



Bids & Awards Committee

Project :REHABILITATION OF SLSU-MCC BUILDING ELECTRICAL SYSTEM (Phase 1)
Subject : SUPPLEMENTAL/BID BULLETIN NO. 02
Date : 29 NOVEMBER 2024

This Supplemental/Bid Bulletin No. 2 is issued to modify or amend items in the Bid Documents. This shall form an integral part of the Bid Documents.

The following documents are revised:

From

Section VII Plans/Drawings

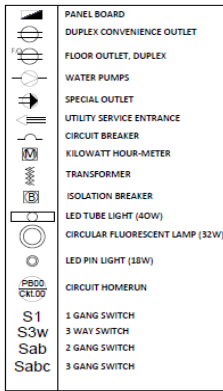
- incorrect Project title
- no signatures
- old SLSU logo
- Single Line Diagram(drawing)

Section VIII Bill of Materials

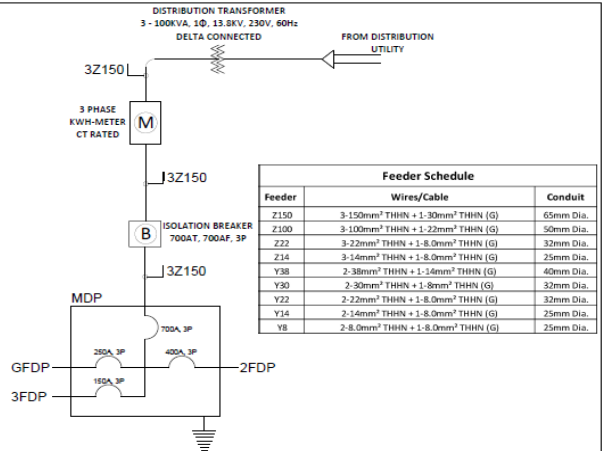
- no notations to item line wires

1. ALL WORKS HEREIN SHALL CONFORM WITH ALL THE APPLICABLE PROVISIONS OF THE LATEST EDITION OF THE PHILIPPINE ELECTRICAL CODE (P.E.C.) THE RULES AND REGULATIONS OF THE LOCAL ENFORCING AUTHORITY AND APPLICABLE POWER COMPANY REQUIREMENTS.
2. THE POWER SUPPLY SHALL BE 3 PHASE, 230 VOLTS, 3 WIRES + GND, 60 HERTS.
3. THE ELECTRICAL WIRING INSTALLATIONS SHALL BE CONCEALED IN INTERMEDIATE. METALLIC CONDUIT OR AS SPECIFIED, THE MINIMUM SIZE OF IMC SHALL BE 15mm. UNLESS OTHERWISE SPECIFIED.
4. THE WIRES TO BE USED ARE THERMOPLASTIC INSULATED. THWN, THHN, PHELD DODGE OR EQUIVALENT. THE MINIMUM SIZE SHALL BE 3.5 mm
5. ALL MATERIALS AND DEVICES USED ARE NEW AND APPROVED QUALITY FOR THE TYPE OF LOCATION AND PURPOSE INTENDED
6. ALL ELECTRICAL WORKS SHALL BE SUPERVISED BY DULY LICENSED ELECTRICAL ENGINEER.

A GENERAL NOTES

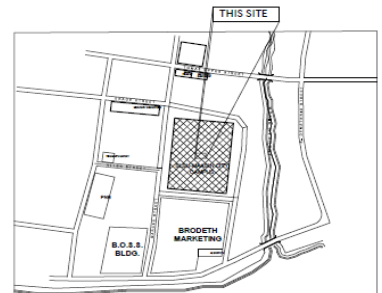


B LEGEND



C SINGLE LINE DIAGRAM

PANEL SIMULATOR		PANEL BOARD		CIRCUIT BREAKERS		MOTOR DATA		FEEDER LOADS	
MAIN	700 AT	3P	700AT	3P	700AF	3P	700AF	3P	700AF
CT	CH	AE	AE	AE	AE	AE	AE	AE	AE
1	250	400	400	250P	2ND FLOOR DISTRIBUTION PANEL	132540	3	AIC	204.6
2	3	400	400	250P	2ND FLOOR DISTRIBUTION PANEL	132540	3	AIC	321.3
3	3	150	225	250P	3RD FLOOR DISTRIBUTION PANEL	60692	3	AIC	139.1
TOTAL		28592		NO BALANCE CHECK		8530	26451	7641	TOTAL PHASE DEMAND LOAD (OTDCA)
CALCULATIONS:		TOTAL CVA		TOTAL M.CVA		= 28592 - 0 =		28592	
		TOTAL DVA		TOTAL M.DVA		= 3785502 -		3785502	
		I _{sc} for MCCB		I _{sc} for MCB		= 1745.5021 (3*230*1.09) -		3*1.5*117 =	
		I _{sc} for MFD		I _{sc} for MFD		= 1745.5021 (3*230*1.09) -		3*0.25*117 =	
		CVA		MFD		= 1745.5021 (3*230*1.09) -		3*0.25*117 =	
		I _{sc} for MFD		I _{sc} for MFD		= 1745.5021 (3*230*1.09) -		3*0.25*117 =	
		I _{sc} for MFD		I _{sc} for MFD		= 1745.5021 (3*230*1.09) -		3*0.25*117 =	

