NUMBER
- VOLTAGE LEVEL
  - 7 FOR 765kV SYSTEM
  - 4 FOR 400kV SYSTEM
  - 1 FOR 145kV SYSTEM
  - 3 FOR 36kV SYSTEM
  - 6 FOR 72.5kV SYSTEM

AS BUILT

ENGG. REFERENCE DOCUMENT:-

TENDER DRG. NO. SPGVL-KPTL-KHANDWA-SLD-01

NOTES:

1. TOTAL TERTIARY BUS OF TRANSFORMER SHALL BE INSULATED USING 52KV CLASS HEAT SHINKABLE INSULATING TAPE ON TUBE. INSULATION MAY BE DOUBLE LAYER TO ACHIEVE THE INSULATION LEVEL OF 52KV CLASS.
2. SUPPLY OF 7NOS. SINGLE PHASE, 500MVA, 765/400KV ICT'S & SINGLE PHASE 10NOS. 765KV, 80MVAR REACTORS (BUS & LINE) ARE NOT IN SCOPE OF M/S SIEMENS.
3. 765KV AUXILIRAY BUS OF TRANSFORMERS & REACTORS WITH ASSOCIATED NEUTRAL BUS ARE IN SCOPE OF M/S SIEMENS.
4. THE BURDEN OF CT'S ARE AS PER APPROVED EQUIPMENTS CT/PT DRAWINGS.

LEGEND:-

- PRESENT SCOPE
- FUTURE / NOT IN SCOPE OF M/s SIEMENS

REV.No.	DESCRIPTION	DATE	DRAWN	REVIEWED	ELE.	CIVIL	MECH.	APPROVED	STATUS
4	72.5KV, 3-PH ISO REPLACED THROUGH CB	23.05.18	SASI	Name: RK; Date: 23.05.2018; Sign.					
3	COMMENTS INCORPORATED	17.01.18	SASI	Name: RK; Date: 17.01.2018; Sign.					
2	COMMENTS INCORPORATED	16.05.17	MR	Name: RK; Date: 16.05.2017; Sign.					
1	COMMENTS INCORPORATED	12.04.17	MR	Name: RK; Date: 12.04.2017; Sign.					
0	FIRST SUBMISSION	26.12.16	MR	Name: RK; Date: 26.12.2016; Sign.					

CHECKED

OWNER: Sterlite Power — **STERLITE POWER GRID VENTURES LIMITED**

LOA No.: SPGVL/16-17/LOA/006 Dtd.:15.12.2016 (SERVICES)
SPGVL/16-17/LOA/005 Dtd.:15.12.2016 (SUPPLY)

PROJECT: ESTABLISHMENT OF 765/400kV KHANDWA (NEW) SUBSTATION TRANSMISION SYSTEM STRENGTHENING IN WR ASSOCIATED WITH KHARGONE TPP (1320 MW).

OWNER'S CONSULTANT: KNR ENGINEERS (INDIA) PRIVATE LIMITED. CHENNAI

NAME OF SUBSTATION: 765/400KV KHANDWA (NEW) AIS SUBSTATION

TITLE: 765kV KEY SINGLE LINE DIAGRAM OF 765/400kV AIS SYSTEM (KHANDWA SUBSTATION)

A1

EPC CONTRACTOR: **SIEMENS** — SIEMENS LTD (EMTS, INDIA) PLOT-6A, SECTOR-18 GURGAON (INDIA)

DRAWING No.: (1)-G71770-AB963-S151-01

TOTAL SH. 04 | SH.No. 01/04 | REV. R4 | SCALE NTS

REFERENCE NO. | DESCRIPTION | LEGEND