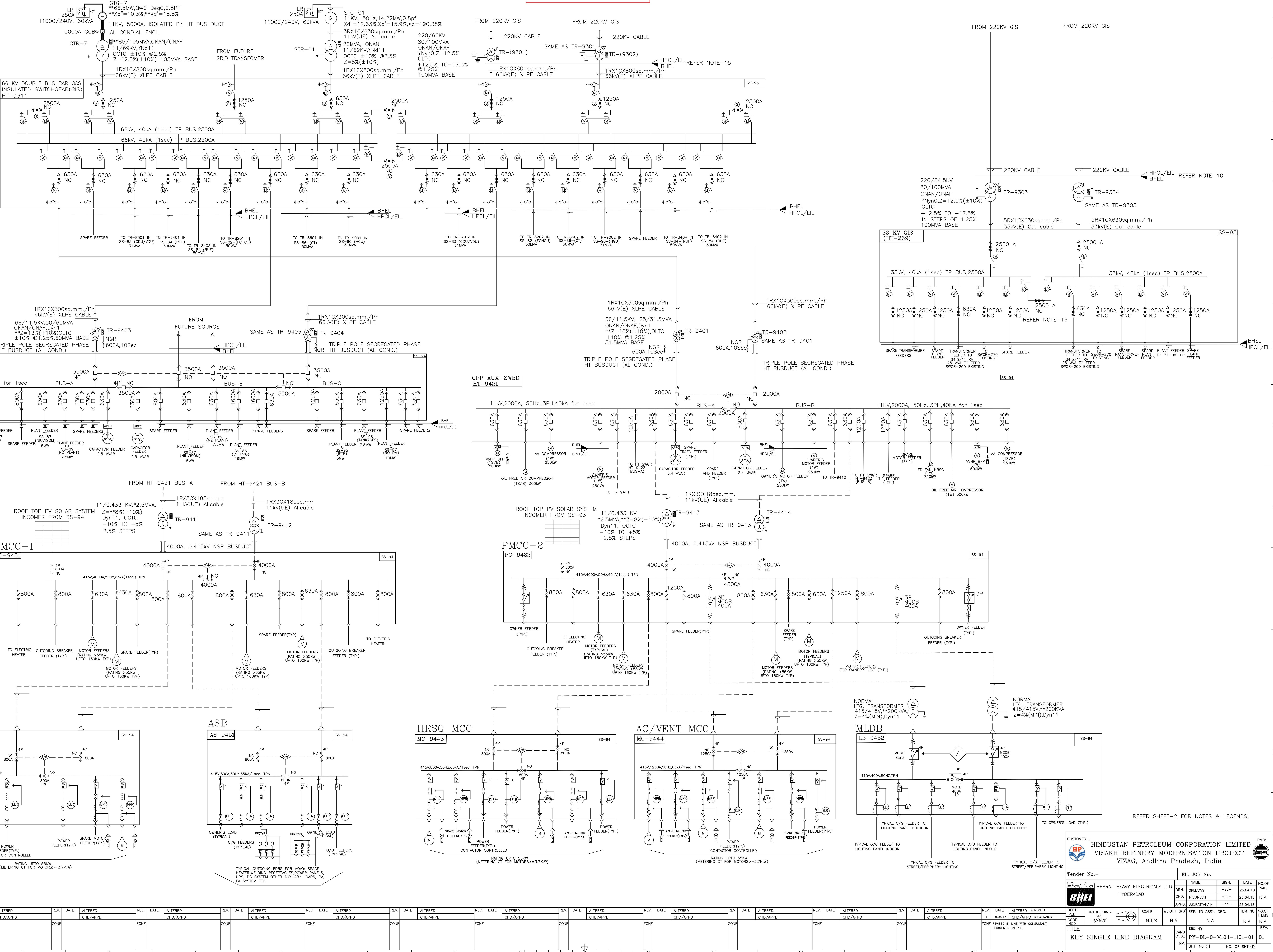


Annexure-1: KEY SLD



REFER SHEET-2 FOR NOTES & LEGENDS.