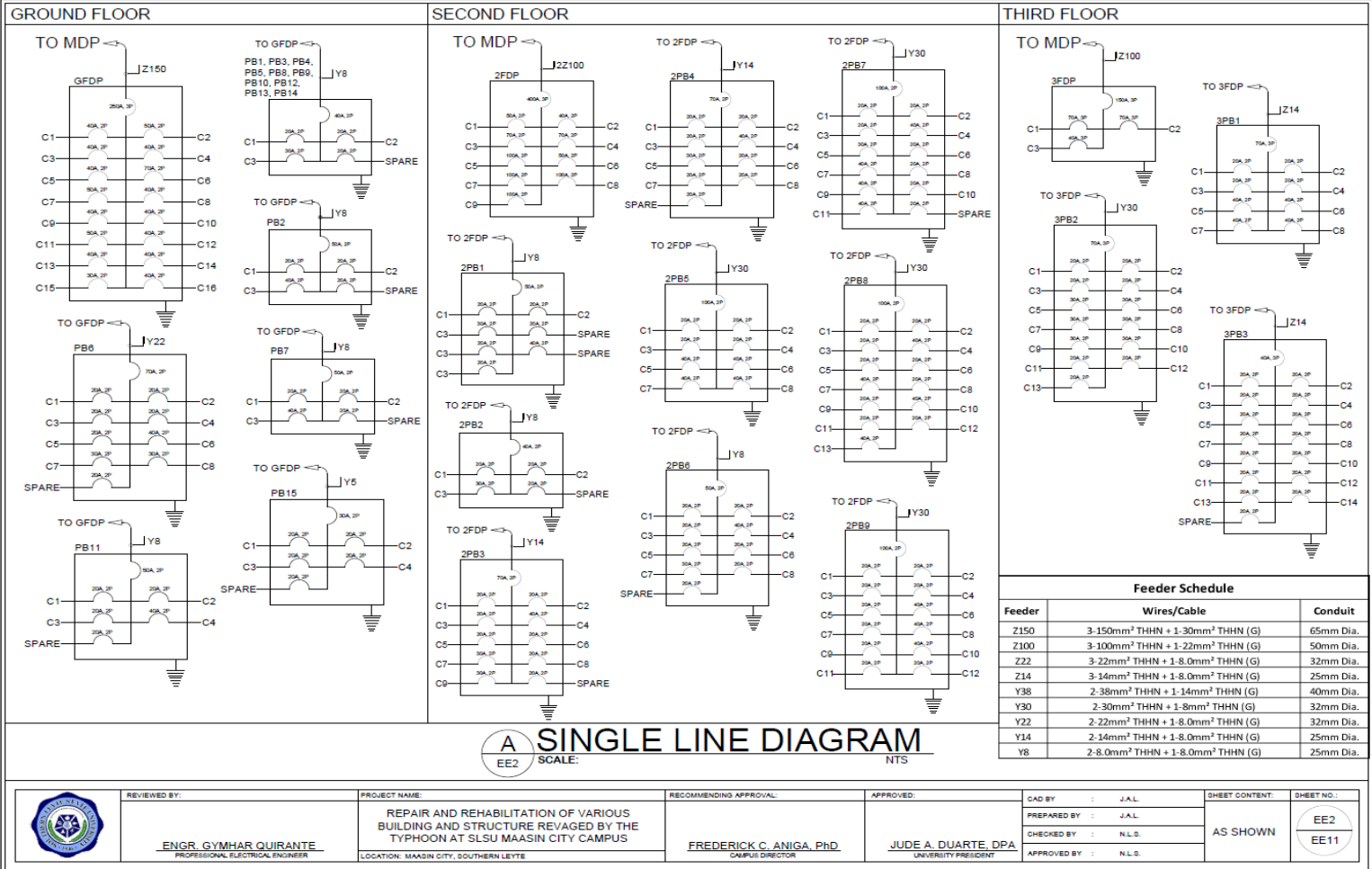


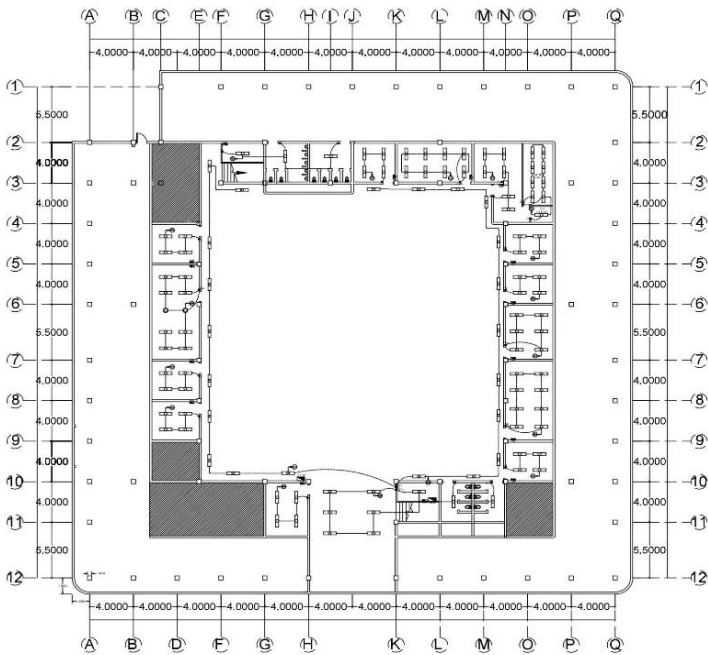
D SCHEDULE OF LOADS

E LOCATION

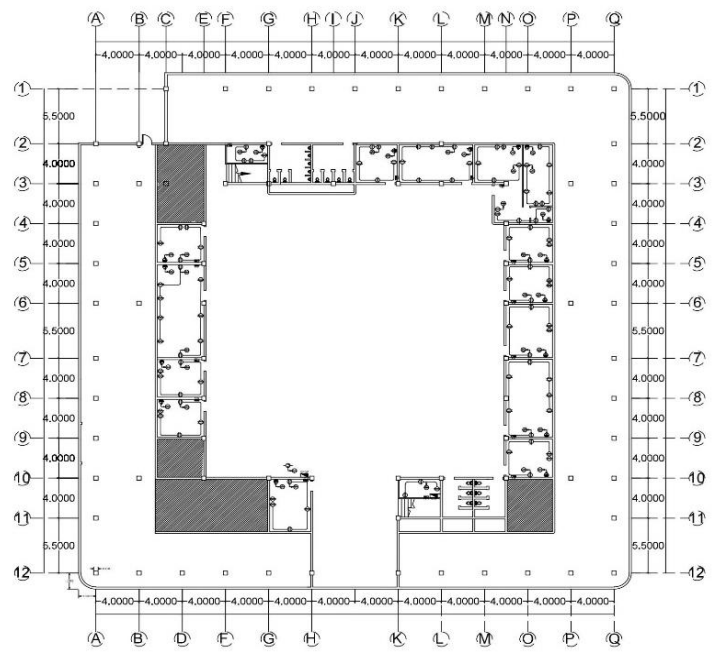
	REVISIONS: ENGR. GYM HAR QUIRANTE PROFESSIONAL ELECTRICAL ENGINEER	PROJECT NAME: REPAIR AND REHABILITATION OF VARIOUS BUILDING AND STRUCTURE REVAGED BY THE TYPHOON AT SLSU MAASIN CITY CAMPUS LOCATION: MAASIN CITY, SOUTHERN LEYTE	RECOMMENDING APPROVAL: FREDERICK C. ANIGA, PhD CAMPUS DIRECTOR	APPROVED: JUDE A. DUARTE, DPA UNIVERSITY PRESIDENT	CAD BY: J.A.L. PREPARED BY: J.A.L. CHECKED BY: N.L.S. APPROVED BY: N.L.S.	SHEET CONTENT: AS SHOWN	SHEET NO.: EE1 EE11
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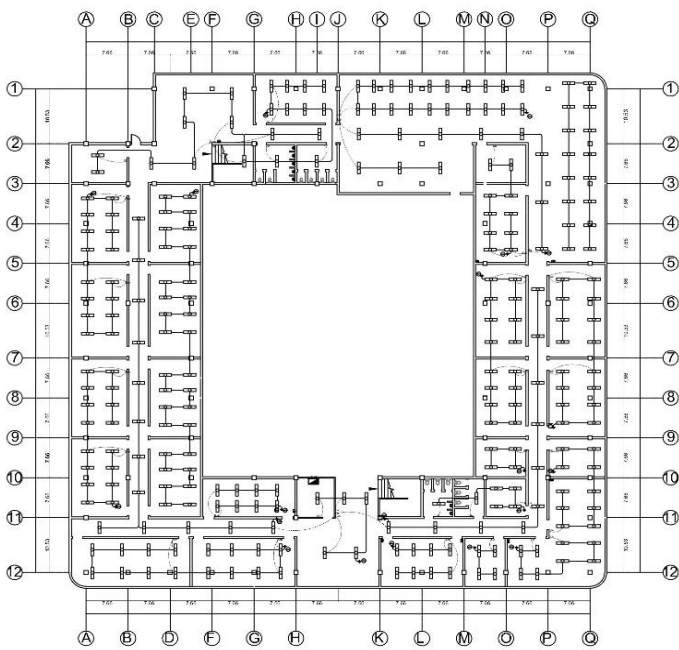
A GROUND FLOOR LIGHTING SYSTEM LAYOUT
 EE3 SCALE: NTS



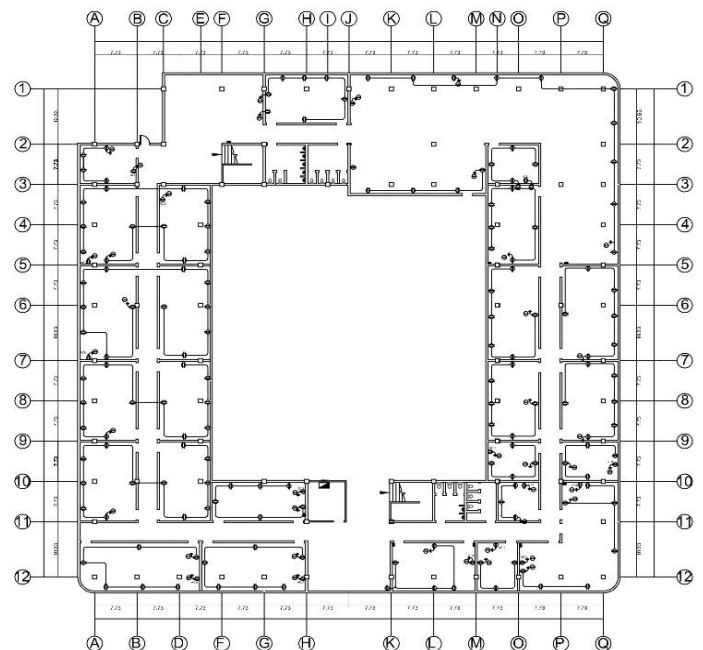
B GROUND FLOOR POWER SYSTEM LAYOUT
 EE3 SCALE: NTS

	REVIEWED BY:	PROJECT NAME:	RECOMMENDING APPROVAL:	APPROVED:	CAD BY : J.A.L.	SHEET CONTENT:	SHEET NO.:
	ENGR. GYM HAR QUIRANTE PROFESSIONAL ELECTRICAL ENGINEER	REPAIR AND REHABILITATION OF VARIOUS BUILDING AND STRUCTURE REVAGED BY THE TYPHOON AT SLSU MAASIN CITY CAMPUS LOCATION: MAASIN CITY, SOUTHERN LEYTE	FREDERICK C. ANIGA, PhD CAMPUS DIRECTOR	JUDE A. DUARTE, DPA UNIVERSITY PRESIDENT	PREPARED BY : J.A.L. CHECKED BY : N.L.S. APPROVED BY : N.L.S.	AS SHOWN	EE3 EE11





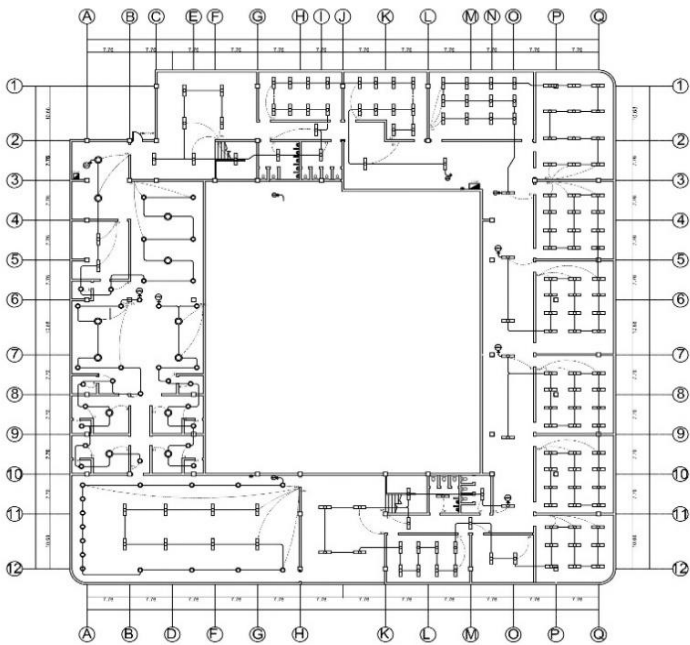
A SECOND FLOOR LIGHTING SYSTEM LAYOUT
 EES SCALE: NTS



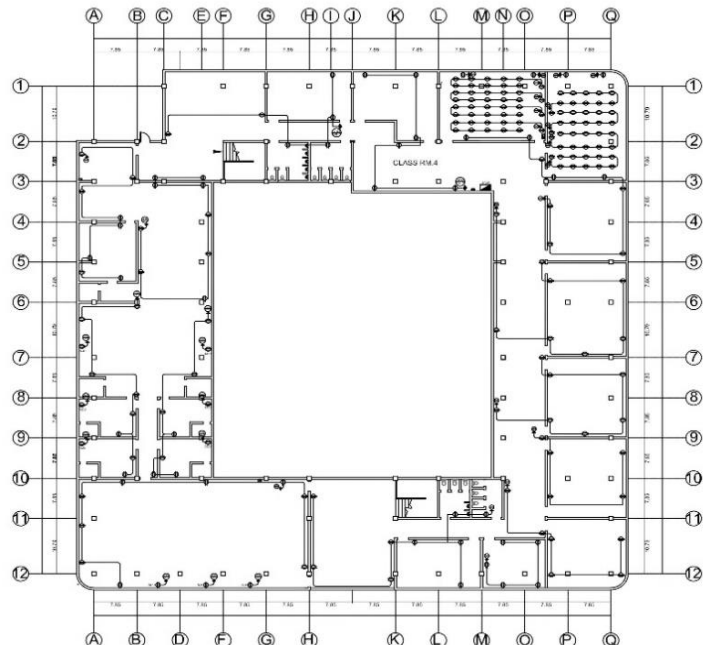
B SECOND FLOOR POWER SYSTEM LAYOUT
 EES SCALE: NTS

	REVIEWED BY:	PROJECT NAME:	RECOMMENDING APPROVAL:	APPROVED:	CAD BY : J.A.L.	SHEET CONTENT:	SHEET NO.:
	ENGR. CYMHAR QUIRANTE PROFESSIONAL ELECTRICAL ENGINEER	REPAIR AND REHABILITATION OF VARIOUS BUILDING AND STRUCTURE REVAGED BY THE TYPHOON AT SLSU MAASIN CITY CAMPUS	FREDERICK C. ANIGA, PhD CAMPUS DIRECTOR	JUDE A. DUARTE, DPA UNIVERSITY PRESIDENT	PREPARED BY : J.A.L.	AS SHOWN	EE5 EE11
		LOCATION: MAASIN CITY, SOUTHERN LEYTE			CHECKED BY : N.L.S.		
					APPROVED BY : N.L.S.		






A THIRD FLOOR LIGHTING SYSTEM LAYOUT
 EES SCALE: NTS



B THIRD FLOOR POWER SYSTEM LAYOUT
 EES SCALE: NTS



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Excellence | Service | Leadership and Good Governance | Innovation | Social Responsibility | Integrity | Professionalism | Spirituality

ELECTRICAL LOAD SCHEDULE (EELS) - MAIN FEEDER: 2F 40A1F 40A1F SCB											
FACILITY			LOAD DESCRIPTIONS			CALCULATIONS			REMARKS		
20	1	1	1	1	1	1	1	1	1	1	
<p>NOTE: STARTING CURRENT OF LARGEST MOTOR TAKEN INTO ACCOUNT: NOTE: THE FOLLOWING VALUES ARE BASED ON THE DATA PROVIDED BY THE CLIENT. THE ENGINEER HAS CONDUCTED VISUAL INSPECTION AND VERIFICATION OF THE DATA PROVIDED. THE CLIENT IS RESPONSIBLE FOR THE ACCURACY OF THE DATA PROVIDED.</p>											

A SCHEDULE OF LOADS
 EE6 SCALE: NTS

	REVIEWED BY:	PROJECT NAME:	RECOMMENDING APPROVAL:	APPROVED:	CAD BY:	SHEET CONTENT:	SHEET NO.:
	ENGR. GYM HAR QUIRANTE PROFESSIONAL ELECTRICAL ENGINEER	REPAIR AND REHABILITATION OF VARIOUS BUILDING AND STRUCTURE REVAGED BY THE TYPHOON AT SLS MAASIN CITY CAMPUS	FREDERICK C. ANIGA, PH.D CAMPUS DIRECTOR	JUDE A. DUARTE, DPA UNIVERSITY PRESIDENT	J.A.L.	AS SHOWN	EE6
		LOCATION: MAASIN CITY, SOUTHERN LEYTE			N.L.D.		EE11
					N.L.D.		





