



COVER

1

DESIGNATION OF	TITLE	REVISION			
1	COVERING SHEET	0			
2	LIST OF DRAWINGS	0			
3	LEGEND & NOTE	0			
4	EXTENSION OF SAS CONFIGURATION	0			

LIST OF DRAWINGS


REFERENCE DRAWINGS									
DRAWINGS NO.:					TITLE:				
<div><div><input type="checkbox"/> APPROVED</div><div><input type="checkbox"/> APPROVED WITH COMMENTS</div><div><input type="checkbox"/> NOT APPROVED</div><div><input type="checkbox"/> FOR INFORMATION</div></div> <div>DATE:.....SIGNATURE/STAMP:.....PROJECT CONSULTANT.....</div>									
					KENYA ELECTRICITY TRANSMISSION COMPANY LTD				
					COLENCO CONSULTING LIMITED				
PROJECT: KENYA TRANSMISSION NETWORK IMPROVEMENT PROJECT (KTRNIP).									
PROJECT DRAWING NO.:									
		NAME:		DATE:		PROJECT NO.:			
PREPARED:		NIL				RUMURUTI 132/33kV SUBSTATION			
DRAWN:		F.J		09/05/2025		TITLE:			
CHECKED:		V.JOSHI		09/05/2025		LIST OF DRAWINGS			
APPROVED:		S.DESHMUKH		09/05/2025					
REVISIONS									
		NO.		NAME		DATE			
SCALE:		1:600		DWG NO.				REV.:	

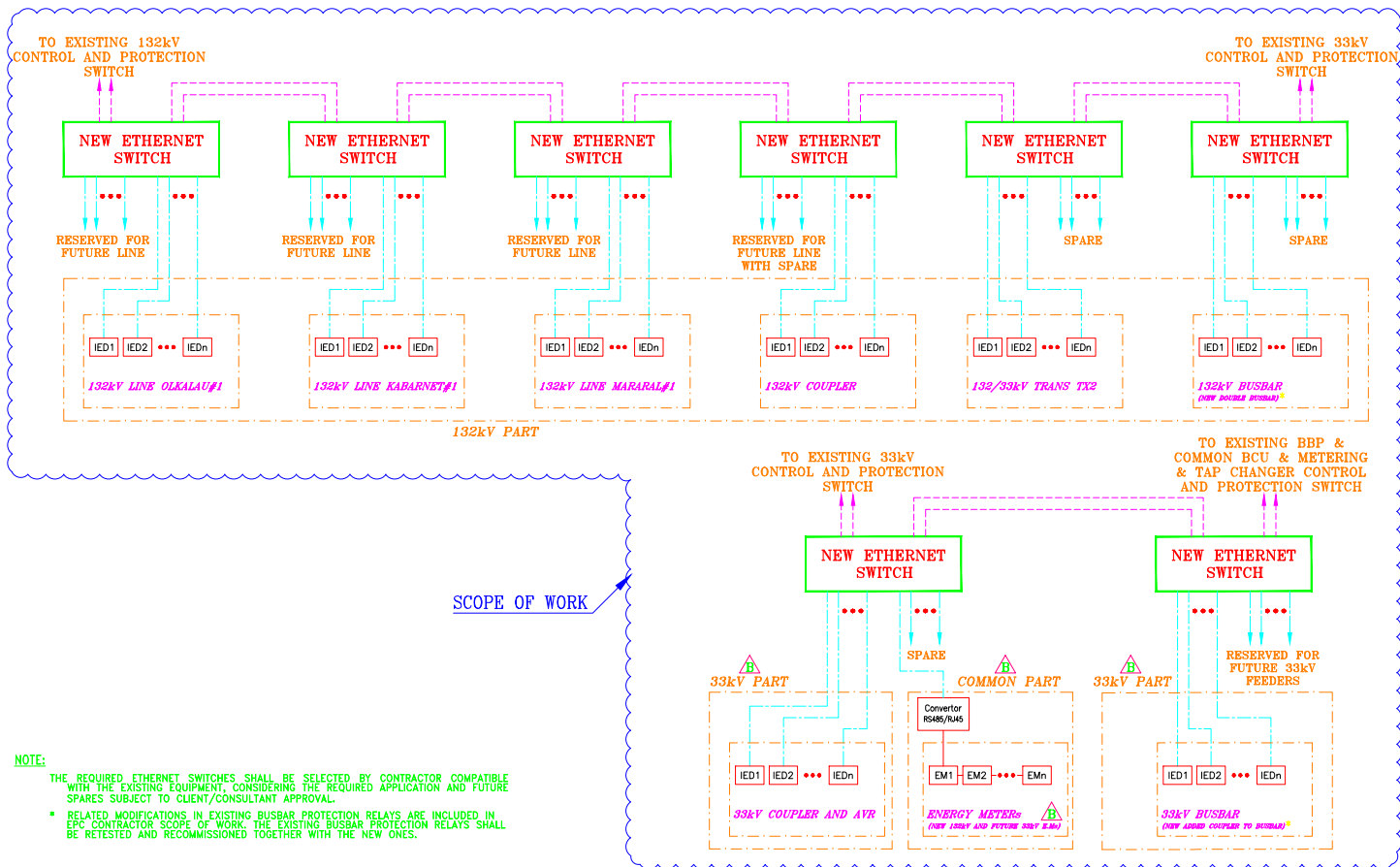
SYMBOL	DESCRIPTION
<i>IED</i>	INTELLIGENT ELECTRONIC DEVICE
<i>BCU</i>	BAY CONTROL UNIT
<i>SAS(SACS)</i>	SUBSTATION AUTOMATION & CONTROL SYSTEM
<i>F.O</i>	FIBER OPTIC CABLE
<i>NSCC</i>	KETRACO'S NATIONAL SYSTEM CONTROL CENTER A FUTURE PROJECT FOR THE CONTROL AND OPERATION OF KETRACO'S TRANSMISSION NETWORK AND FOR POWER DISPATCH.
<i>NCC</i>	NATIONAL CONTROL CENTER OWN AND OPERATED BY KPLC FOR THE OPERATION OF THE COUNTRY'S TRANSMISSION GRID AND FOR POWER DISPATCH.
<i>RCC</i>	REGIONAL CONTROL CENTER OWN AND OPERATED BY KPLC FOR THE OPERATION OF THE REGION'S DISTRIBUTION NETWORK AND MONITORING OF GRID.
<i>EM</i>	ENERGY METER

