



मंगलूर रिफाइनरी एण्ड पेट्रोकेमिकल्स लिमिटेड
MANGALORE REFINERY & PETROCHEMICALS LTD.
(ऑयल एण्ड नेचुरल गैस कॉर्पोरेशन लिमिटेड की सहायक कंपनी)
(A Subsidiary of Oil and Natural Gas Corporation Ltd.)



**PRE-TENDER MEET (PTM) FOR
MAIN EPC PACKAGE FOR REFINERY COMPLEAX
POWER SYSTEM UPGRADATION PROJECT
(LSTK BASIS)**



**Document NO.:
MRPL/PROJECTS/02/2023**

Mangalore Refinery and Petrochemicals Limited (MRPL) is a subsidiary of M/s. Oil and Natural Gas Corporation Limited (ONGC). Presently, MRPL is planning to upgrade its electrical power system for both Aromatic Complex and Refinery Complex, for which Tractebel Engineering Private Limited (TEPL) has been appointed as the Project Management Consultant (PMC). On behalf of MRPL, Tractebel is inviting competent bidders having experience in constructing 220/33 kV substations on EPC LSTK basis, to attend the PRE-TENDER MEET for the MRPL Refinery Complex power system upgradation work.

Pre tender Details as follows:

Pre Tender No.	MRPL/Projects/02/2023
Pre Tender on Website	From 16.08.2023 to 21.08.2023
Closing date for submission of any documents if applicable.	Up to 10:30 hrs (IST) on 21.08.2023
Pre Tender Meet For	Main EPC Package for MRPL Refinery Complex Power System Upgradation Work
Pre Tender Meet Timing	21.08.2023 at 11:00 AM (IST)
Date of Meeting Through VC	<p>Option-A: Through the following link whoever is having Microsoft TEAMS</p> <p>https://teams.microsoft.com/l/meetup-join/19%3ameeting_YmZhYThhZmYtNGM1MC00ZTQ5LWJmNTMtODhkZTg4OGIwNzJi%40thread.v2/0?context=%7b%22Tid%22%3a%2224139d14-c62c-4c47-8bdd-ce71ea1d50cf%22%2c%22Oid%22%3a%22f96aea47-336f-45b4-ba20-878d102e4c2b%22%7d</p> <p>Option-B: Through the following link whoever is NOT having Microsoft TEAMS</p> <p>Click here to join the meeting</p> <p>Meeting ID: 311 401 501 454 Passcode: dEwHPr</p>
Pre tenders documents available at	www.mrpl.co.in/eoi

Please contact below mentioned personnel for further details:

Designation	Contact No.	Email id
Subha Biswas Project Manager	+91-124 469 8500 +91-99997 79796	Subha.biswas@tract ebel.engie.com

All Credentials/ Documents shall be

addressed to General Manager

(Projects)
Projects Department,
Netravati Building
Mangalore Refinery & Petrochemicals
Ltd Kuthethoor PO, Via Katipalla,
Mangalore – 575 030 Karnataka- India

The envelope containing the documents shall be superscribed **“MAIN
EPC PACKAGE FOR REFINERY COMPLEAX POWER SYSTEM
UPGRADATION WORK (LSTK BASIS)”**

**MAIN EPC PACKAGE FOR REFINERY
COMPLEAX POWER SYSTEM UPGRADATION
WORK (LSTK BASIS)**



PRE TENDER MEET (PTM)

**MANGALORE REFINERY AND
PETROCHEMICALS LIMITED**

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1.0 INTRODUCTION

- 1.1 Mangalore Refinery & Petrochemicals Limited (MRPL) a government of India schedule 'A' CPSE and a subsidiary of ONGC is a State of Art Grassroots Petroleum Refinery located in a beautiful hilly terrain, north of Mangalore city, in Dakshina Kannada region, Karnataka State. The Refinery has got a versatile design with high flexibility to process Crudes of various API and with high degree of Automation. MRPL has high standards in refining and environment protection matched by its commitments to society. MRPL has also developed a Green Belt around the entire Refinery with plant species specially selected to blend with the local flora.
- 1.2 MRPL has an Aromatics Complex, which is a downstream unit of the refinery which processes naphtha for the production of high quality Px & Bz. MRPL has high standards in refining and environment protection matched by its commitments to society.
- 1.3 MRPL calls for a Pre Tender Meet for the Main EPC Package for Refinery Complex Power System Upgradation Work at MRPL (LSTK Basis).

2.0 BRIEF DESCRIPTION OF THE SYSTEM

- 2.1 MRPL has gone through three phases of expansion and over time has added power generation facilities in each of the three phases. The power generation facility in each phase was supported by associated cooling water and De-Mineralization water system. In addition, as an emergency backup, connectivity to the grid was also provided for start-up and emergency. While Phase 1 & 2 power plants are well integrated, Phase 3 and Aromatic complexes are, geographically separated and the interconnection between each of these power plants is limited.
- 2.2 The design intent of the setting up of own Captive generation facilities was to ensure that the poor reliability of the grid prevalent (and inability of machines to operate at the low frequencies of the grid) at the time of conceptualization of the refinery expansions (1992, 1998 & 2006) does not cause frequent upsets in the complex which would have resulted in production interruptions and high costs. It was also design intent that the utilization of the internal refinery fuel would be cost effective compared to the purchase of power from external source, considering co-generation of steam required for the process. It is also to be noted that Phase-3 was conceptualized without grid connectivity and subsequently connectivity was provided through one feeder.
- 2.3 In the past decade, there have been significant changes to the power generation and transmission infrastructure in the country. Availability of power has stabilized. Operational experience also indicates the same on evidence of grid frequencies that rarely fall below 50 Hz (even at lower levels of 110 kV). Further the availability of cheap renewable power has also drastically reduced the cost of power available for long term supplies.

3.0 OBJECTIVES

Based on this study, it is decided to focus on the upgradation of facilities of Steam and Power network as the major area for energy saving potential as given below:

- 3.1 Refinery Complex intends to augment its grid infrastructure to 220 kV from current 110 kV in order to draw increased power to the tune of 100 MVA. Accordingly, a completely new 220/33 kV substation needs to be constructed within MRPL Refinery Complex premises which will distribute the grid power to all existing CPPs namely CPP-1, CPP-2 and CPP-3 at 33 kV level.

4.0 SCOPE OF WORK

- 4.1 The scope includes but not limited to Design, Engineering, Procurement, Construction, Testing, Commissioning and putting into successful operation of a new 220/33 kV Substation and make the grid power available to all existing captive power plant generation buses at 33 kV voltage level.

The scope of work starts from the 220 kV cable termination in the proposed 220/33 kV substation, design, engineering and construction of the new 220/33 kV substation in LSTK basis, laying of free issued 33 kV cables from this S/S to different CPPs, commissioning & charging of a free issued 33/33 kV, 31.5 MVA interconnecting transformer (ICT-2) along with supply of a 33 kV local adaptor breaker panel, supply & commissioning of 33/33 kV, 31.5 MVA interconnecting transformer (ICT-3) between CPP-1 & CPP-2.

Please refer to the attached drawings in this regard.

5.0 DATA TO BE FURNISHED BY THE BIDDER

1. General Information		
1.1	Name of the BIDDER / Firm	
1.2	Nature or legal status of the Firm	
1.3	Name and address of associated companies to be involved in the project with relationship and role, if any.	
1.5	Registered Address of Firm	
1.6	Contact Person	
1.7	Designation and address of Contact person	
1.8	Email ID	

1.9	Turnover & Net worth of the Firm during last three financial years (Please enclose copy of audited annual reports)	Year	Turn Over (INR)	Net Worth (INR)
		2019-20		
		2020-21		
		2021-22		
2. Past experience of the bidder.				
2.1	<ul style="list-style-type: none"> Design, Engineering and Construction management of Switch yard of at least 220 kV level. Design, Engineering and Construction Management of GIS sub-station. Details of above activities in last ten (10) year term.			
2.2	Bidder should provide necessary documents staining the above clauses. The bidder shall give copies of signed Agreement/ Work order/ Purchase order/ acknowledged final report or any other document to prove the scope of completed works against the order to the satisfaction of MRPL.			