SCHEDULE OF LOADS

EE7 SCALE: _____ NTS

The table contains 10 identical copies of a technical load schedule. Each copy includes:

- TABLE SUMMARY:** A small table with columns for 'NO.', 'TYPE', 'LOAD DESCRIPTION', 'DEMAND', 'DURATION', and 'LOADING'. It lists various electrical loads like lighting, fans, and motors.
- MAIN CIRCUIT BREAKER (MCB) DATA:** A table with columns for 'NO.', 'TYPE', 'LOAD DESCRIPTION', 'DEMAND', 'DURATION', and 'LOADING'. It provides detailed data for each load.
- CALCULATIONS:** A series of mathematical formulas and values for determining total demand, diversity factor, and starting current.

$$\text{TOTAL D.C.M.A.} = \text{TOTAL C.M.A.} \times \text{DIVERSITY FACTOR}$$

$$\text{STARTING CURRENT} = \frac{\text{TOTAL D.C.M.A.}}{\text{POWER FACTOR}}$$
- NOTES:** A section at the bottom of each copy containing technical notes and safety warnings.

	REVIEWED BY: ENGR. GYMHAR QUIRANTE PROFESSIONAL ELECTRICAL ENGINEER	PROJECT NAME: REPAIR AND REHABILITATION OF VARIOUS BUILDING AND STRUCTURE REVAGED BY THE TYPHOON AT SLU MAASIN CITY CAMPUS	LOCATION: MAASIN CITY, SOUTHERN LEYTE	RECOMMENDING APPROVAL: FREDERICK C. ANIGA, PHD CAMPUS DIRECTOR	APPROVED: JUDE A. DUARTE, DPA UNIVERSITY PRESIDENT	CAD BY: J.A.L. PREPARED BY: J.A.L. CHECKED BY: N.L.D. APPROVED BY: N.L.D.	SHEET CONTENT: AS SHOWN SHEET NO.: EE7 EE11
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<p>DASHBOARD</p> <p>MAIN CTY AT 2P 00:00 4P 00:00 8P 00:00 12P 00:00</p> <p>LOAD DESCRIPTIONS</p> <table border="1"> <thead> <tr> <th>NO.</th> <th>DESCRIPTION</th> <th>PHASE</th> <th>AMPS</th> <th>VOLTS</th> <th>WATTS</th> <th>KVAHRS</th> <th>VAULT</th> <th>UNIT</th> <th>QTY</th> <th>UNIT PRICE</th> <th>TOTAL</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2000 WATT LIGHTING FIXTURES</td> <td>1.0</td> <td>0.00</td> <td>1.10</td> <td>2.00</td> <td>0.00</td> <td>0.00</td> <td>PCS</td> <td>100</td> <td>100.00</td> <td>10000.00</td> </tr> <tr> <td>2</td> <td>2000 WATT LIGHTING FIXTURES</td> <td>1.0</td> <td>0.00</td> <td>1.10</td> <td>2.00</td> <td>0.00</td> <td>0.00</td> <td>PCS</td> <td>100</td> <td>100.00</td> <td>10000.00</td> </tr> <tr> <td>3</td> <td>2000 WATT LIGHTING FIXTURES</td> <td>1.0</td> <td>0.00</td> <td>1.10</td> <td>2.00</td> <td>0.00</td> <td>0.00</td> <td>PCS</td> <td>100</td> <td>100.00</td> <td>10000.00</td> </tr> <tr> <td>4</td> <td>2000 WATT LIGHTING FIXTURES</td> <td>1.0</td> <td>0.00</td> <td>1.10</td> <td>2.00</td> <td>0.00</td> <td>0.00</td> <td>PCS</td> <td>100</td> <td>100.00</td> <td>10000.00</td> </tr> <tr> <td>5</td> <td>2000 WATT LIGHTING FIXTURES</td> <td>1.0</td> <td>0.00</td> <td>1.10</td> <td>2.00</td> <td>0.00</td> <td>0.00</td> <td>PCS</td> <td>100</td> <td>100.00</td> <td>10000.00</td> </tr> </tbody> </table> <p>NOTE: STARTING CURRENT OF LARGEST MOTOR TAKEN INTO ACCOUNT: <small>NOTE: THIS EXCEEDS MAXIMUM QUANTITY WHICH ARE INDICATED IN THE BIDDING DOCUMENTS. 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A SCHEDULE OF LOADS
 EE8 SCALE NTS

 ENGR. GYM HAR QUIRANTE PROFESSIONAL ELECTRICAL ENGINEER	PROJECT NAME: REPAIR AND REHABILITATION OF VARIOUS BUILDING AND STRUCTURE REVAGED BY THE TYPOON AT SLSU MAASIN CITY CAMPUS	RECOMMENDING APPROVAL: FREDERICK C. ANIGA, PhD CAMPUS DIRECTOR	APPROVED: JUDE A. DUARTE, DPA UNIVERSITY PRESIDENT	CAD BY: J.A.L. PREPARED BY: J.A.L. CHECKED BY: N.L.S. APPROVED BY: N.L.S.	SHEET CONTENT: AS SHOWN	SHEET NO.: EE8 EE11
	LOCATION: MAASIN CITY, SOUTHERN LEYTE					





Excellence | Service | Leadership and Good Governance | Innovation | Social Responsibility | Integrity | Professionalism | Spirituality

TABLE NO. (SEE P. 79)	FIELD (SEE P. 79)	FEED (SEE P. 79)	FEED (SEE P. 79)	FEED (SEE P. 79)	FEED (SEE P. 79)	FEED (SEE P. 79)	FEED (SEE P. 79)	FEED (SEE P. 79)	FEED (SEE P. 79)	FEED (SEE P. 79)	FEED (SEE P. 79)	FEED (SEE P. 79)	FEED (SEE P. 79)
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A SCHEDULE OF LOADS

EE0 SCALE: NTS

	REVIEWED BY:	PROJECT NAME:	RECOMMENDING APPROVAL:	APPROVED:	CAD BY:	SHEET CONTENT:	SHEET NO.:
	ENGR. GYMHAR QUIRANTE	REPAIR AND REHABILITATION OF VARIOUS BUILDING AND STRUCTURE REVAGED BY THE TYPHOON AT SLU MAASIN CITY CAMPUS	FREDERICK C. ANIGA, PhD CAMPUS DIRECTOR	JUDE A. DUARTE, DPA UNIVERSITY PRESIDENT	J.A.L.	AS SHOWN	EE11
	PROFESSIONAL ELECTRICAL ENGINEER	LOCATION: MAASIN CITY, SOUTHERN LEYTE			J.A.L.		





Excellence | Service | Leadership and Good Governance | Innovation | Social Responsibility | Integrity | Professionalism | Spirituality

DASHBOARD		PROJ: 2792		MAIN CR: 17		FLOOR: 01		ENCLOSURE: N4M4	
SCHEDULE		SCHEDULE		SCHEDULE		SCHEDULE		SCHEDULE	
SCHEDULE		SCHEDULE		SCHEDULE		SCHEDULE		SCHEDULE	
<p>NOTE: STARTING CURRENT OF LARGEST MOTOR TAKEN INTO ACCOUNT NOTE: THESE VALUES ARE QUANTITIES, WHICH ARE ARITHMETIC, TO UNDERSTAND AND FULLY KNOWLEDGE OF ELECTRICAL ENGINEERING IS REQUIRED.</p>									
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A SCHEDULE OF LOADS
 EE10 SCALE: NTS

REVIEWED BY: ENGR. GYM HAR QUIRANTE PROFESSIONAL ELECTRICAL ENGINEER	PROJECT NAME: REPAIR AND REHABILITATION OF VARIOUS BUILDING AND STRUCTURE REVAGED BY THE TYPHOON AT SLSU MAASIN CITY CAMPUS LOCATION: MAASIN CITY, SOUTHERN LEYTE	RECOMMENDING APPROVAL: FREDERICK C. ANIGA, PhD CAMPUS DIRECTOR	APPROVED: JUDE A. DUARTE, DPA UNIVERSITY PRESIDENT	CAD BY: J.A.L.	SHEET CONTENT: AS SHOWN	SHEET NO.: EE10 EE11
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ELECTRICAL DESIGN ANALYSIS

Project Title : **3-100kVA Transformer Bank**
 Location : **Maasin City, Southern Leyte**

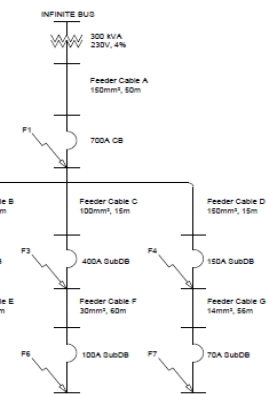
- Objectives:
1. To provide Design Load Analysis required.
 2. To identify the Fault level at the location where electrical devices are installed in order to select the correct circuit breaker current interrupting rating.
 3. To evaluate the voltage drop from the source.

- Reference:
1. PHILIPPINE ELECTRICAL CODE
 2. INTERNATIONAL ELECTROTECHNICAL COMMISSION

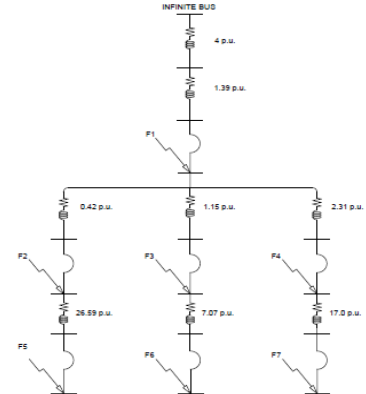
Data Collected:

Cable A - Power Source to MCB	669.4 Amps	Cable E - GFDP to Farthest Circuit (3PB9)	19.6 Amps
Total Line Current (I)	150 mm ²	Total Line Current (I)	8.0 mm ²
Cable Size	3 sets	Cable Size	1 set
Set of Wires	0.045 Ohms	Set of Wires	0.78 Ohms
Cable Impedance (Z) per 305	50 meters	Cable Impedance (Z) per 305	0.19 Ohms
Length of Cable in meters		Length of Cable in meters	65 meters
Cable B - MDP to GFDP	208.6 Amps	Cable F - 2FDP to Farthest Circuit (2PB7)	78.7 Amps
Total Line Current (I)	150 mm ²	Total Line Current (I)	30 mm ²
Cable Size	1 set	Cable Size	1 set
Set of Wires	0.045 Ohms	Set of Wires	0.19 Ohms
Cable Impedance (Z) per 305	15 meters	Cable Impedance (Z) per 305	0.49 Ohms
Length of Cable in meters		Length of Cable in meters	60 meters
Cable C - MDP to 2FDP	323.3 Amps	Cable G - 3FDP to Farthest Circuit (3PB1)	51.4 Amps
Total Line Current (I)	100 mm ²	Total Line Current (I)	14 mm ²
Cable Size	2 sets	Cable Size	1 set
Set of Wires	0.062 Ohms	Set of Wires	0.49 Ohms
Cable Impedance (Z) per 305	30 meters	Cable Impedance (Z) per 305	56 meters
Length of Cable in meters		Length of Cable in meters	
Cable D - MDP to 3FDP	139.1 Amps	Transformer kVA, 3 Phase	300 kVA
Total Line Current (I)	100 mm ²	Transformer Per Unit Impedance (%)	2.2 Ohms
Cable Size	1 set	Secondary Voltage (V)	230 Volts
Set of Wires	0.062 Ohms		
Cable Impedance (Z) per 305	60 meters		
Length of Cable in meters			