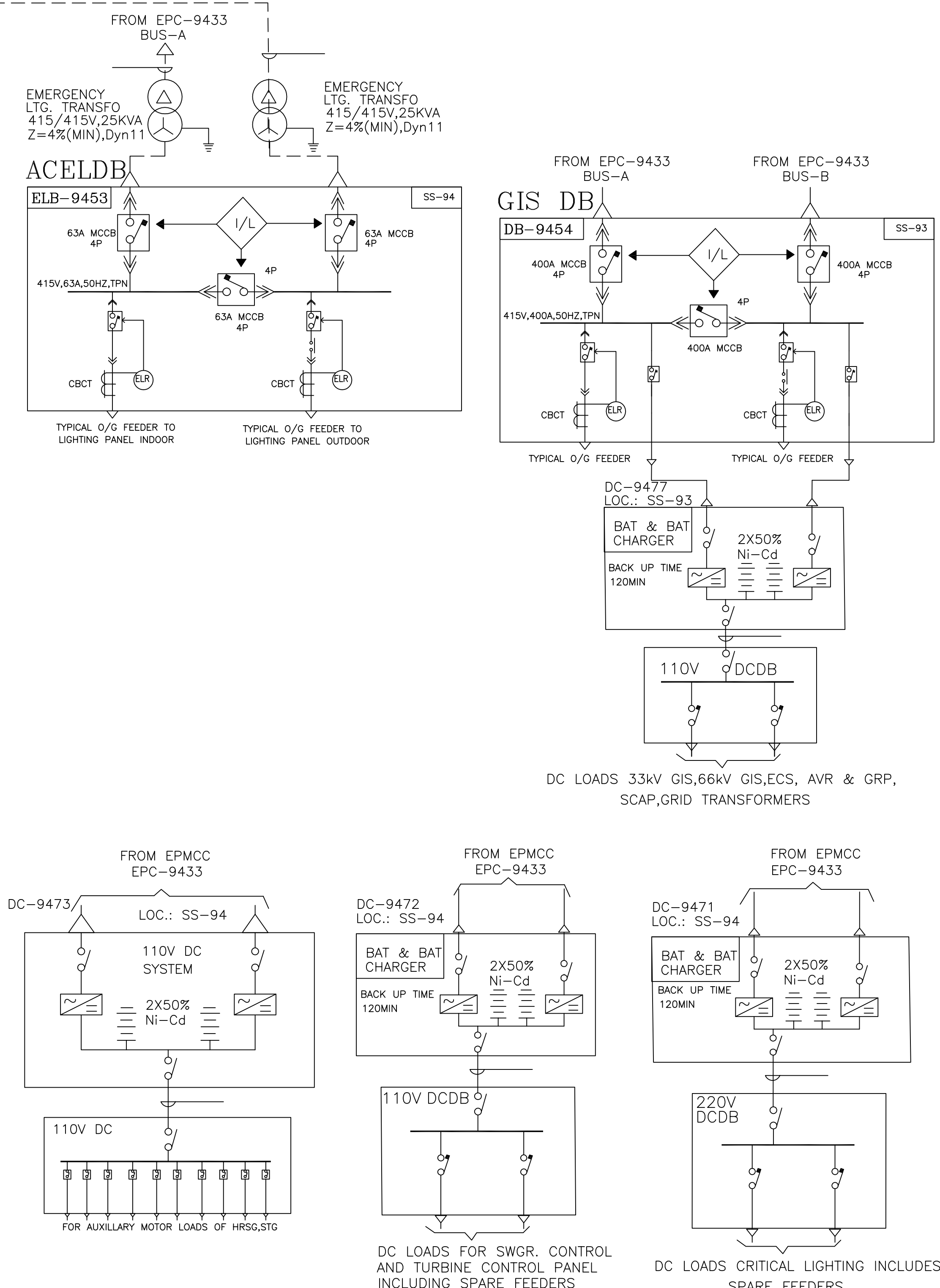
CUSTOMER :  HINDUSTAN PETROLEUM CORPORATION LIMITED
VISAKH REFINERY MODERNISATION PROJECT
VIZAG, Andhra Pradesh, India

Tender No. -		EIL JOB No.		
 BHARAT HEAVY ELECTRICALS LTD.		NAME	SIGN.	DATE

	HYDERABAD		DRN.	GRM/AVS	-sd-	25.04
			CHD.	P.SURESH	-sd-	26.04
			APPD.	J.K.PATTANAIK	-sd-	26.04
DEPT. PED CODE	UNTO. DIMS. GR.		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM

CODE 450	Q/M/Y		N.I.S.	N.A.	N.A.	N.A.
TITLE KEY SINGLE LINE DIAGRAM				CARD CODE NA	DRG. NO. PY-DL-0-M104-1101- SHT. No 01 NO. OF SHT	

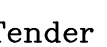
INVENTORY NO	SIG
M	



	EHV/HV CIRCUIT BREAKER
	HV CIRCUIT BREAKER
	AIR CIRCUIT BREAKER
	NEUTRAL GROUNDING RESISTOR (NGR)
	TRANSFORMER
	BUS DUCT
	BUSBAR
	FUSE UNIT
	ON LOAD ISOLATOR
	MOULDED CASE CIRCUIT BREAKER
	MINIATURE CIRCUIT BREAKER
	EARTH LEAKAGE CIRCUIT BREAKER