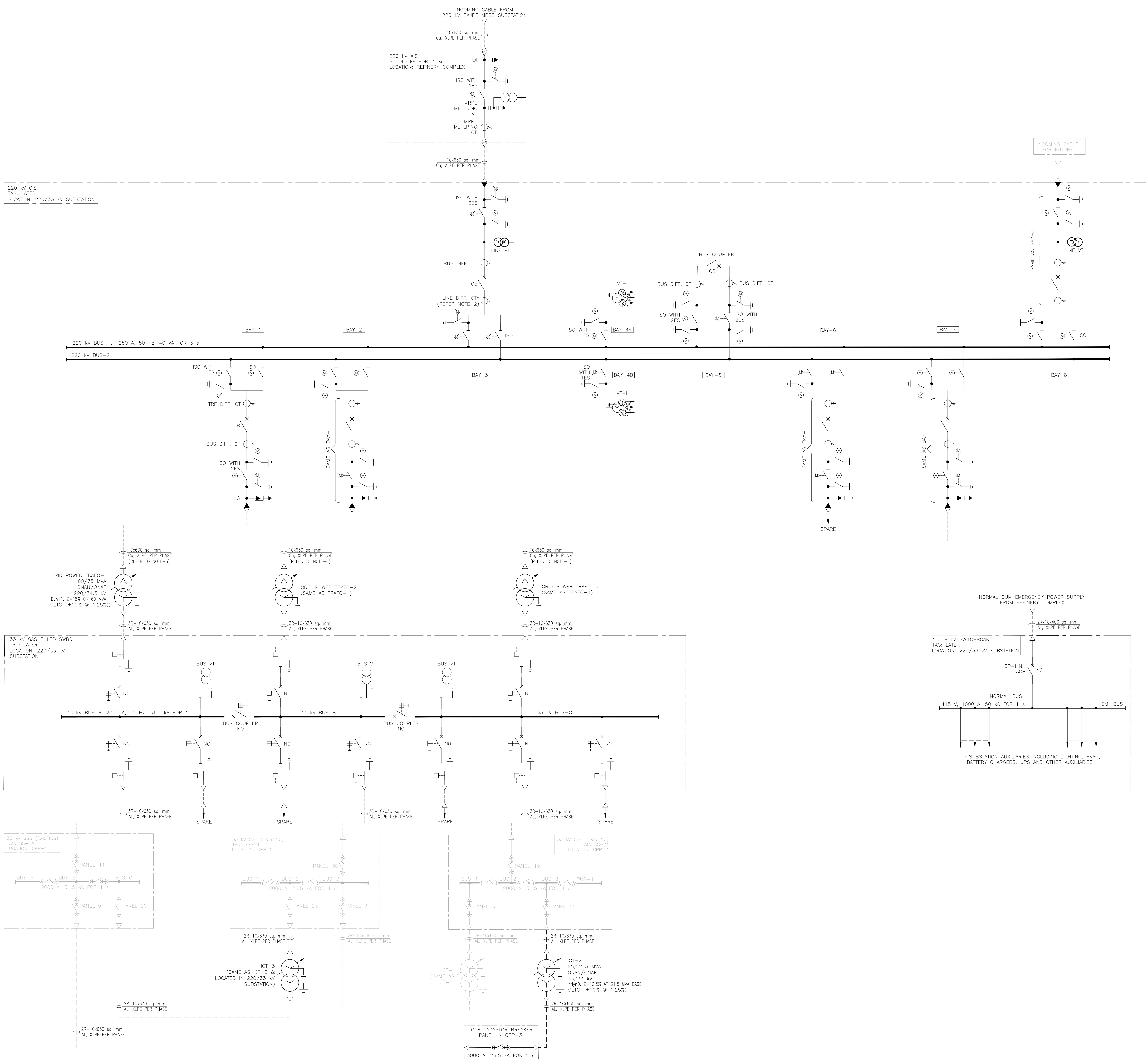
6.0 DISCLAIMER

MRPL has prepared this document to give interested parties background information on the project. While MRPL has taken due care in the preparation of the information contained herein and believes it to be accurate, neither MRPL nor any office authorities, officers, employees, agents/and advisors gives any warranty or make any representations, express or implied as to the completeness or accuracy of the information contained in this document or any information contained in this document or any information which may be provided in connection therewith.

Interested parties are required to make their own inquiries and respondents will be required to confirm in writing that they have done so and they do not rely on the information provided in the Pre Tender document in submitting their response. The information is provided on the basis that it is non-binding on MRPL or any of its authorities or agencies or any of their respective officers, employees, agents or advisors.

MRPL reserves the right not to proceed with the project, to alter the timetable reflected in this document or to change the process or procedure to be applied for

listing of enquiry partners. It also reserves the right to decline to discuss the project further with any party expressing interest. No reimbursement of cost of any type whatsoever will be paid to persons, or entities, expressing interest in the project.



- NOTES**
- THIS DRAWING INDICATES ONLY THE POWER DISTRIBUTION PHILOSOPHY OF THE MRPL REFINERY COMPLEX.
 - THE PARAMETERS OF THIS CT SHALL BE CONSIDERED SIMILAR TO THE PARAMETERS OF THE UPSTREAM 220 kV CT LOCATED IN BAJPE MRSS SUBSTATION.
 CT RATIO: TO PROVIDED BY KPTCL/MRPL
 V_n : TO PROVIDED BY KPTCL/MRPL
 R_{ct} : TO PROVIDED BY KPTCL/MRPL
 R_{ct} : TO PROVIDED BY KPTCL/MRPL
 - MRPL METERING CT & VT SHALL BE OF CLASS 0.2s AND 0.2 RESPECTIVELY.
 - ALL COMPONENT RATING SPECIFIED IN SINGLE LINE DIAGRAM ARE TENTATIVE.
 - THE TYPE OF EARTH SWITCH (HIGH SPEED OR MAINTENANCE TYPE) ARE NOT SPECIFIED IN THE DRAWING. THE EPC CONTRACTOR SHALL DECIDE THE SAME AT DETAIL ENGINEERING STAGE.
 - COPPER CABLE IS USED HERE ALSO TO ELIMINATE ONE ADDITIONAL VARIETY OF 220 kV CABLES.