Network Model Diagram



Equivalent Impedance Diagram



A. Voltage Drop Calculation

- Utility Power Source to MCB**
 Solving for Voltage Drop
 $= 1.732 \times I \times Z \times L / (305 \times s)$
 $= 1.732 \times 669.4 \times 0.045 \times 50 / (305 \times 3)$
 $= 2.85 \text{ Volts}$
 % Voltage Drop
 $= 2.85 \times 100 / 230$
 $= 1.24 \%$
- Utility Power Source to GFDP**
 Solving for Voltage Drop
 $= 1.732 \times I \times Z \times L / (305 \times s)$
 $= 1.732 \times 208.6 \times 0.045 \times 15 / (305 \times 1)$
 $= 1.06 \text{ Volts}$
 % Voltage Drop
 $= 1.06 \times 100 / 230$
 $= 0.46 \%$
- Utility Power Source to 2FDP**
 Solving for Voltage Drop
 $= 1.732 \times I \times Z \times L / (305 \times s)$
 $= 1.732 \times 323.3 \times 0.062 \times 30 / (305 \times 2)$
 $= 1.71 \text{ Volts}$
 % Voltage Drop
 $= 1.71 \times 100 / 230$
 $= 0.74 \%$
- Utility Power Source to 3FDP**
 Solving for Voltage Drop
 $= 1.732 \times I \times Z \times L / (305 \times s)$
 $= 1.732 \times 139.1 \times 0.062 \times 60 / (305 \times 1)$
 $= 2.84 \text{ Volts}$
 % Voltage Drop
 $= 2.84 \times 100 / 230$
 $= 1.28 \%$
- Utility Power Source to PB9**
 Solving for Voltage Drop
 $= 1.732 \times I \times Z \times L / (305 \times s)$
 $= 1.732 \times 19.6 \times 0.78 \times 65 / (305 \times 1)$
 $= 4.71 \text{ Volts}$
 % Voltage Drop
 $= 4.71 \times 100 / 230$
 $= 2.07 \%$
- Utility Power Source to 2PB7**
 Solving for Voltage Drop
 $= 1.732 \times I \times Z \times L / (305 \times s)$
 $= 1.732 \times 78.7 \times 0.19 \times 60 / (305 \times 1)$
 $= 5.09 \text{ Volts}$
 % Voltage Drop
 $= 5.09 \times 100 / 230$
 $= 2.21 \%$
- Utility Power Source to 3PB1**
 Solving for Voltage Drop
 $= 1.732 \times I \times Z \times L / (305 \times s)$
 $= 1.732 \times 51.4 \times 0.49 \times 66 / (305 \times 1)$
 $= 8 \text{ Volts}$
 % Voltage Drop
 $= 8 \times 100 / 230$
 $= 3.48 \%$

B. Short Circuit Calculation

- $MVA_{max} = 10$
 $MVA_{min} = 0.3$
 $kV_{min} = 0.23$
 Transformer p.u. Z = 0.04
- Transformer Z change of Base (with 100MVA_{max})
 $Z_{base} \text{ p.u.} = \frac{Z_{old} (MVA_{max} / MVA_{old})^2}{100}$
 $= \frac{0.04 (10 / 0.3)^2}{100}$
 $= 1.33 \text{ p.u.}$
- Cable Impedance Z to p.u.
 $Z_{cable} = \frac{kV_{min}^2 / MVA_{max}}{Z_{old}}$
 $= \frac{0.23^2 \times 10}{0.00529}$
 $= 0.00529$
- Cable A p.u. Z
 $= [Z_a \times L / (305 \times s)] / Z_{cable}$
 $= [0.045 \times 50 / (305 \times 3)] / 0.00529$
 $= 0.465 \text{ p.u.}$
- Cable B p.u. Z
 $= [Z_b \times L / (305 \times s)] / Z_{cable}$
 $= [0.045 \times 15 / (305 \times 1)] / 0.00529$
 $= 0.42 \text{ p.u.}$
- Cable C p.u. Z
 $= [Z_c \times L / (305 \times s)] / Z_{cable}$
 $= [0.062 \times 30 / (305 \times 2)] / 0.00529$
 $= 0.576 \text{ p.u.}$

Short Circuit Current at F1.

$I_{sc} = MVA_{max} / [(\sqrt{1.732 \times V} \times I \times 22) / (1,000,000)]$
 $= 10 / [(1.732 \times 230 \times (1.33 + 0.465)) / (1,000,000)]$
 $= 13.98 \text{ KA}$

Main Circuit Breaker KAIC rating should not be less than 13.98 KA
 Circuit Breaker Interrupting Current rating of 58 KAIC is selected.

	REVIEWED BY:	PROJECT NAME:	RECOMMENDING APPROVAL:	APPROVED:	CAD BY : J.A.L.	SHEET CONTENT:	SHEET NO.:
	<u>ENGR. GYM HAR QUIRANTE</u> PROFESSIONAL ELECTRICAL ENGINEER	REPAIR AND REHABILITATION OF VARIOUS BUILDING AND STRUCTURE REVAGED BY THE TYPHOON AT SLSU MAASIN CITY CAMPUS LOCATION: MAASIN CITY, SOUTHERN LEYTE	<u>FREDERICK C. ANIGA, PhD.</u> CAMPUS DIRECTOR	<u>JUDE A. DUARTE, DPA</u> UNIVERSITY PRESIDENT	PREPARED BY : J.A.L.	AS SHOWN	EE11
					CHECKED BY : N.L.S.		
					APPROVED BY : N.L.S.		





PROJECT: Rehabilitation of SLSU-MCC Building Electrical System (Phase 1)
LOCATION: Brgy. Tunga-tunga, Maasin City, Southern Leyte

Project: SLSU - MCC
Subject: Electrical BOQ
GROUND FLOOR

ITEM	DESCRIPTION	TOTAL QTY	UNIT	UNIT RATE			
				UNIT PRICE	TOTAL	LABOR COST	TOTAL PRICE
NOTE: ALL PANEL BOARDS, WIRES, CIRCUIT BREAKERS SHOULD BE STANDARD/BRANDED MATERIALS							
1	150mm ² THHN WIRE				-		-
	Line 1	10	lm				
	Line 2	10	lm				
	Line 3	10	lm				
	Ground (Green)	10	lm				
2	Panel Board, Nema-1, 16 Branches, 2P MCCB, Main Breaker - 250AT, 3P MCCB (OFFER: PANEL BOARD ONLY)	1	unit				
3	Panel Board, Nema-1, 3 Branches, 3P MCCB, Main Breaker - 700AT, 3P MCCB (NOTE: PANEL BOARD ONLY)	1	unit				
4	3 Phase, ECB Nema-3R, 700 AT, 700 AF, Isolation Breaker	1	unit				
5	30 AT, 50 AF, 2P, MCCB	1	pcs				
6	40 AT, 50 AF, 2P, MCCB	11	pcs				
7	50 AT, 100 AF, 2P, MCCB	3	pcs				
8	70 AT, 100 AF, 2P, MCCB	1	pc				
9	250 AT, 100 AF, 3P, MCCB	2	pcs				
10	700 AT, 700 AF, 3P, MCCB	2	pcs				
11	65mm Dia. PVC Pipe	10	length				
12	65mm Dia. IMC Pipe with Coupling	30	length				
13	Lock Nut & Bushing(65mm Dia.)	60	pcs				
14	Terminal Lugs (150mm ² THHN Wire) (OFFER: LONG BARREL)	18	pcs				
15	Mechanical Lugs (150mm ² THHN Wire)	18	pcs				
16	Shrinkable Tube (150mm ² THHN Wire)	9	lm				
17	Electrical Tape	10	roll				
18	Cable Gutter (500mmx300mmx300mm)	2	length				
19	Service Entrance Cap 3 sets of (3-150mm ² THHN + 1-30mm ² THHN (G))	3	pc				
20	C - Clamp for 65mm Dia. IMC Pipe	30	pcs				
21	Tox with Screw	50	set				
GROUND FLOOR TOTAL COST							

MATERIALS COST	
FREIGHT	
LABOR COST	
OCM	
CONTRACTORS PROFIT	
VAT 5%	
GRAND TOTAL	



Project: SLSU - MCC
Subject: Electrical BOQ
2ND FLOOR

ITEM	DESCRIPTION	TOTAL QTY.	UNIT	UNIT RATE			
				UNIT PRICE	TOTAL PRICE	LABOR PRICE	TOTAL
NOTE: ALL PANEL BOARDS, WIRES, CIRCUIT BREAKERS SHOULD BE STANDARD/BRANDED MATERIALS							
1	30.0mm ² THHN WIRE						
	Line 1	90	lm				
	Line 2	90	lm				
	Ground (Green)	90	lm				
2	100mm ² THHN WIRE						
	Line 1	62	lm				
	Line 2	62	lm				
	Line 3	62	lm				
	Ground (Green)	62	lm				
3	Square Box	10	pcs				
4	Panel Board, Nema-1, 14 Branches, 2P MCB, Main Breaker - 100AT, 2P MCCB (NOTE: PANEL BOARD ONLY)	1	pc				
5	Panel Board, Nema-1, 9 Branches, 2P MCCB, Main Breaker -400AT, 3P MCCB (NOTE: PANEL BOARD)	1	pc				
6	20 AT, 50 AF, 2P, MCB	9	pcs				
7	40 AT, 50 AF, 2P, MCB	5	pcs				
8	40 AT, 50 AF, 2P, MCCB	2	pcs				
9	50 AT, 100 AF, 2P, MCCB	2	pcs				
10	70 AT, 100 AF, 2P, MCCB	2	pc				
11	100 AT, 100 AF, 2P, MCCB	5	pc				
12	400 AT, 400 AF, 3P, MCCB	2	pcs				
13	32mm Dia. PVC Pipe	32	length				
14	32mm Dia. IMC Pipe with Coupling	5	length				
15	50mm Dia. IMC Pipe with Coupling	7	length				
16	Straight Connector	50	pcs				
17	Lock Nut & Bushing(32mm Dia.)	10	pcs				
18	Lock Nut & Bushing(50mm Dia.)	10	pcs				
19	Terminal Lugs (100mm ² THHN Wire) (OFFER: 100-12)	12	pcs				
20	Terminal Lugs (30.0mm ² THHN Wire) (OFFER: 38-8)	26	pcs				
21	Mechanical Lugs (100mm ² THHN Wire)	12	pcs				
22	Mechanical Lugs (30.0mm ² THHN Wire)	26	pcs				
23	Shrinkable Tube (100mm ² THHN Wire)	6	lm				
24	Shrinkable Tube (30.0mm ² THHN Wire)	13	lm				
25	Electrical Tape	15	roll				
26	Cable Gutter (500mmx300mmx300mm)	4	length				
27	C - Clamp for 32mm Dia. IMC Pipe	10	pcs				
28	C - Clamp for 50mm Dia. IMC Pipe	10	pcs				
29	Tox with Screw	100	set				
SECOND FLOOR TOTAL COST							