-----	FIBER OPTIC CABLE (IEC-61850)
-----	ETHERNET CAT6 CABLE (IEC-61850)
-----	RS485/MODBUS CABLE
	REVISION MARK

- 1- THIS DOCUMENT IS PRELIMINARY AND FOR BIDDING PURPOSE ONLY.
- 2- COMMUNICATION NODES SHALL BE ADDED WHERE NEEDED. THE SACS ARCHITECTURE SHALL BE SCALABLE TO ALLOW FUTURE BAY EXTENSIONS. EACH ETHERNET SWITCH AND OTHER NETWORK COMPONENTS SHALL HAVE 20% SPARE PORTS AND DATA CAPACITY TO ACCOMMODATE EXPANSIONS.
- 3- ETHERNET SWITCHES SHALL BE IN RING TOPOLOGY AND SUPPORT RSTP PROTOCOL.
 - 4- THE EXTENSION SCOPE SHALL MATCH WITH THE EXISTING SAS ARCHITECTURE.
 - 5- THE TELE-PROTECTION CONFIGURATION TO REMOTE ENDS SHALL BE EXTENDED.
 - 6- INTEGRATION INTO EXISTING SCADA/HMI CONFIGURATION SHALL BE CARRIED OUT.
 - 7- ALL BAY LEVEL COMMUNICATION SHALL BE BASED ON "IEC-61850" PROTOCOL.
 - 8- ALL RELATED MODIFICATIONS IN EXISTING F.O. CABLING AND ALSO SWITCHES/SERVERS INCLUDING SOFTWARE UPDATE AND ETC ARE IN EPC CONTRACTOR SCOPE OF WORK.
 - 9- THE CONTRACTOR SCOPE OF WORK TO INCORPORATE THE NEW EQUIPMENT AND/OR SYSTEM INTO THE EXISTING SUBSTATION FOR COMPLETE FUNCTIONALITY, INCLUDES BUT IS NOT LIMITED TO:
 - PROVISION/INSTALLATION OF ALL NECESSARY HARDWARE AND SOFTWARE TO CONTROL AND MONITOR THE ENTIRE SUBSTATION FROM BOTH NCC AND RCC LOCALLY AND REMOTELY.
 - PROVISION OF ALL FACILITIES FOR A COMPLETE INTEGRATION OF SUBSTATION AUTOMATION & CONTROL SYSTEM (SACS) FOR THE EXTENDED SCOPE.
 - INCORPORATION OF THE EXTENDED STATIONS SCOPE INTO THE SCADA/EMS SYSTEM AT THE NCC/RCC.
 - PROVISION OF A MAINTENANCE LAPTOP WITH ALL THE SUBSTATION SOFTWARE USED AND THEIR CONFIGURATION REQUIRED LICENSES.
 - PROVISION OF ALL NECESSARY WORKS, DESIGN, SUPPLY AND IMPLEMENTATION AT THE INTERFACING STATION(S) FOR COMPLETE FUNCTIONALITY OF THE NEW OR EXTENDED STATIONS.
 - ANY OTHER FACILITIES REQUIRED FOR COMPLETE FUNCTIONALITY.
- ALL SUCH WORKS ARE TO BE CARRIED OUT BY THE CONTRACTOR AFTER THE APPROVAL OF BOTH KETRACO AND KPLC.
- 10- EACH GATEWAY SHALL HAVE THREE COMMUNICATION CHANNELS: ONE FOR CONNECTION TO THE NSCC, ANOTHER FOR CONNECTION TO NCC AND ONE FOR CONNECTION TO THE RCC.
- 11- THE CONTRACTOR SHALL INTEGRATE THE NEW ENERGY METERS INTO THE EXISTING SUBSTATION AUTOMATION & CONTROL SYSTEM. THE CUMULATIVE MWH AND MVARH VALUES SHALL BE DISPLAYED ON EACH BAY OVERVIEW SCREEN. THE CONTRACTOR SHALL ENSURE THAT THE COMMUNICATION PROTOCOLS USED IN THE ENERGY METERS CAN BE ACCOMMODATED BY THE SUPPLIED OR EXISTING SAS. THE ENERGY METERS SHALL BE IN ACCORDANCE WITH BOTH KETRACO AND KPLC REQUIREMENTS/SPECIFICATIONS.
- 12- THE PROPER MODIFICATIONS OF OPERATOR HUMAN MACHINE INTERFACE (HMI) SUCH AS DATA ENGINEERING AND MODIFICATION OF SINGLE LINE DIAGRAMS ARE IN EPC CONTRACTOR SCOPE OF WORK.
- 13- TWO SEPARATE AND INDEPENDENT PORTS SHALL BE ASSIGNED FOR EACH PROTOCOL.
- 14- COMMUNICATION TO DISPATCH CENTERS SHALL BE ACCORDING IEC-60870-104 WITH TWO REDUNDANT PORTS TO NCC AND RCC.
- 15- THE FINAL LIST OF SIGNALS SHALL BE GENERATED DURING DETAILED DESIGN STAGE BY EPC CONTRACTOR CONSIST OF THE BINARY INPUTS/OUTPUTS AND THE ANALOGUE INPUTS OF PROTECTION IEDS. ALSO ALL DATA ENGINEERING AT THE GATEWAYS AND NCC AND POINT TO POINT TESTING OF THE SIGNALS FROM PROCESS TO GATEWAY AND TO THE NCC ARE IN SCOPE OF EPC CONTRACTOR.