LEGEND

SYMBOLS	DESCRIPTION	SYMBOLS	DESCRIPTION
	TRANSFORMER		33 kV ISOLATOR
	CIRCUIT BREAKER		33 kV CIRCUIT BREAKER
	DISCONNECTOR (ISOLATOR)		DRAWOUT
	EARTH SWITCH		XLPE TO AIR TERMINATION
	EARTH		XLPE TO SF6 TERMINATION
	CABLE CONNECTION		LIGHTNING ARRESTOR
	CURRENT TRANSFORMER		EM. VOLTAGE TRAF0.
	CAPACITIVE VOLTAGE TRANSFORMER		

Rev.	D M Y	Modifications	Drawn	Checked	Validated	Approved
G	01/08/2023	MRPL COMMENTS INCORPORATED BY CHANGING 33 kV GSB BUS RATING TO 2000 A, CEILING 3 SPARE BAYS IN 220 kV GIS AND UPDATING 220 kV INCOMING CABLE SIZE AS 630 sq. mm Cu. (REF. ISSUED FOR TENDERING)	ASH	TMA	SSB	SSB
F	28/03/2023	REVISED AS PER MRPL COMMENTS, ISSUED FOR TENDERING	APH	TMA	SSB	SSB
E	13/03/2023	GENERALLY REVISED; ISSUED FOR APPROVAL	APH	TMA	SSB	SSB
D	03/03/2023	REVISED AS PER SYSTEM STUDY REQUIREMENT; ISSUED FOR APPROVAL	APH	TMA	SSB	SSB
C	30/12/2022	REVISED AS PER MRPL COMMENTS, ISSUED FOR APPROVAL	APH	TMA	SSB	SSB
B	15/11/2022	REVISED AS PER MRPL COMMENTS, ISSUED FOR APPROVAL	APH	TMA	SSB	SSB
A	07/11/2022	ISSUED FOR REVIEW	NPD	TMA	SSB	SSB

LDA NO. : 55000098R Dated 01.10.2022 SAP PO number:

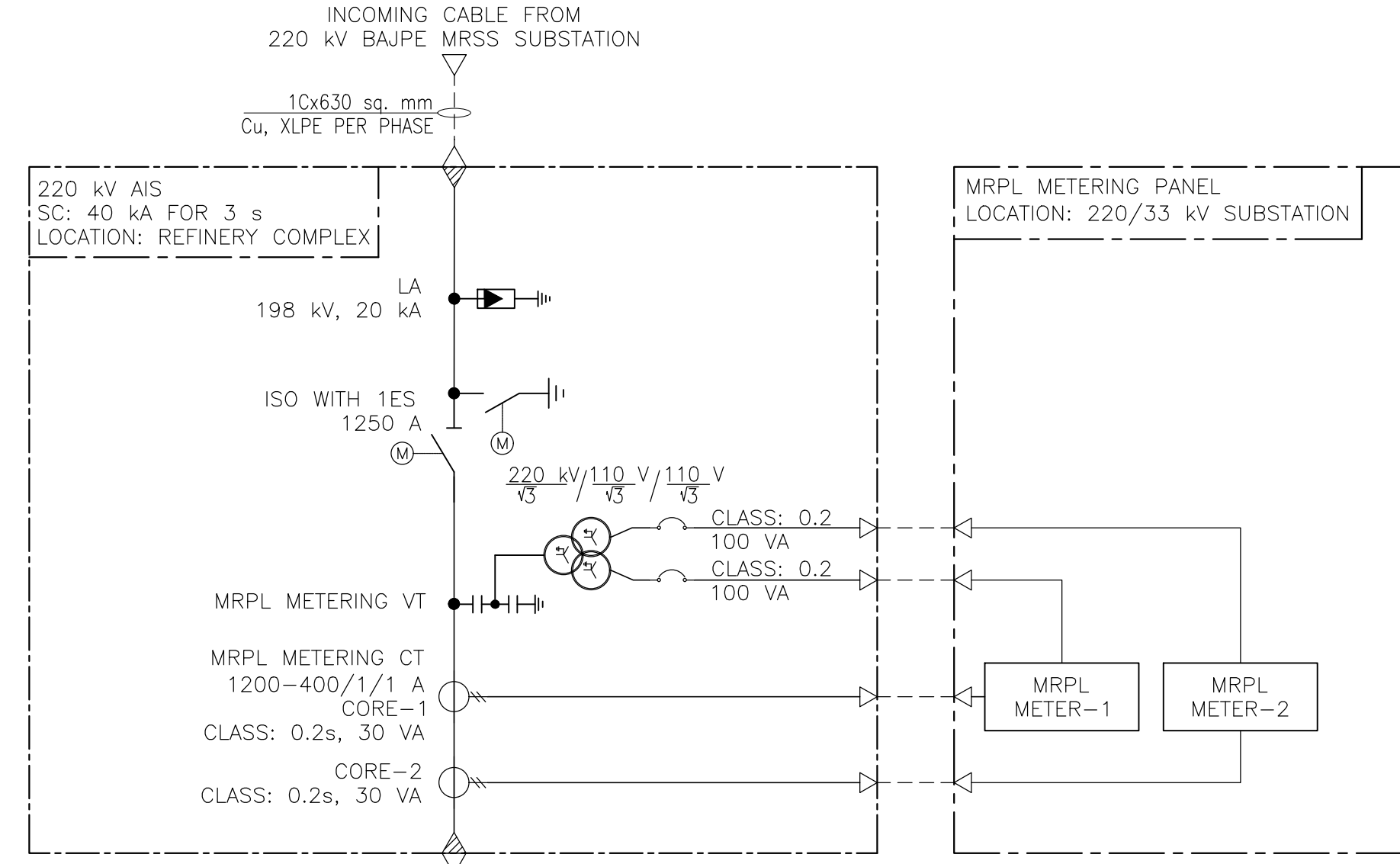
OWNER/CUSTOMER: **MANGALORE REFINERY & PETROCHEMICALS LTD.**
 (A Subsidiary of Oil & Natural Gas Corp. Ltd. -ONGC)
 Regd. Office: Kuttanoor P.O., Vile, Kappala, Mangalore-575030 (India)
 Phone: 081-824-2210400 Fax: 081-824-2211238

PROJECT: POWER SYSTEM UPGRADATION PROJECT AT MRPL REFINERY COMPLEX, MANGALORE

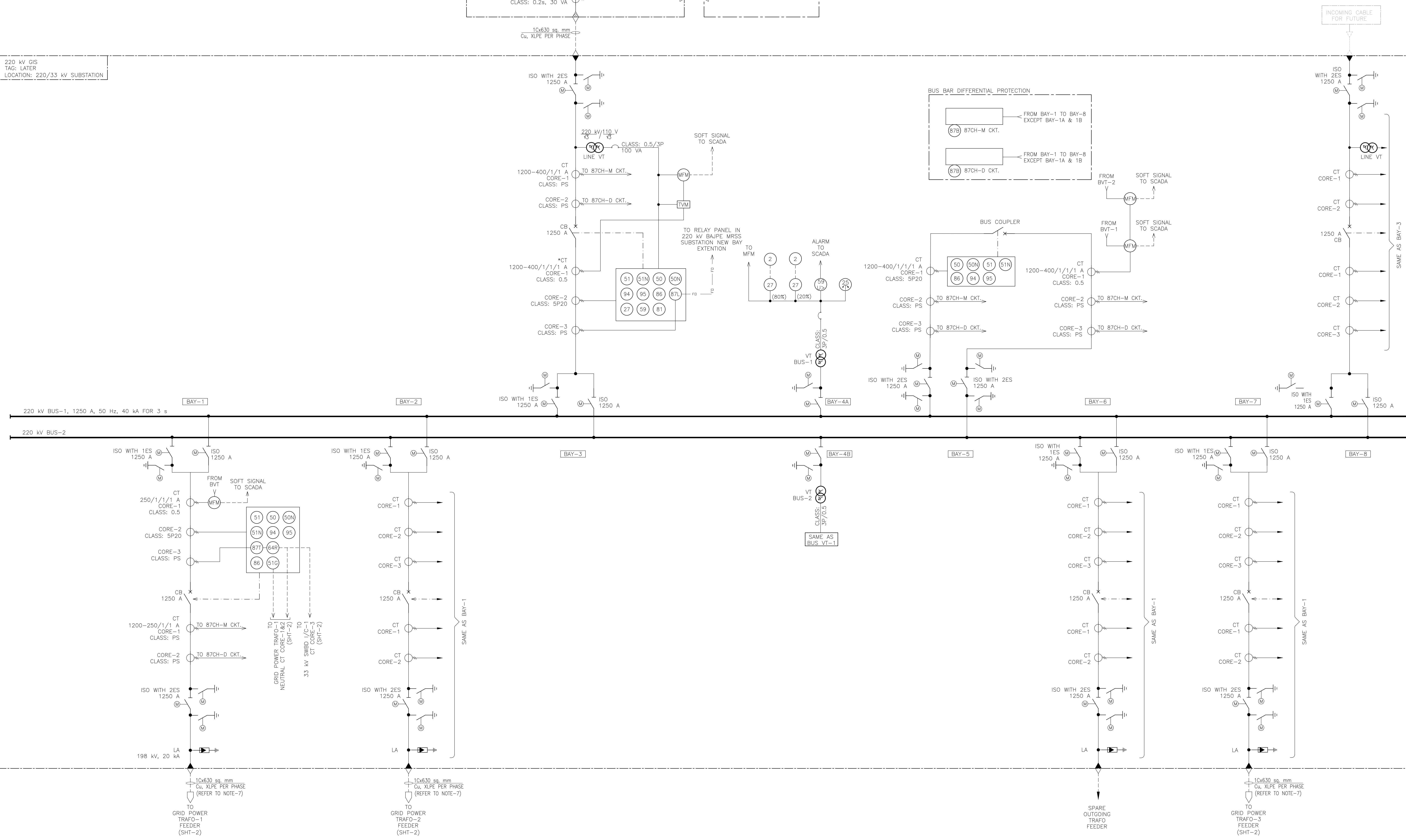
SUBJECT: KEY SINGLE LINE DIAGRAM FOR REFINERY COMPLEX POWER SYSTEM UPGRADATION WORK