MATERIALS COST	
FREIGHT	
LABOR COST	
OCM	
CONTRACTORS PROFIT	
VAT 5%	
GRAND TOTAL	



Project: SLSU - MCC
 Subject: Electrical BOQ
 3RD FLOOR

ITEM	DESCRIPTION	TOTAL QTY.	UNIT	UNIT RATE			
				UNIT PRICE	TOTAL	LABOR PRICE	TOTAL
NOTE: ALL PANEL BOARDS, WIRES, AND CIRCUIT BREAKERS SHOULD BE STANDARD/BRANDED MATERIALS							
1	Panel Board, Nema-1, 15 Branches, 2P MCCB, Main Breaker - 40AT, 3P MCCB (NOTE: PANEL BOARD ONLY)	1	unit				
2	Panel Board, Nema-1, 8 Branches, 2P MCCB, Main Breaker 70AT, 3P MCCB (NOTE: PANEL BOARD ONLY)	1	unit				
3	Panel Board, Nema-1, 13 Branches, 2P MCCB, Main Breaker - 70AT, 3P MCCB (NOTE: PANEL BOARD ONLY)	1	unit				
4	Panel Board, Nema-1, 3 Branches, 3P MCCB, Main Breaker - 150AT, 3P MCCB (NOTE: PANEL BOARD ONLY)	1	unit				
5	22.0mm ² THHN WIRE						
	Line 1	74	lm				
	Line 2	74	lm				
	Line 3	74	lm				
	Ground (Green)	74	lm				
6	14.0mm ² THHN WIRE						
	Line 1	67	lm				
	Line 2	67	lm				
	Line 3	67	lm				
	Ground (Green)	67	lm				
7	25mm Dia. PVC Pipe	23	length				
8	32mm Dia. PVC Pipe	24	length				
9	20 AT, 50 AF, 2P, MCCB	25	pcs				
10	30 AT, 50 AF, 2P, MCCB	6	pcs				
11	40 AT, 50 AF, 2P, MCCB	4	pcs				
12	40 AT, 50 AF, 3P, MCCB	2	pcs				
13	70 AT, 100 AF, 3P, MCCB	4	pcs				
14	150 AT, 100 AF, 3P, MCCB	2	pcs				
THIRD FLOOR TOTAL COST							

MATERIALS COST	
FREIGHT	
LABOR COST	
OCM	
CONTRACTORS PROFIT	
VAT5%	
GRANDTOTAL	P0.00



To

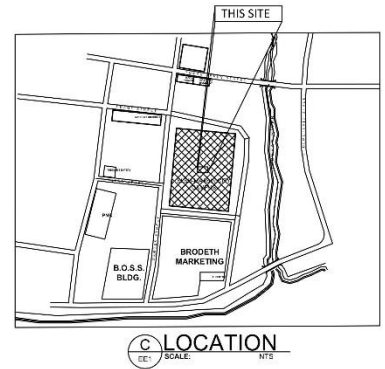
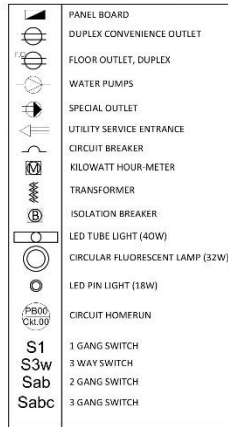
Plans/Drawings

- correct Project title
- with signatures
- New SLSU logo
- Single Line Diagram (drawing)

Bill of Materials

- with notations to item line wires.

1. ALL WORKS HEREIN SHALL CONFORM WITH ALL THE APPLICABLE PROVISIONS OF THE LATEST EDITION OF THE PHILIPPINE ELECTRICAL CODE (P.E.C.) THE RULES AND REGULATIONS OF THE LOCAL ENFORCING AUTHORITY AND APPLICABLE POWER COMPANY REQUIREMENTS.
2. THE POWER SUPPLY SHALL BE 3 PHASE, 230 VOLTS, 3 WIRES + GND, 60 HERTS.
3. THE ELECTRICAL WIRING INSTALLATIONS SHALL BE CONCEALED IN INTERMEDIATE. METALLIC CONDUIT OR AS SPECIFIED, THE MINIMUM SIZE OF IMC SHALL BE 15mm. UNLESS OTHERWISE SPECIFIED.
4. THE WIRES TO BE USED ARE THERMOPLASTIC INSULATED. THWN, THHN, PHELP DODGE OR EQUIVALENT. THE MINIMUM SIZE SHALL BE 3.5 mm
5. ALL MATERIALS AND DEVICES USED ARE NEW AND APPROVED QUALITY FOR THE TYPE OF LOCATION AND PURPOSE INTENDED
6. ALL ELECTRICAL WORKS SHALL BE SUPERVISED BY DULY LICENSED ELECTRICAL ENGINEER.



A GENERAL NOTES

B LEGEND

PANEL SIMULATOR		PANEL: MIP		MAIN CIRCUIT: 3P 700A1 700AF MCCB		PORT PHASE: PHASE DELTA		ENCLOSURE: NEMA-1	
MAIN		PANEL: 10P		VOLTAGE: 230VAC-DELTA		PHASE WIRE: 3PHASE WIRE DELTA 230VAC 60HZ SYSTEM		MIN. KVA FOR MAIN BREAKER: 42	
3P 700 1AT		SOURCE: MAINS		PHASE WIRE: 3PHASE WIRE DELTA 230VAC 60HZ SYSTEM		PANEL DESIGN SERVICE SIZE: 40		MOUNTING: SURFACE	
CT	CREATING	LOAD DESCRIPTIONS	CIRCUIT PARTICULARS (AUTOMATIC)	DEMAND MULTIPLIERS	SET POINTS (WIRE IN CONDUIT)	FEEDER LOADS			
1	1 250 400	UTP (GROUND FLOOR DISTRIBUTION PANEL)	1E 43.5 100.00 100.00	1.00	1-15MM ² TW & 1-5MM ² FG IN 65MM Ø ESC	2295			
2	3 400 400	1E2P (2ND FLOOR DISTRIBUTION PANEL)	1E2P 13210	3 ABC 208.5 27136 22265 22295	3BETS 3-100MM ² TW & 1-50MM ² FG IN 65MM Ø BSG	36152			
3	3 150 325	1E2P (3RD FLOOR DISTRIBUTION PANEL)	66692	3 AFC 139.1 15998 17904 17904	3-100MM ² TW & 1-50MM ² FG IN 65MM Ø ESC				
TOTAL			28392	NO BALANCE CHECK	8582 7643 7643	TOTAL PHASE TO GROUND LOAD (90VAC)			
CALCULATIONS:			ASSUME DIVERSITY FACTOR (DF) IS APPROX 1.20	AVERAGE VOLTAGE	7945B	100% TYP. FOR MAINS SYSTEM			
TOTAL CVA			38592 - 0 = 38592	NO BALANCE	7.6%	USE: MAIN CKT BRK: 3P 700A1 700AF MCCB			
TOTAL DVA			378240 - 0 = 378240	AVERAGE VOLTAGE	7945B	MAIN FEEDER: 3BETS 3-100MM² TW & 1-50MM² FG IN 65MM Ø BSG			
L. to BRK			13985.502 (3P 230V 1.60) 13985.502	NO BALANCE	669.4 2382	CONSULT ME: EE1			
L. to FEEDER			13985.502 (3P 230V 1.60) 13985.502	NO BALANCE	648.1 2382	CONSULT ME: EE1			
KVA REQ'D			13985.502 (3P 230V 1.60) 13985.502	NO BALANCE	258.2 2323	Main Feeder Ampacity & Load: 770A @ 100%			
						Wire Length of Main Feeder: 19 METERS			
						Estimated Voltage Drop and % Regulation: 2.99V @ 1.75%			

D SCHEDULE OF LOADS

USE: 3 - 100KVA, 1Φ, 13.8KV, 230V, 60Hz, TRANSFORMER DELTA CONNECTED



REVIEWED BY:
 ENGR. GYMAR QUIRANTE
 PROFESSIONAL ELECTRICAL ENGINEER

PROJECT NAME: **REHABILITATION OF SLSU-MCC BUILDING ELECTRICAL SYSTEM**
 LOCATION: **MAASIN CITY, SOUTHERN LEYTE**

RECOMMENDING APPROVAL:
 FREDERIC C. ANIGA, PhD
 CAMPUS DIRECTOR

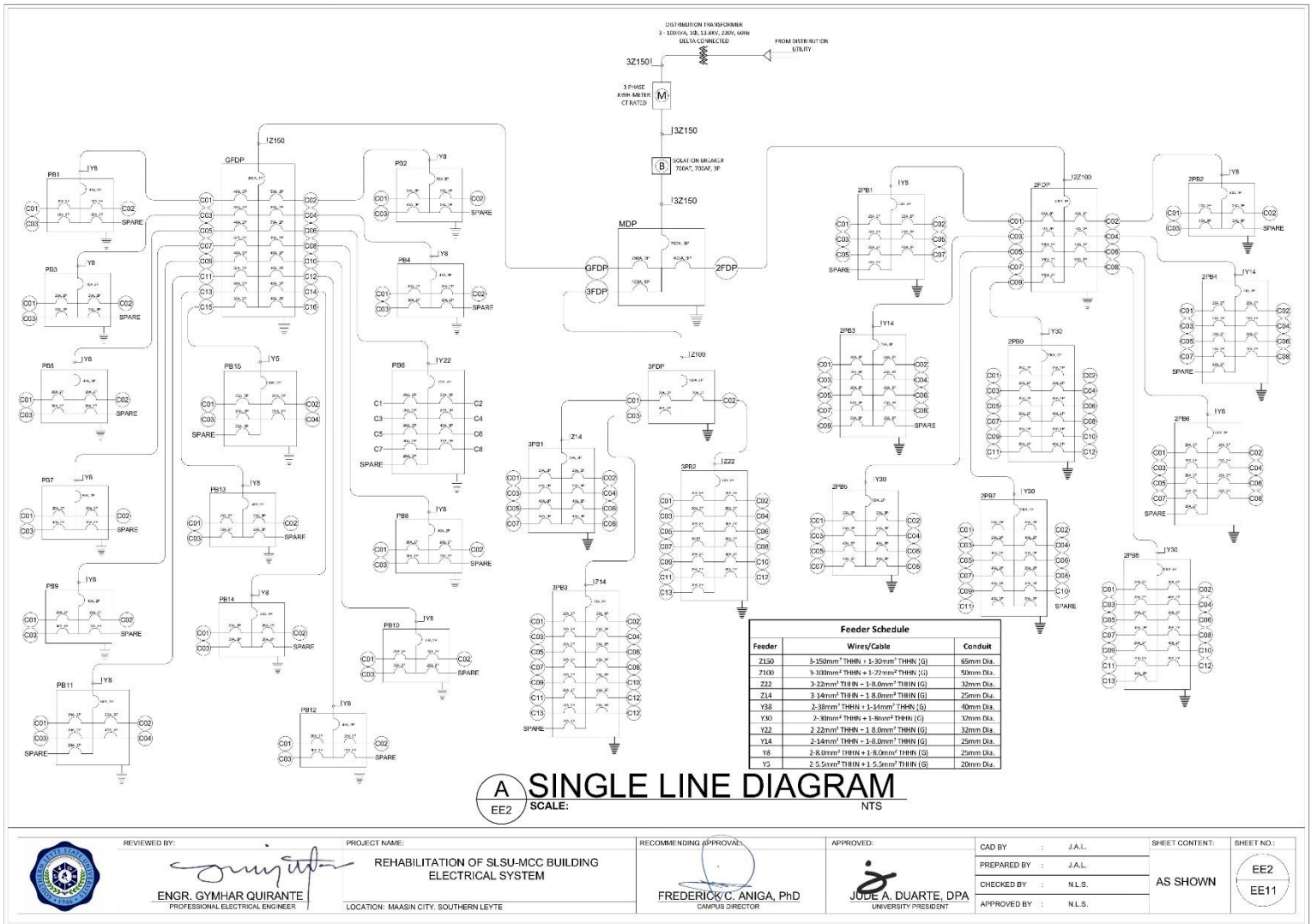
APPROVED:
 JODE A. DUARTE, DPA
 UNIVERSITY PRESIDENT

CAD BY: J.A.L.
 PREPARED BY: J.A.L.
 CHECKED BY: N.L.S.
 APPROVED BY: N.L.S.