1. THE SLD IS INTENDED TO HIGHLIGHT THE POWER DISTRIBUTION PHILOSOPHY AND BROADLY DEFINES THE MAJOR ELECTRICAL EQUIPMENT ENVISAGED IN THE PROJECT.
2. THE RATINGS & QUANTITY OF FEEDERS FROM 66kV, 33kV & 11kV SWITCHBOARDS ARE AS SHOWN IN THIS DRAWING AND MV SWITCHBOARD ARE TYPICAL. EXACT DETAILS WILL BE SHOWN IN THE CORRESPONDING SWITCHBOARD SLDs.
3. EQUIPMENT RATING/PARAMETERS/QUANTITY (MARKED WITH **) ARE SUBJECT TO APPROVAL OF RESPECTIVE EQUIPMENT SIZING CALCULATIONS WHICH WILL BE SUBMITTED SEPARATELY BASED ON LOAD ANALYSIS.
4. TERMINAL POINT FOR OWNER'S FEEDERS IS AT THE RESPECTIVE SWITCHBOARD FEEDER TERMINALS.
5. AUTO MANUAL CHANGE OVER FACILITY IS PROVIDED AMONG INCOMERS & BUSCOUPLER (CB TYPE) FOR 11KV SWITCH BOARDS AND 415V PMCC.
6. HT CAPACITOR BANKS WITH AUTOMATIC POWER FACTOR CORRECTION SHALL BE PROVIDED SO AS TO ACHIEVE 0.95 POWER FACTOR FOR CPP AUXILIARY LOAD.
7. DG SETS CONSIDERING OWNER'S COMPLEX EMERGENCY LOAD OF 10 MW AND CPP PACKAGE EMERGENCY LOADS, 2 NOS. EMERGENCY DG SETS SHALL BE CONSIDERED EACH RATED FOR 50% OF FULL LOAD CAPACITY.
8. 10% OF EACH TYPE OF OUTGOING FEEDERS OR ATLEAST ONE NUMBER OF EACH TYPE (WHICH EVER IS MORE) SHALL BE PROVIDED AS SPARE IN ALL MV AND HV SWITCHBOARDS EXCEPT FOR CAPACITOR FEEDERS IN HV SWITCHBOARD.
9. IN 33KV GIS FOLLOWINGS SHALL BE PROVIDED BY BHEL:
 - A. FEEDER DIFFERENTIAL RELAYS, CTs (ON BOTH SIDES AS APPLICABLE) ALONG WITH CONTROL/DIFFERENTIAL CABLES FOR FEEDERS TO SWGR-270 AND MODIFICATION IN EXISTING SWGR-270 AS REQUIRED.
 - B. TRANSFORMER CUM FEEDER DIFFERENTIAL RELAYS (ONE SIDE), CTs (BOTH SIDES) ALONG WITH CONTROL/DIFFERENTIAL CABLES FOR FEEDERS TO SWGR-200 AND MODIFICATIONS IN EXISTING SWGR-200 AS REQUIRED.
 - C. RELOCATION OF EXISTING DIFFERENTIAL RELAY (P543) IN EXISTING HT-265 TO REUSE IN 33KV GIS FOR FEEDER TO 71-HV-111 WHILE SUPPLY AND INSTALLATION OF CONTROL CABLES, DIFFERENTIAL CABLES FROM 33KV GIS TO EXISTING SWGR 71-HV-111 IS IN OWNER'S SCOPE.
10. SUPPLY OF 220KV CABLES INCLUDING SUPPLY OF 220KV GIS SIDE PLUG/SOCKET FOR TERMINATION OF CABLES IS IN OWNER'S SCOPE WHILE LAYING, TERMINATION AT BOTH ENDS FROM 220KV GIS TO 220/66KV AND 220/33KV TRANSFORMES INCLUDING SUPPLY OF PRE MOULDED 220KV END TERMINATION KITS, SCREEN BONDING ARRANGEMENT FOR CABLES, LINK BOXES WITH AND WITHOUT SVL IS IN BHEL SCOPE.
11. SUPPLY, INSTALLATION AND TERMINATION OF CONTROL CABLES AND FEEDER DIFFERENTIAL CABLES FROM SENDING END 220KV GIS TO 66KV GIS IN CPP IS IN BHEL SCOPE.
12. SUPPLY AND INSTALLATION OF DIFFERENTIAL RELAYS TO BE INSTALLED IN 220KV GIS FOR 220/66KV & 220KV/33KV TRANSFORMERS IS IN OWNER'S SCOPE.
13. SUPPLY, INSTALLATION AND TERMINATION OF FO CABLE FOR FEEDER DIFFERENTIAL PROTECTION FROM SENDING END 66KV GIS TO OWNER'S DOWNSTREAM 66KV GIS PANELS AND 11KV UTILITY SWITCHBOARD TO OWNER'S DOWNSTREAM 11KV SWITCHBOARD IS IN OWNER'S SCOPE.
14. SUPPLY, MOUNTING AND WIRING OF SENDING END FEEDER DIFFERENTIAL NUMERICAL RELAY FOR DIFFERENTIAL PROTECTION IN 66KV GIS FOR OWNER'S 66KV CABLES AND 11KV UTILITY SWITCHBOARD FOR OWNER'S 11KV CABLES TO DOWNSTREAM SWITCHBOARDS IS IN BHEL SCOPE WHILE AT RECEIVING END IS NOT IN BHEL SCOPE.
15. SUPPLY OF 220/66KV TRANSFORMER WITH OLTC, RTCC IS IN OWNER'S SCOPE WHILE INSTALLATION, TESTING & COMMISSIONING OF TRANSFORMER, RTCC INCLUDING TERMINATION AT 220KV SIDE & 66KV SIDE IS IN BHEL SCOPE.
16. BUS COUPLER IN 33KV GIS CAN BE IN N (NORMALLY CLOSED) THE LOAD ON EACH BUS SHALL BE LIMITED TO 50MVA TO MAINTAIN THE FAULT LEVEL (BOTH RMS & PEAK) WITHIN DESIGN LIMITS.
17. THE TRANSFORMER RATINGS MARKED (*) ARE SIZED BASED ON THE PRELIMINARY LOAD LISTS. THEREFORE THE RATING OF TRANSFORMER IS LIABLE TO CHANGE WRT CHANGES IN LOADS. ACCORDENTLY REVISED RATINGS WILL BE MENTIONED BEFORE PROCUREMENT.
18. SUPPLY AND LAYING OF CABLES & OTHER ACCESSORIES REQUIRED FOR THE SPARE FEEDERS, O/G FEEDERS FOR CUSTOMER USE EXCEPT 33KV ARE NOT IN BHEL'S SCOPE OF SUPPLY.