Size	Scale	Sheet	Rev.
A0	NTS	1 OF 1	G
Project No.	Discipline Code	System Code	Serial No.
P.020679	M	00041	E001

TRACTEBEL Engineering pvt. ltd. ENGIE



220 kV GIS
TAG: LATER
LOCATION: 220/33 kV SUBSTATION



- NOTES**
- THIS DRAWING INDICATES THE POWER DISTRIBUTION PHILOSOPHY OF THE MRPL REFINERY COMPLEX AND ITS METERING & PROTECTION SYSTEM.
 - THE PARAMETERS OF THIS CT SHALL BE CONSIDERED SIMILAR TO THE PARAMETERS OF THE UPSTREAM 220 kV CT LOCATED IN BAJPE MRSS SUBSTATION NEW BAY EXTENSION.
CT RATIO: TO PROVIDED BY KPTCL/MRPL FOR 87L PROTECTION
V_L: TO PROVIDED BY KPTCL/MRPL
R_{CT}: TO PROVIDED BY KPTCL/MRPL
I_{CT}: TO PROVIDED BY KPTCL/MRPL
 - THE EXISTING CTs IN THESE PANELS SHALL BE REPLACED BY NEW 1600/1/1/1 A CT WHICH WILL BE SUPPLIED LOOSE BY THE EPC CONTRACTOR. THE TO CONVERTER FOR 87L RELAY IN THE EXISTING SWITCHBOARDS SHALL ALSO BE SUPPLIED AND INSTALLED BY EPC CONTRACTOR.
 - MFM SHALL MEASURE FOLLOWING PARAMETERS I.e. V1, V2, V3, A1, A2, A3, MW, MVA, MVAR, PF, Hz. ALL THESE SIGNALS SHALL BE TRANSMITTED TO SCADA THROUGH SOFT SIGNALS.
 - CT PARAMETER OF PS CLASS SHALL BE DECIDED BY EPC CONTRACTOR DURING DETAIL ENGINEERING.
 - THE TYPE OF EARTH SWITCH (HIGH SPEED OR MAINTENANCE TYPE) ARE NOT SPECIFIED IN THE DRAWING. THE EPC CONTRACTOR SHALL DECIDE THE SAME AT DETAIL ENGINEERING STAGE.
 - COPPER CABLE IS USED HERE ALSO TO ELIMINATE ONE ADDITIONAL VARIETY OF 220 kV CABLES.

LEGEND

SYMBOLS	DESCRIPTION	SYMBOLS	DESCRIPTION
	TRANSFORMER		CABLE CONNECTION
	DIESEL GENERATOR		DISCONNECTOR
	CURRENT TRANSFORMER		VOLTAGE TRANSFORMER
	CIRCUIT BREAKER		33 kV ISOLATOR
	EARTH SWITCH (INSULATED)		LIGHTING ARRESTOR
	EARTH		DRAWOUT
	33 kV CIRCUIT BRAKER		XLPE TO AIR TERMINATION
	CAPACITIVE VOLTAGE TRANSFORMER		XLPE TO SF6 TERMINATION
	EM. VOLTAGE TRANSFORMER		MOULDED CASE CIRCUIT BREAKER
	CONTACTOR		SYNCHRONIZING RELAY
	INSTANTANEOUS OVER-CURRENT RELAY		OVER VOLTAGE RELAY
	INVERSE TIME OVER CURRENT		TRANSFORMER HIGH IMPEDENCE DIFFERENTIAL PROTECTION RELAY
	INSTANTANEOUS EARTH FAULT RELAY		LOCK-OUT RELAY
	INVERSE TIME EARTH FAULT RELAY		UNDER VOLTAGE RELAY
	WINDING TEMP. INDICATOR (WTI)		OIL SURGE RELAY FOR OLTC
	OIL TEMP. INDICATOR (OTI)		PRESSURE RELIEF VALVE (PRV)
	BUCHHOLTZ RELAY (BO)		OIL SURGE RELAY (OSR)
	TRIP CIRCUIT SUPERVISION RELAY		ANTI PUMPING RELAY
	LINE DIFFERENTIAL		HIGH IMP. RESTRICTED EARTH FAULT RELAY
	STAND BY EARTH FAULT RELAY		MULTI FUNCTION METER WITHOUT ENERGY METER
	TRI-VECTOR METER		U/F & O/F RELAY
	BUS BAR DIFFERENTIAL RELAY		

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NO.
OVERALL SINGLE LINE DIAGRAM (BY TEIL)	6249-E-00-051-001

LOA NO: 742000126 Dated 01.10.2022 SAP PO number:

Rev.	D	M	Y	Modifications	Drawn	Checked	Validated	Approved
E	01/08/2023			MRPL COMMENTS INCORPORATED BY CHANGING 33 kV GIS BUS RATING TO 2000 A RESULTING 3 SPARE BAYS IN 220 kV GIS AND UPDATING 220 kV INCOMING CABLE SIZE AS 630 sq. mm Cu XLPE. ISSUED FOR TENDERING.	ASH	TMA	SSB	SSB
D	28/03/2023			REVISED AS PER MRPL COMMENTS. ISSUED FOR TENDERING	APR	RHR	TMA	SSB
C	14/03/2023			GENERALLY REVISED. ISSUED FOR APPROVAL.	APR	RHR	TMA	SSB
B	15/12/2022			REVISED AS PER MRPL COMMENTS. ISSUED FOR APPROVAL	APR	RHR	TMA	SSB
A	07/12/2022			ISSUED FOR APPROVAL.	APR	RHR	TMA	SSB