SHEET CONTENT: **AS SHOWN**

SHEET NO.: **EE1**





REVIEWED BY: *[Signature]*
ENGR. GYM HAR QUIRANTE
 PROFESSIONAL ELECTRICAL ENGINEER

PROJECT NAME: REHABILITATION OF SLSU-MCC BUILDING ELECTRICAL SYSTEM
 LOCATION: MAASIN CITY, SOUTHERN LEYTE

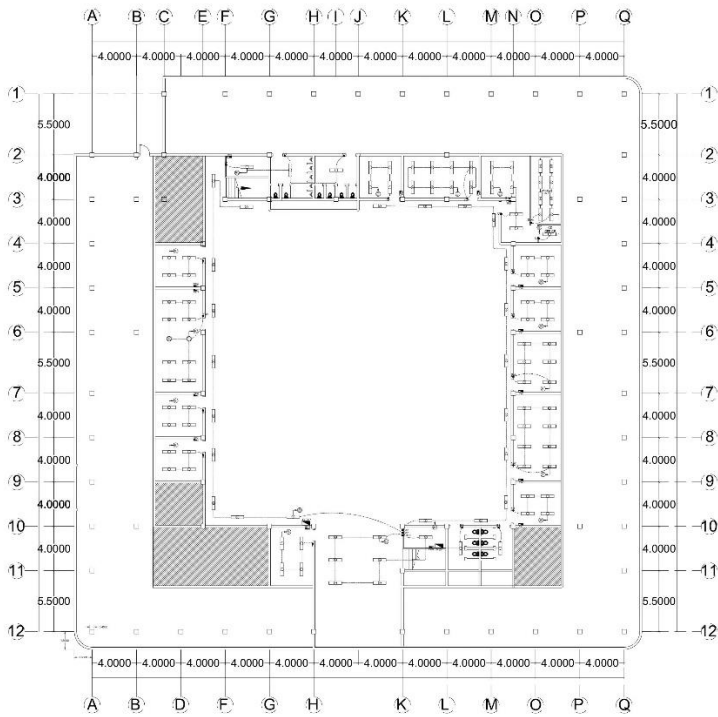
RECOMMENDING APPROVAL: *[Signature]*
FREDERICK C. ANIGA, PhD
 CAMPUS DIRECTOR

APPROVED: *[Signature]*
JUDE A. DUARTE, DPA
 UNIVERSITY PRESIDENT

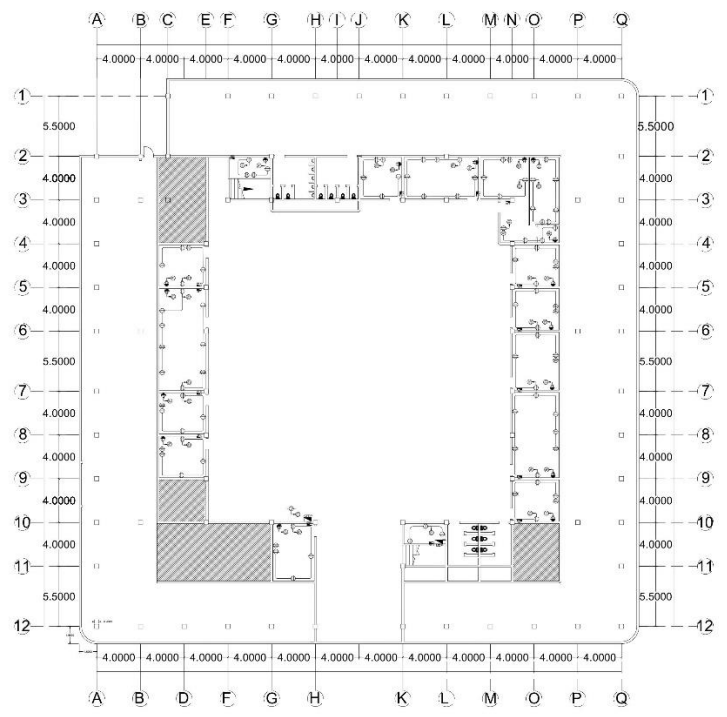
CAD BY: J.A.L.
 PREPARED BY: J.A.L.
 CHECKED BY: N.L.S.
 APPROVED BY: N.L.S.

SHEET CONTENT: AS SHOWN
 SHEET NO.: EE2
 EE11





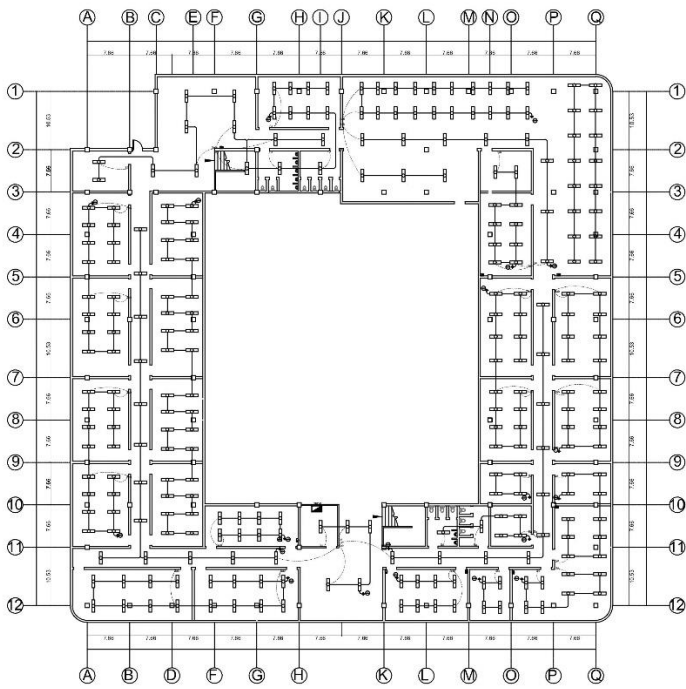
A GROUND FLOOR LIGHTING SYSTEM LAYOUT
 EE3 SCALE: NTS



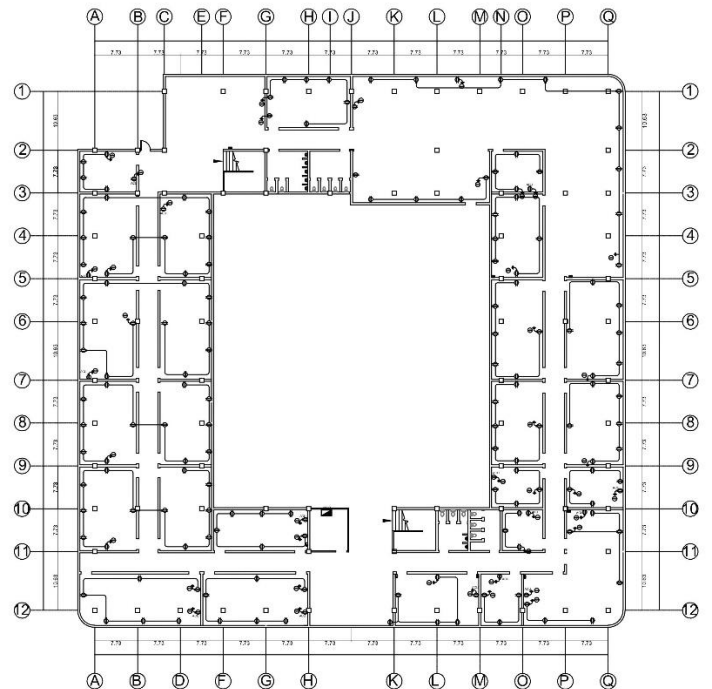
B GROUND FLOOR POWER SYSTEM LAYOUT
 EE3 SCALE: NTS

	REVIEWED BY:	PROJECT NAME:	RECOMMENDING APPROVAL:	APPROVED:	CAD BY :	SHEET CONTENT:	SHEET NO.:				
		REHABILITATION OF SLSU-MCC BUILDING ELECTRICAL SYSTEM			PREPARED BY :	AS SHOWN	EE3 EE11				
					ENGR. GYMHAR QUIRANTE PROFESSIONAL ELECTRICAL ENGINEER			LOCATION: MAASIN CITY, SOUTHERN LEYTE	FREDERICK C. ANIGA, PhD CAMPUS DIRECTOR	JUDE A. DUARTE, DPA UNIVERSITY PRESIDENT	CAD BY :
										PREPARED BY :	
					CHECKED BY :						
					APPROVED BY :						





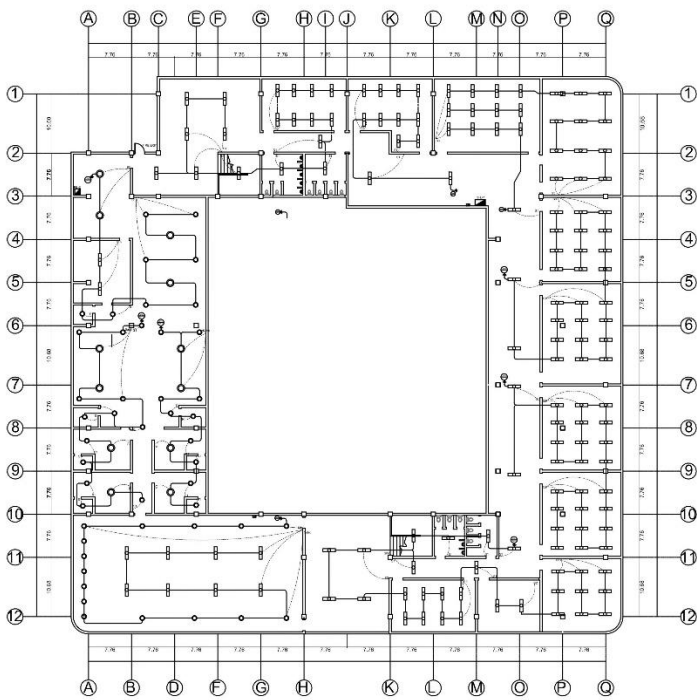
A SECOND FLOOR LIGHTING SYSTEM LAYOUT
 EES SCALE: NTS