NO.	FEEDER DESCRIPTION	SWAY	TRUSS	RATING	TYPE	BREKERS RATING	TOTAL NO.	10-A-1 B-B-8	POWER CABLE DETAILS	
1	MOTOR FEEDERS	10KV	1N1-2421	SWAY	MOTOR	630A	3	1	OWNER'S SCOPE	
2	LIGHTING FEEDERS IN LEB	415V	MLB	***	MOTOR SWAY JUNCTION	43A	4	2	OWNER'S SCOPE	
3	MOTOR FEEDERS IN A3B	415V	A3B	***	MOTOR SWAY	63A	2	1	OWNER'S SCOPE	
4	MOTOR CONTRACTOR FEEDERS BY MR. SMO	415V	PMW2-2	1500W	MOTOR CONTRACTOR	250A	2	1	OWNER'S SCOPE	
5	A3B FEEDERS	415V	PMW2-2	3000A	A3B	250A	2	1	OWNER'S SCOPE	
6	MOTOR FEEDERS	415V	PMW2-1	1600A	A3B	630A	2	1	OWNER'S SCOPE	
7	MOTOR FEEDERS	415V	PMW2-1	3000A	A3B	630A	2	1	OWNER'S SCOPE	
8	MOTOR FWH FEEDERS	415V	SWC-1	***	SWAY	MOTOR	630A	3	1	OWNER'S SCOPE
9	FEEDERS FOR OWNER'S STRUCTURE IN JPM	110V	UPS	***	UPS	100A	1	1	OWNER'S SCOPE	
10	FEEDERS FOR OWNER'S SYSTEM ON POLE	110V	UPS	***	UPS	100A	1	1	OWNER'S SCOPE	
11	FEEDERS FOR OWNER'S USE	110V	UPS	***	UPS	100A	1	1	OWNER'S SCOPE	
12	OWNER'S MOTOR LOADS	415V	PMW2-1	1600A	MOTOR	630A	2	1	1	OWNER'S SCOPE
13	OWNER'S MOTOR LOADS	415V	PMW2-1	3000A	MOTOR	630A	2	1	1	OWNER'S SCOPE

Tender No. -					EIL JOB No.			
 BHARAT HEAVY ELECTRICALS LTD. HYDERABAD					NAME		SIGN.	DATE
DEPT. / CODE PED 450 UNITS / DIMS. OF  SCALE N.T.S.					DRN.	GRM/JVS	-sd-	25.04.18
					CHD.	P.SURESH	-sd-	26.04.18
					APPD.	J.S.PATTANAIK	-sd-	26.04.18
TITLE KEY SINGLE LINE DIAGRAM					REF. TO ASSY. DRG.		ITEM NO.	
					N.A.		N.A.	
					DRG. NO. P.Y-02-O-MI04-1101-01			
					SHT. No DL-02 NA		NO. OF SHT.02	