OWNER/CLIENT: **MANGALORE REFINERY & PETROCHEMICALS LTD.**
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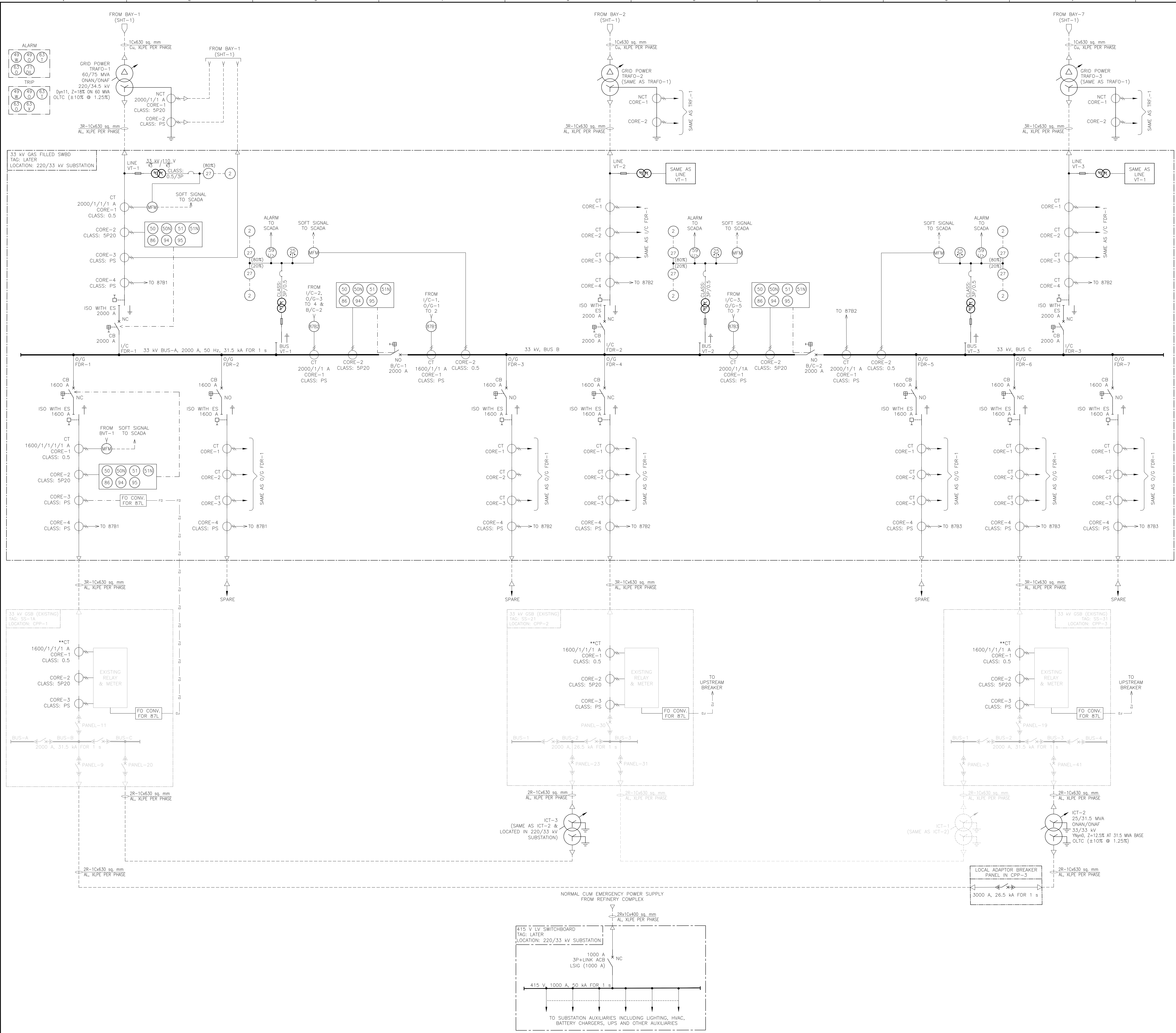
PROJECT: POWER SYSTEM UPGRADATION PROJECT AT MRPL REFINERY COMPLEX, MANGALORE

SUBJECT: PROTECTION & METERING DIAGRAM FOR REFINERY COMPLEX POWER SYSTEM UPGRADATION WORK

Size: A0 Scale: NTS Sheet: 1 OF 2 Rev. E

Project No. Discipline Code System Code Serial No.

TRACTEBEL Engineering pvt. Ltd. P.020679 M 00056 E006



NOTES
 1. FOR REFERENCE, NOTES AND LEGEND PLEASE REFER SHEET-1 OF THIS DRAWING.

Rev.	Date	Description	By	Check	Approved
E	01/08/2023	MRPL COMMENTS INCORPORATED BY CHANGING 33 kV OSB BUS RATING TO 2000 A, ISSUING 3 SPARE BUSES IN 220 kV GIS AND UPDATING 220 kV INCOMING CABLE SIZE AS 630 sq. mm Cu, XLPE ISSUED FOR TENDERING.	ASH	TMA	SSB
D	28/03/2023	REVISED AS PER MRPL COMMENTS; ISSUED FOR TENDERING	ASH	RevR	TMA
C	14/03/2023	GENERALLY REVISED; ISSUED FOR APPROVAL	ASH	RevR	TMA
B	13/12/2022	REVISED AS PER MRPL COMMENTS; ISSUED FOR APPROVAL	ASH	RevR	TMA
A	07/12/2022	ISSUED FOR APPROVAL	NPT	RevR	TMA