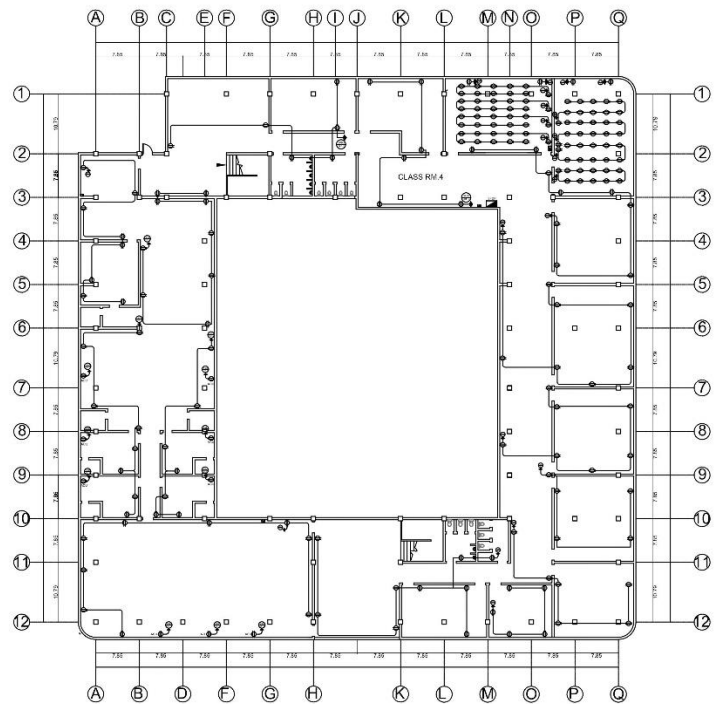
B SECOND FLOOR POWER SYSTEM LAYOUT
 EES SCALE: NTS

	REVIEWED BY:	PROJECT NAME:	RECOMMENDING APPROVAL:	APPROVED:	CAD BY : J.A.L.	SHEET CONTENT:	SHEET NO.:
	 ENGR. GYMHAR QUIRANTE PROFESSIONAL ELECTRICAL ENGINEER	REHABILITATION OF SLSU-MCC BUILDING ELECTRICAL SYSTEM LOCATION: MAASIN CITY, SOUTHERN LEYTE	 FREDERICK C. ANIGA, PhD CAMPUS DIRECTOR	 JUDE A. DUARTE, DPA UNIVERSITY PRESIDENT	PREPARED BY : J.A.L. CHECKED BY : N.L.S. APPROVED BY : N.L.S.	AS SHOWN	EE4 EE11


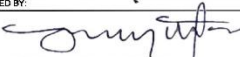






A THIRD FLOOR LIGHTING SYSTEM LAYOUT
 EES SCALE: NTS



B THIRD FLOOR POWER SYSTEM LAYOUT
 EES SCALE: NTS

 REVIEWED BY:  ENGR. GYMHAR QUIRANTE PROFESSIONAL ELECTRICAL ENGINEER	PROJECT NAME: REHABILITATION OF SLSU-MCC BUILDING ELECTRICAL SYSTEM LOCATION: MAASIN CITY, SOUTHERN LEYTE	RECOMMENDING APPROVAL:  FREDERICK C. ANIGA, PhD CAMPUS DIRECTOR	APPROVED:  JUDE A. DUARTE, DPA UNIVERSITY PRESIDENT	CAD BY : J.A.L. PREPARED BY : J.A.L. CHECKED BY : N.L.S. APPROVED BY : N.L.S.	SHEET CONTENT: AS SHOWN	SHEET NO.: EES EE11
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Excellence | Service | Leadership and Good Governance | Innovation | Social Responsibility | Integrity | Professionalism | Spirituality

EQUIPMENT		PANEL DESCRIPTION		LOAD DESCRIPTION		PANEL LOAD		TOTAL LOAD		TOTAL LOAD		TOTAL LOAD		TOTAL LOAD		TOTAL LOAD		TOTAL LOAD		TOTAL LOAD	
NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION
1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...

EQUIPMENT		PANEL DESCRIPTION		LOAD DESCRIPTION		PANEL LOAD		TOTAL LOAD		TOTAL LOAD		TOTAL LOAD		TOTAL LOAD		TOTAL LOAD		TOTAL LOAD		TOTAL LOAD	
NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION
1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...	1	...

A SCHEDULE OF LOADS

SCALE: E66

	REVIEWED BY: ENGR. GYMAR QUIRANTE PROFESSIONAL ELECTRICAL ENGINEER	PROJECT NAME: REHABILITATION OF SLSU-MCC BUILDING ELECTRICAL SYSTEM LOCATION: MAASIN CITY, SOUTHERN LEYTE	RECOMMENDING APPROVAL: FREDERICK C. ANIGA, PhD CHIEF ENGINEER	APPROVED BY: JUDE A. DUARTE, DPA UNIVERSITY PRESIDENT	CAD BY: J.A.L. PREPARED BY: J.A.L. CHECKED BY: N.L.S. APPROVED BY: N.L.S.	SHEET CONTENT: AS SHOWN SHEET NO.: E66 E611
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ELECTRICAL LOAD SCHEDULE		TOTAL LOADS		TOTAL LOADS		TOTAL LOADS	
NO.	DESCRIPTION	AMOUNT	UNIT	AMOUNT	UNIT	AMOUNT	UNIT
1	General Lighting	1000	VA	1000	VA	1000	VA
2	Refrigeration	2000	VA	2000	VA	2000	VA
3	Power Factor Correction	1000	VA	1000	VA	1000	VA
4	Power Factor Correction	1000	VA	1000	VA	1000	VA
5	Power Factor Correction	1000	VA	1000	VA	1000	VA
6	Power Factor Correction	1000	VA	1000	VA	1000	VA
7	Power Factor Correction	1000	VA	1000	VA	1000	VA
8	Power Factor Correction	1000	VA	1000	VA	1000	VA
9	Power Factor Correction	1000	VA	1000	VA	1000	VA
10	Power Factor Correction	1000	VA	1000	VA	1000	VA
11	Power Factor Correction	1000	VA	1000	VA	1000	VA
12	Power Factor Correction	1000	VA	1000	VA	1000	VA
13	Power Factor Correction	1000	VA	1000	VA	1000	VA
14	Power Factor Correction	1000	VA	1000	VA	1000	VA
15	Power Factor Correction	1000	VA	1000	VA	1000	VA
16	Power Factor Correction	1000	VA	1000	VA	1000	VA
17	Power Factor Correction	1000	VA	1000	VA	1000	VA
18	Power Factor Correction	1000	VA	1000	VA	1000	VA
19	Power Factor Correction	1000	VA	1000	VA	1000	VA
20	Power Factor Correction	1000	VA	1000	VA	1000	VA
21	Power Factor Correction	1000	VA	1000	VA	1000	VA
22	Power Factor Correction	1000	VA	1000	VA	1000	VA
23	Power Factor Correction	1000	VA	1000	VA	1000	VA
24	Power Factor Correction	1000	VA	1000	VA	1000	VA
25	Power Factor Correction	1000	VA	1000	VA	1000	VA
26	Power Factor Correction	1000	VA	1000	VA	1000	VA
27	Power Factor Correction	1000	VA	1000	VA	1000	VA
28	Power Factor Correction	1000	VA	1000	VA	1000	VA
29	Power Factor Correction	1000	VA	1000	VA	1000	VA
30	Power Factor Correction	1000	VA	1000	VA	1000	VA

ELECTRICAL LOAD SCHEDULE		TOTAL LOADS		TOTAL LOADS		TOTAL LOADS	
NO.	DESCRIPTION	AMOUNT	UNIT	AMOUNT	UNIT	AMOUNT	UNIT
1	General Lighting	1000	VA	1000	VA	1000	VA
2	Refrigeration	2000	VA	2000	VA	2000	VA
3	Power Factor Correction	1000	VA	1000	VA	1000	VA
4	Power Factor Correction	1000	VA	1000	VA	1000	VA
5	Power Factor Correction	1000	VA	1000	VA	1000	VA
6	Power Factor Correction	1000	VA	1000	VA	1000	VA
7	Power Factor Correction	1000	VA	1000	VA	1000	VA
8	Power Factor Correction	1000	VA	1000	VA	1000	VA
9	Power Factor Correction	1000	VA	1000	VA	1000	VA
10	Power Factor Correction	1000	VA	1000	VA	1000	VA
11	Power Factor Correction	1000	VA	1000	VA	1000	VA
12	Power Factor Correction	1000	VA	1000	VA	1000	VA
13	Power Factor Correction	1000	VA	1000	VA	1000	VA
14	Power Factor Correction	1000	VA	1000	VA	1000	VA
15	Power Factor Correction	1000	VA	1000	VA	1000	VA
16	Power Factor Correction	1000	VA	1000	VA	1000	VA
17	Power Factor Correction	1000	VA	1000	VA	1000	VA
18	Power Factor Correction	1000	VA	1000	VA	1000	VA
19	Power Factor Correction	1000	VA	1000	VA	1000	VA
20	Power Factor Correction	1000	VA	1000	VA	1000	VA
21	Power Factor Correction	1000	VA	1000	VA	1000	VA
22	Power Factor Correction	1000	VA	1000	VA	1000	VA
23	Power Factor Correction	1000	VA	1000	VA	1000	VA
24	Power Factor Correction	1000	VA	1000	VA	1000	VA
25	Power Factor Correction	1000	VA	1000	VA	1000	VA
26	Power Factor Correction	1000	VA	1000	VA	1000	VA
27	Power Factor Correction	1000	VA	1000	VA	1000	VA
28	Power Factor Correction	1000	VA	1000	VA	1000	VA
29	Power Factor Correction	1000	VA	1000	VA	1000	VA
30	Power Factor Correction	1000	VA	1000	VA	1000	VA

A SCHEDULE OF LOADS
 SCALE: EET
 NTS

	REVIEWED BY: ENGR. GYMHAR QUIRANTE PROFESSIONAL ELECTRICAL ENGINEER	PROJECT NAME: REHABILITATION OF SLSU-MCC BUILDING ELECTRICAL SYSTEM LOCATION: MAASIN CITY, SOUTHERN LEYTE	RECOMMENDING APPROVAL: FREDERICK C. ANIGA, PhD CAMPUS DIRECTOR	APPROVED: JUDE A. DUARTE, DPA UNIVERSITY PRESIDENT	CAD BY: J.A.L. PREPARED BY: J.A.L. CHECKED BY: N.L.S. APPROVED BY: N.L.S.	SHEET CONTENT: AS SHOWN	SHEET NO.: E07 (of E01-E11)
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PANEL-BILLBOARD		PANEL-BILLBOARD		PANEL-BILLBOARD		PANEL-BILLBOARD	
FLOOR	LOADS	FLOOR	LOADS	FLOOR	LOADS	FLOOR	LOADS
1	...	1	...	1	...	1	...
2	...	2	...	2	...	2	...
3	...	3	...	3	...	3	...
4	...	4	...	4	...	4	...