3

REFERENCE DRAWINGS							
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APPROVED	APPROVED WITH COMMENTS	NOT APPROVED	FOR INFORMATION				
DATE:		SIGNATURE/STAMP..... PROJECT CONSULTANT					
<div style="text-align: center;"> KENYA ELECTRICITY TRANSMISSION COMPANY LTD</div>							
<div style="text-align: center;"> COLONGO CONSULTING LIMITED Innovation · for sustainable future</div>							
PROJECT: KENYA TRANSMISSION NETWORK IMPROVEMENT PROJECT (KTRNIP).							
PROJECT DRAWING NO.		PROJECT NO.:					
NAME:		DATE:		RUMURUTI 132/33kV SUBSTATION			
PREPARED: NIL				TITLE:			
DRAWN: F.J		09/05/2025					
CHECKED: V.JOSHI		09/05/2025					
APPROVED: S.DESHMUKH		09/05/2025		LEGEND & NOTE			
REVISIONS							
NO. NAME DATE							
SCALE: 1:600 DWG NO.				REV.: :			




NOTE:

THE REQUIRED ETHERNET SWITCHES SHALL BE SELECTED BY CONTRACTOR COMPATIBLE WITH THE EXISTING EQUIPMENT, CONSIDERING THE REQUIRED APPLICATION AND FUTURE SPARES SUBJECT TO CLIENT/CONSULTANT APPROVAL.

* RELATED MODIFICATIONS IN EXISTING BUSBAR PROTECTION RELAYS ARE INCLUDED IN EPC CONTRACTOR SCOPE OF WORK. THE EXISTING BUSBAR PROTECTION RELAYS SHALL BE RETESTED AND RECOMMISSIONED TOGETHER WITH THE NEW ONES.

EXTENSION OF SAS CONFIGURATION

4

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REVISION NO.	DATE														
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 COLONCO CONSULTING LIMITED															
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PROJECT MANAGER	NAME	DATE	REVISION NO.												
PREPARED	NR	19/05/2023	RUMURUTI 1 32/33kV SUBSTATION												
DRAWN	J.J	19/05/2023													
CHECKED	V.J/CSH	19/05/2023													
APPROVED	S.EDHAKART	19/05/2023	EXTENSION OF SAS CONFIGURATION												
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