Rev. D M Y Modifications Drawn Checked Validated Approved

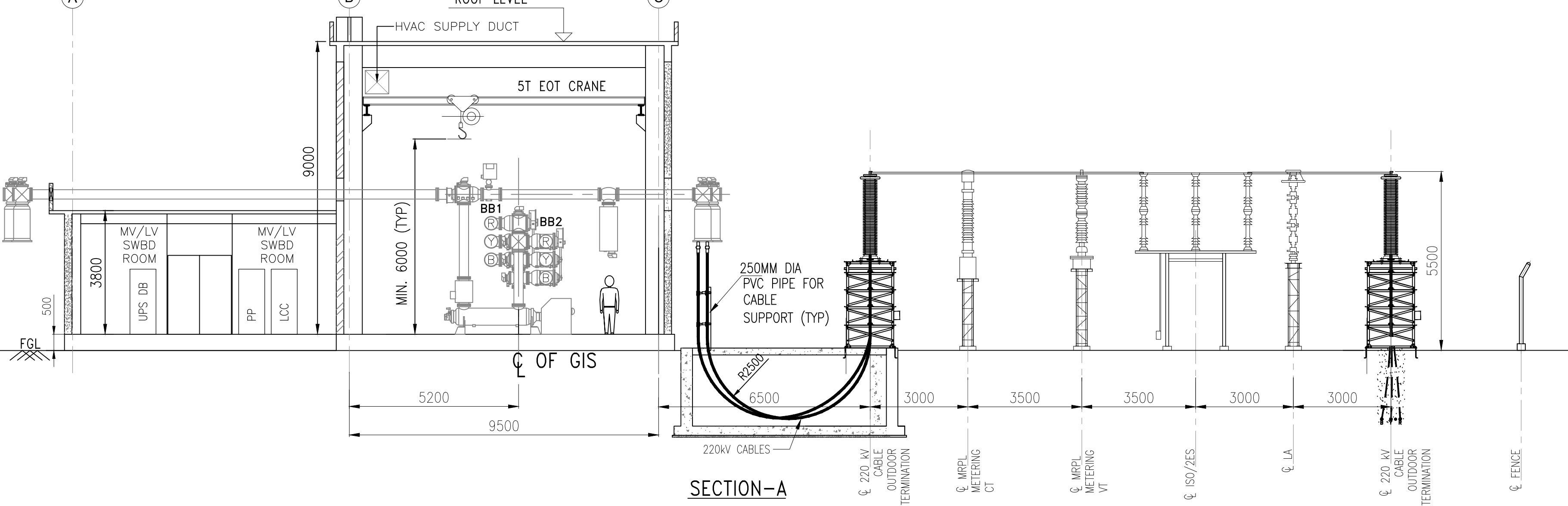
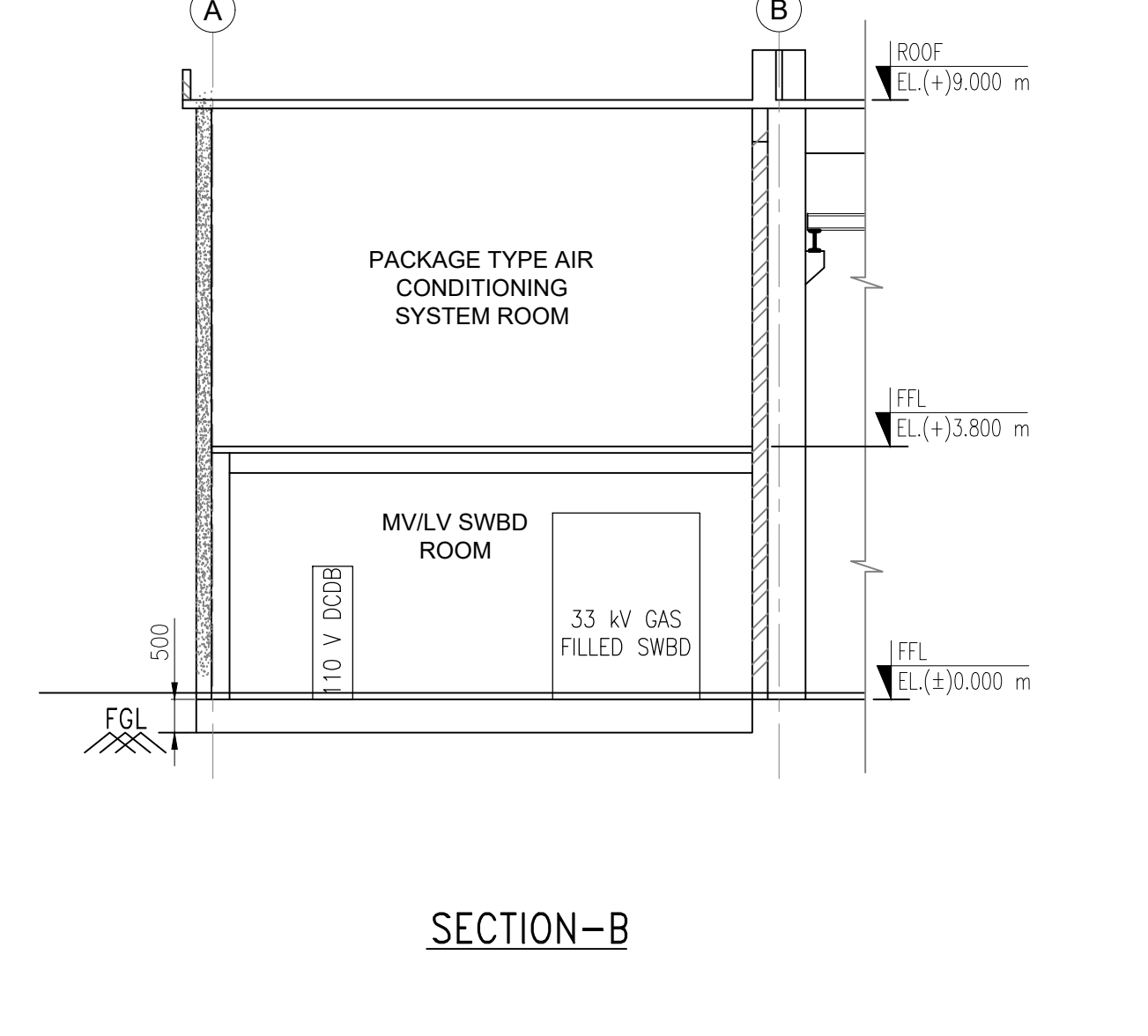
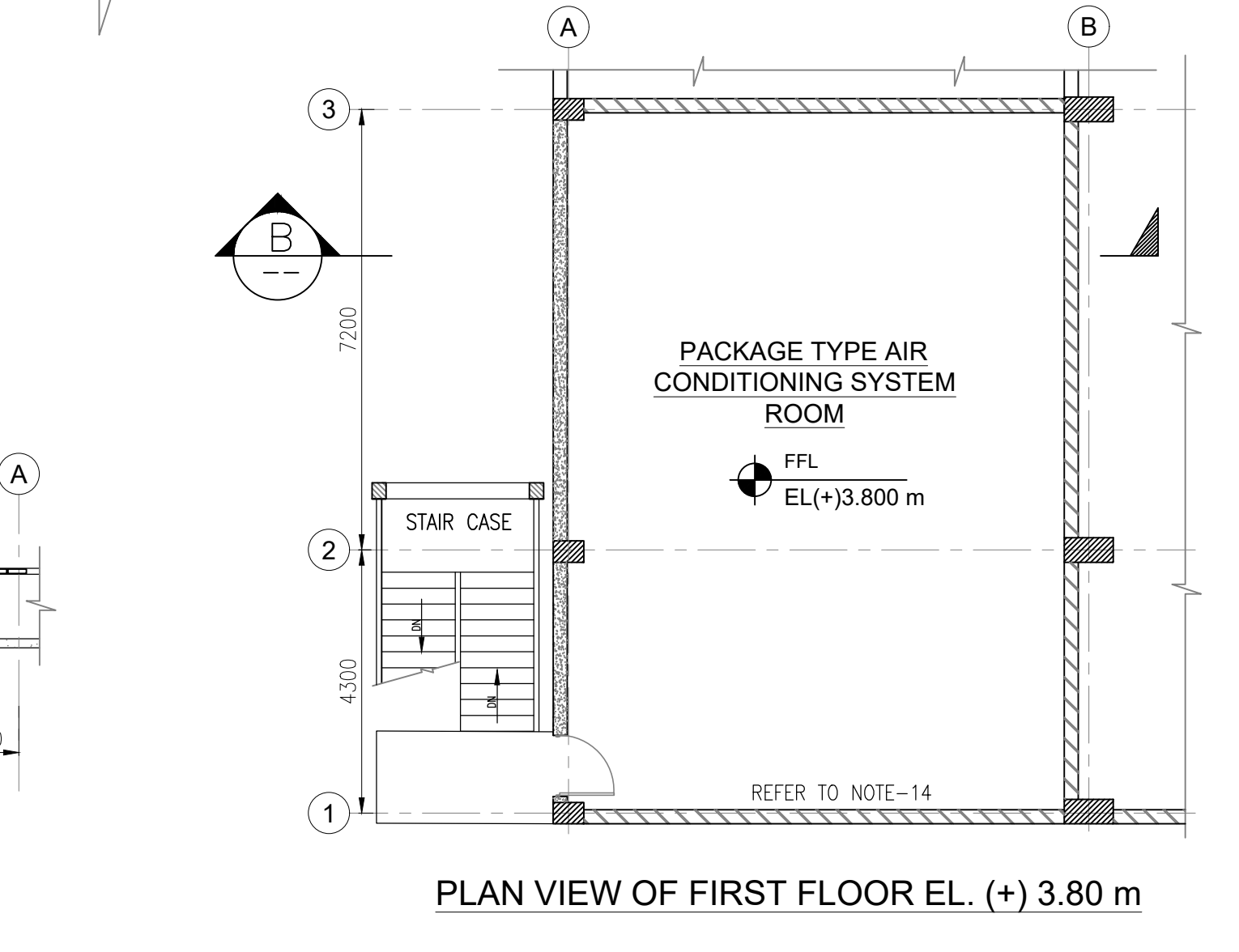
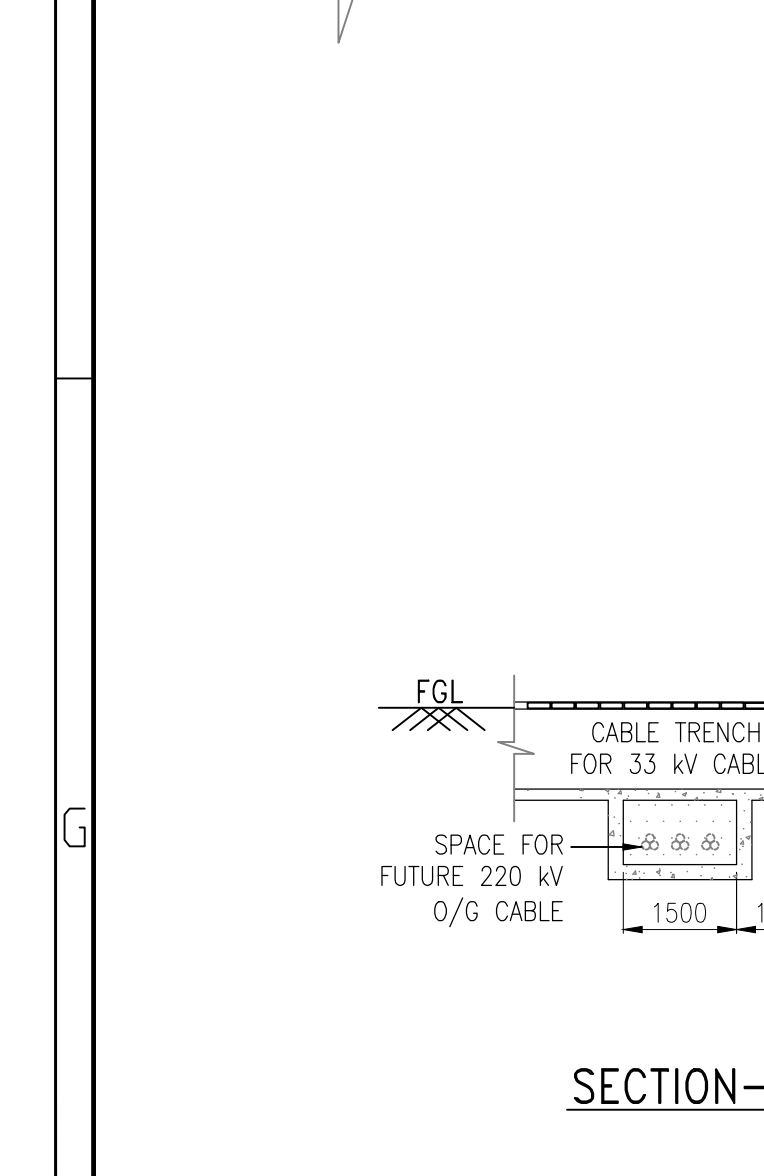
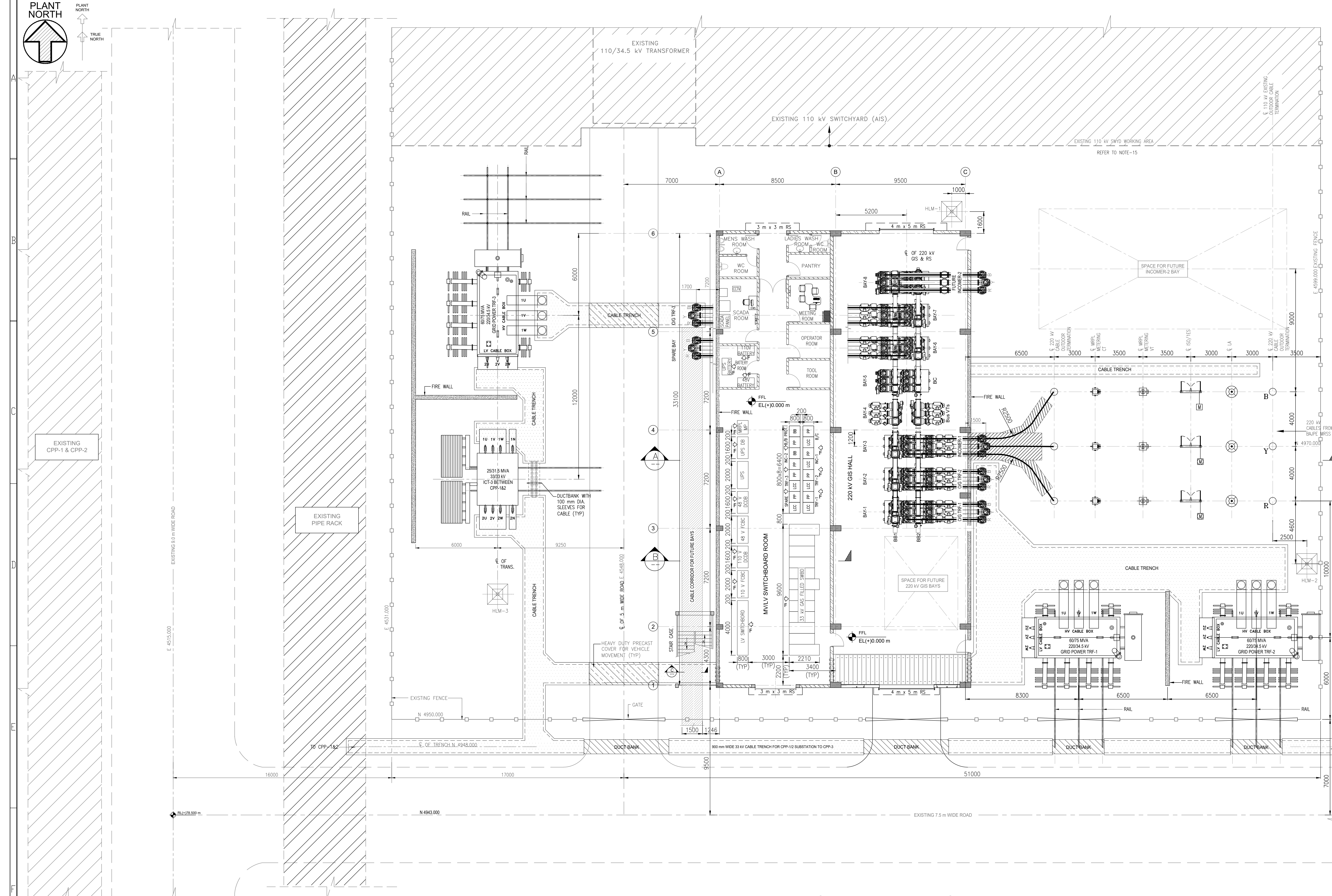
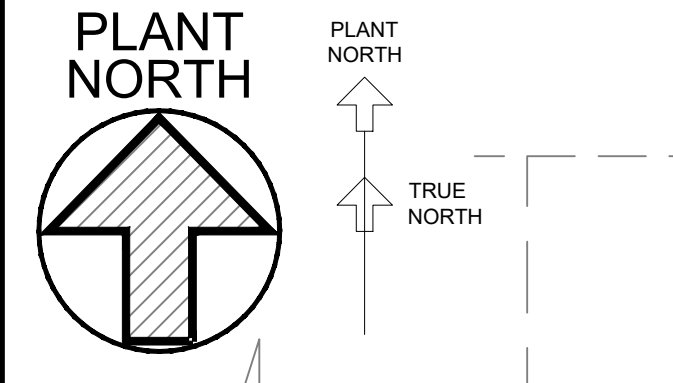
LDA NO: 742000126 Dated 01.10.2022 SAP PO number:

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 Regd. Office: Kuthoor P.O., Via: Kulpatta, Mangalore-575030 (India)
 Phone: 081-824-221040 Fax: 081-824-221239

PROJECT: POWER SYSTEM UPGRADATION PROJECT AT MRPL REFINERY COMPLEX, MANGALORE

SUBJECT: PROTECTION & METERING DIAGRAM FOR REFINERY COMPLEX POWER SYSTEM UPGRADATION WORK

 TRACTEBEL Engineering pvt. ltd.	Size	Scale	Sheet	Rev.
	AO	NTS	2 OF 2	E
Project No.	Discipline Code	System Code	Serial No.	
P.020679	M	00056	E006	



NOTES:-

- ALL DIMENSIONS ARE IN MM, UNLESS OTHERWISE SPECIFIED.
- THE HEIGHT OF 220 kV GIS BUILDING IS DECIDED BASED ON MAXIMUM HEIGHT OF 2300 mm FROM BOTTOM OF HOOK OF EOT CRANE IN FULLY WITHDRAWN POSITION, TO BOTTOM OF BEAM BELOW ROOF SLAB, OCCUPIED BY THE CRANE. HOWEVER, THE BUILDING HEIGHT SHALL BE FINALIZED BASED ON THE REQUIREMENTS BY GIS MANUFACTURER & EOT CRANE.
- CAGE LADDER SHALL BE PROVIDED FOR ACCESS TO THE ROOF OF GIS BAY FROM ROOF OF MV/LV SWITCHBOARD ROOM.
- BASIC INSULATION LEVEL AND MINIMUM ELECTRICAL CLEARANCES ARE GIVEN BELOW:

S.N.	DESCRIPTION	VALUE
1	NOMINAL VOLTAGE	220 kV
2	HIGHEST VOLTAGE	245 kV
3	POWER FREQ. WITH STAND VOLTAGE	460 kV rms
4	LIGHTNING IMPULSE WITHSTAND VOLTAGE	1050 kV peak
5	PHASE TO PHASE CLEARANCE (PP)	2100 mm
6	PHASE TO EARTH CLEARANCE (PE)	2100 mm
7	SECTION CLEARANCE (SC)	5000 mm
8	GROUND CLEARANCE (LIVE PART TO GROUND)	5500 mm
- PACKAGE TYPE AIR CONDITIONING HAS BEEN CONSIDERED FOR THE 220 kV GIS HALL, MV/LV SWITCH BOARD ROOM, TOOL ROOM, OPERATOR ROOM, SCADA ROOM.
- SPLIT AC HAS BEEN CONSIDERED FOR MEETING ROOM & SCADA ROOM.
- VENTILATION SYSTEM (EXHAUST FANS) HAVE BEEN CONSIDERED IN BATTERY ROOM, TOILET, WASH ROOM, PANTRY.
- THE WATER CONNECTION FOR THE SUBSTATION USE SHALL BE FROM THE EXISTING CPP-1/2 LOCATED ADJACENT TO THIS PREMISES. THE SCOPE OF WORK OF THE PACKAGE SUPPLIER ENDS AT THE SS BOUNDARY. THERE WILL BE OVERHEAD STORAGE TANK.
- THE HEIGHT OF HLM SHALL BE 30 METRE.
- THE ELECTRICAL BUILDING SHALL HAVE CABLE TRENCHES INSIDE FOR CABLE PURPOSES.
- THE MRPL TOILET, MEETING ROOM, SCADA ROOM, OPERATOR ROOM, TOOL ROOM SHALL HAVE FALSE CEILING AT A HEIGHT OF 3 m FROM THE FLOOR LEVEL.
- THE LIGHTNING MAST IN FUTURE INCOMER-2 AREA SHALL BE INSTALLED IN FUTURE. THE LOCATION OF LIGHTNING MAST IS TENTATIVE ONLY AND SHALL BE FINALIZED BY THE CONTRACTOR AFTER THE APPROVAL OF CUSTOMER.
- THE TRANSFORMER RETENTION OIL PIT SHALL BE DESIGNED TO HOLD 150% OF ITS TOTAL OIL QUANTITY. HENCE, NO SEPARATE BURNT OIL PIT IS REQUIRED/ENVISAGED.
- THIS WALL SHALL BE CONSTRUCTED AFTER INSTALLATION OF HVAC EQUIPMENT IN FIRST FLOOR.
- A FENCE SHALL BE PROVIDED TO SEGREGATE THE EXISTING 110 kV SWITCHYARD WHILE WORKING IN THE NEW PROJECT AREA.
- ALL CABLE TRENCHES LOCATED OUTDOOR SHALL NOT HAVE ANY CABLE TRAYS. HOWEVER, SUCH CABLE TRENCHES SHALL BE FILLED WITH SAND AFTER INSTALLATION OF ALL CABLES.

LEGEND :-

NOMINAL VOLTAGE	SYMBOL
SURGE ARRESTOR	⊗
220 kV OUTDOOR TERMINATION KIT	○
VOLTAGE TRANSFORMER	⊕
CURRENT TRANSFORMER	⊖
ISOLATOR WITH MOTOR + 1 E/S	⊞
HIGH LIGHTNING MAST	⊞
CABLE TRENCH	▨
DUCT BANK	▩
HEAVY DUTY PRECAST COVER FOR VEHICLE MOVEMENT	▧

ABBREVIATION :-

DCDB:	DIRECT CURRENT DISTRIBUTION BOARD
FCBC:	FLOAT OUM BOOST CHARGER
RP:	RELAY PANEL
RTCC:	REMOTE TAP CHANGING CUBICLE

Rev. 01/08/2023 MRPL COMMENTS INCORPORATED BY CHANGING 33 kV GIS BUS RATING TO 2000 A, SELECTING 3 SPARE BAYS IN 220 kV GIS AND UPDATING 220 kV INCOMING CABLE SIZE AS 630 sq. mm Cu. SAFE ISSUED FOR TENDERING. ASH TMA SSB SSB

Rev. 11/07/2023 GENERALLY REVISED; ISSUED FOR APPROVAL. ASH TMA SSB SSB

Rev. 16/03/2023 GENERALLY REVISED; ISSUED FOR APPROVAL. ASH TMA SSB SSB

Rev. 30/12/2022 REVISED AS PER MRPL COMMENTS ISSUED FOR APPROVAL. ASH TMA SSB SSB

Rev. 14/11/2022 ISSUED FOR APPROVAL. ASH TMA SSB SSB

Rev. D M Y Modifications (Drawn) (Checked) (Validated) (Approved)

LDA NO. - 550000989 Dated 01.10.2022 SAP PO number:

OWNER/CLIENT: **MANGALORE REFINERY & PETROCHEMICALS LTD.**
 (A subsidiary of Oil & Natural Gas Corp. Ltd - ONGC)
 Regd. Office: Kuthoor P.O., Via: Kattipalla, Mangalore-575030 (India)
 Phone: 0091-824-2270400 Fax: 0091-824-2271239

PROJECT: POWER SYSTEM UPGRADATION PROJECT AT MRPL REFINERY COMPLEX, MANGALORE

SUBJECT: 220/33 kV SUBSTATION LAYOUT IN MRPL COMPLEX FOR REFINERY COMPLEX POWER SYSTEM UPGRADATION WORK

TRACTEBEL **Engineering pvt. Ltd.**
 Project No. P.020679 | Scale: 1 OF 1 | Sheet: 1 OF 1 | Date: 04/315 | Rev: E002