SCHEDULE OF LOADS
 SCALE: $\frac{1}{8}$
 NTS

	REVIEWED BY: ENGR. GYMAR QUIRANTE PROFESSIONAL ELECTRICAL ENGINEER	PROJECT NAME: REHABILITATION OF SLSU-MCC BUILDING ELECTRICAL SYSTEM	RECOMMENDING APPROVAL: FREDERIC C. ANIGA, PhD CAMPUS DIRECTOR	APPROVED: JUDE A. DUARTE, DPA UNIVERSITY PRESIDENT	CAD BY : J.A.L. PREPARED BY : J.A.L. CHECKED BY : N.L.S. APPROVED BY : N.L.S.	SHEET CONTENT: AS SHOWN	SHEET NO.: EE18
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Excellence | Service | Leadership and Good Governance | Innovation | Social Responsibility | Integrity | Professionalism | Spirituality

LOAD TYPE	NO.	FLOOR	TYPE	AREA (SQ. M)	FLOOR FINISH	CEILING FINISH	WALL FINISH	DOOR	WINDOW	FIXTURES	LOAD VALUE
1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9
10	10	10	10	10	10	10	10	10	10	10	10
11	11	11	11	11	11	11	11	11	11	11	11
12	12	12	12	12	12	12	12	12	12	12	12

LOAD TYPE	NO.	FLOOR	TYPE	AREA (SQ. M)	FLOOR FINISH	CEILING FINISH	WALL FINISH	DOOR	WINDOW	FIXTURES	LOAD VALUE
1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9
10	10	10	10	10	10	10	10	10	10	10	10
11	11	11	11	11	11	11	11	11	11	11	11
12	12	12	12	12	12	12	12	12	12	12	12

LOAD TYPE	NO.	FLOOR	TYPE	AREA (SQ. M)	FLOOR FINISH	CEILING FINISH	WALL FINISH	DOOR	WINDOW	FIXTURES	LOAD VALUE
1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9
10	10	10	10	10	10	10	10	10	10	10	10
11	11	11	11	11	11	11	11	11	11	11	11
12	12	12	12	12	12	12	12	12	12	12	12

LOAD TYPE	NO.	FLOOR	TYPE	AREA (SQ. M)	FLOOR FINISH	CEILING FINISH	WALL FINISH	DOOR	WINDOW	FIXTURES	LOAD VALUE
1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9
10	10	10	10	10	10	10	10	10	10	10	10
11	11	11	11	11	11	11	11	11	11	11	11
12	12	12	12	12	12	12	12	12	12	12	12

LOAD TYPE	NO.	FLOOR	TYPE	AREA (SQ. M)	FLOOR FINISH	CEILING FINISH	WALL FINISH	DOOR	WINDOW	FIXTURES	LOAD VALUE
1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9
10	10	10	10	10	10	10	10	10	10	10	10
11	11	11	11	11	11	11	11	11	11	11	11
12	12	12	12	12	12	12	12	12	12	12	12

LOAD TYPE	NO.	FLOOR	TYPE	AREA (SQ. M)	FLOOR FINISH	CEILING FINISH	WALL FINISH	DOOR	WINDOW	FIXTURES	LOAD VALUE
1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9
10	10	10	10	10	10	10	10	10	10	10	10
11	11	11	11	11	11	11	11	11	11	11	11
12	12	12	12	12	12	12	12	12	12	12	12

A SCHEDULE OF LOADS

EE10 SCALE: NTS

REVIEWED BY:	PROJECT NAME:	RECOMMENDING APPROVAL:	APPROVED:	CAD BY:	SHEET CONTENT:	SHEET NO.:
 ENGR. GYM HAR QUIRANTE PROFESSIONAL ELECTRICAL ENGINEER	REHABILITATION OF SLSU-MCC BUILDING ELECTRICAL SYSTEM LOCATION: MAASIN CITY, SOUTHERN LEYTE	FREDERICK C. ANIGA, PhD CAMPUUS DIRECTOR	JUDE A. DUARTE, DPA UNIVERSITY PRESIDENT	J.A.L.	AS SHOWN	EE10 EE11





ELECTRICAL DESIGN ANALYSIS

Project Title : **3-100kVA Transformer Bank**
 Location : Maasin City, Southern Leyte

- Objectives:
1. To provide Design Load Analysis required.
 2. To identify the Fault level at the location where electrical devices are installed in order to select the correct circuit breaker current interrupting rating.
 3. To evaluate the voltage drop from the source.

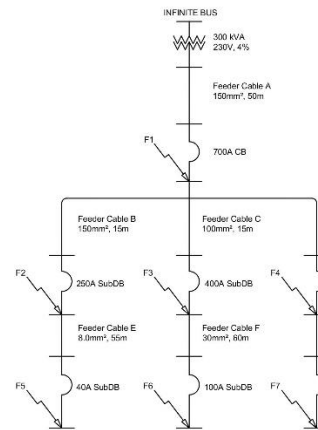
- Reference:
1. PHILIPPINE ELECTRICAL CODE
 2. INTERNATIONAL ELECTROTECHNICAL COMMISSION

Data Collected:

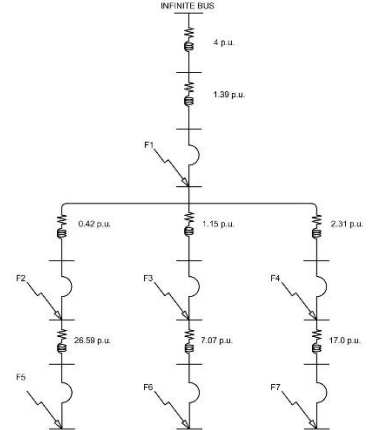
Cable A - Power Source to MCB	Total Line Current (I) Cable Size Set of Wires Cable Impedance (Z) per 305 Length of Cable in meters	699.4 Amps 150 mm ² 3 sets 0.045 Ohms 50 meters
Cable B - MDP to GFDP	Total Line Current (I) Cable Size Set of Wires Cable Impedance (Z) per 305 Length of Cable in meters	208.6 Amps 150 mm ² 1 set 0.045 Ohms 15 meters
Cable C - MDP to 2FDP	Total Line Current (I) Cable Size Set of Wires Cable Impedance (Z) per 305 Length of Cable in meters	323.3 Amps 100 mm ² 2 sets 0.082 Ohms 30 meters
Cable D - MDP to 3FDP	Total Line Current (I) Cable Size Set of Wires Cable Impedance (Z) per 305 Length of Cable in meters	139.1 Amps 100 mm ² 1 set 0.082 Ohms 60 meters

Cable E - GFDP to Farthest Circuit (PB9)	Total Line Current (I) Cable Size Set of Wires Cable Impedance (Z) per 305 Length of Cable in meters	19.6 Amps 8.0 mm ² 1 set 0.78 Ohms 85 meters
Cable F - 2FDP to Farthest Circuit (3PB7)	Total Line Current (I) Cable Size Set of Wires Cable Impedance (Z) per 305 Length of Cable in meters	78.7 Amps 30 mm ² 1 set 0.19 Ohms 80 meters
Cable G - 3FDP to Farthest Circuit (3PB1)	Total Line Current (I) Cable Size Set of Wires Cable Impedance (Z) per 305 Length of Cable in meters	51.4 Amps 14 mm ² 1 set 0.49 Ohms 56 meters
Transformer kVA, 3 Phase	Transformer Per Unit Impedance (%) Secondary Voltage (V)	300 kVA 2.2 230 Volts

Network Model Diagram



Equivalent Impedance Diagram



A. Voltage Drop Calculation

- Utility Power Source to MCB**
Solving for Voltage Drop
= $1.732 \times I \times Z \times L / (305 \times s)$
= $1.732 \times 699.4 \times 0.045 \times 50 / (305 \times 3)$
= 2.85 Volts
% Voltage Drop = $2.85 \times 100 / 230 = 1.24\%$
- Utility Power Source to GFDP**
Solving for Voltage Drop
= $1.732 \times I \times Z \times L / (305 \times s)$
= $1.732 \times 208.6 \times 0.045 \times 15 / (305 \times 1)$
= 1.08 Volts
% Voltage Drop = $1.08 \times 100 / 230 = 0.46\%$
- Utility Power Source to 2FDP**
Solving for Voltage Drop
= $1.732 \times I \times Z \times L / (305 \times s)$
= $1.732 \times 323.3 \times 0.082 \times 30 / (305 \times 2)$
= 1.71 Volts
% Voltage Drop = $1.71 \times 100 / 230 = 0.74\%$
- Utility Power Source to 3FDP**
Solving for Voltage Drop
= $1.732 \times I \times Z \times L / (305 \times s)$
= $1.732 \times 139.1 \times 0.082 \times 60 / (305 \times 1)$
= 2.94 Volts
% Voltage Drop = $2.94 \times 100 / 230 = 1.28\%$

- Utility Power Source to PB9**
Solving for Voltage Drop
= $1.732 \times I \times Z \times L / (305 \times s)$
= $1.732 \times 19.6 \times 0.78 \times 85 / (305 \times 1)$
= 5.51 Volts
% Voltage Drop = $5.51 \times 100 / 230 = 2.4\%$
- Utility Power Source to 2PB7**
Solving for Voltage Drop
= $1.732 \times I \times Z \times L / (305 \times s)$
= $1.732 \times 78.7 \times 0.19 \times 80 / (305 \times 1)$
= 5.88 Volts
% Voltage Drop = $5.88 \times 100 / 230 = 2.56\%$
- Utility Power Source to 3PB1**
Solving for Voltage Drop
= $1.732 \times I \times Z \times L / (305 \times s)$
= $1.732 \times 51.4 \times 0.49 \times 56 / (305 \times 1)$
= 9.25 Volts
% Voltage Drop = $9 \times 100 / 230 = 4.00\%$

B. Short Circuit Calculation

- $MVA_{base} = 10$
 $MVA_{bus} = 0.3$
 $MVA_{cable} = 0.23$
 $I_{sc} = 0.23$
 Transformer p.u. Z = 0.04
- Transformer Z change of Base (with 100MVA_{base})
 $Z_{sc} = (MVA_{base} / MVA_{cable})^2 \times Z_{tr}$
 $Z_{sc} = (100 / 0.23)^2 \times 0.04 = 1.33 \text{ p.u.}$
- Cable Impedance Z to p.u.
 $Z_{cable} = (MVA_{base} / MVA_{cable})^2 \times Z_{cable}$
 $Z_{cable} = (100 / 0.23)^2 \times 0.00029 = 0.00029 \text{ p.u.}$
- Cable A p.u. Z = $[28 \times L / (305 \times s)] / Z_{cable}$
 $Z_{cable} = [0.045 \times 50 / (305 \times 3)] / 0.00029 = 0.485 \text{ p.u.}$
- Cable B p.u. Z = $[28 \times L / (305 \times s)] / Z_{cable}$
 $Z_{cable} = [0.045 \times 15 / (305 \times 1)] / 0.00029 = 0.49 \text{ p.u.}$
- Cable C p.u. Z = $[28 \times L / (305 \times s)] / Z_{cable}$
 $Z_{cable} = [0.062 \times 30 / (305 \times 2)] / 0.00029 = 0.578 \text{ p.u.}$

Short Circuit Current at F1.

$I_{sc} = MVA_{base} / [(1.732 \times V) \times (Z_1 + Z_2) / 1,000,000]$
 $= 10 / [(1.732 \times 230) \times (1.33 + 0.485) / 1,000,000]$
 $= 13.98 \text{ kA}$

Main Circuit Breaker kAIC rating should not be less than **13.98 kA**
 Circuit Breaker Interrupting Current rating of **36 kAIC** is selected.



REVIEWED BY:

ENGR. GYM HAR QUIRANTE
 PROFESSIONAL ELECTRICAL ENGINEER

PROJECT NAME:
REHABILITATION OF SLSU-MCC BUILDING ELECTRICAL SYSTEM
 LOCATION: MAASIN CITY, SOUTHERN LEYTE

RECOMMENDING APPROVAL:

FREDERICK C. ANTIGA, PhD
 CAMPUS DIRECTOR

APPROVED:

JUDE A. DUARTE, DPA
 UNIVERSITY PRESIDENT

CAD BY : J.A.L.
 PREPARED BY : J.A.L.
 CHECKED BY : N.L.S.
 APPROVED BY : N.L.S.

SHEET CONTENT: AS SHOWN
 SHEET NO.: EE11





Project: SLSU - MCC
Subject: Electrical BOQ
GROUND FLOOR

ITEM	DESCRIPTION	TOTAL QTY	UNIT	UNIT RATE			
				UNIT PRICE	TOTAL	LABOR COST	TOTAL PRICE
NOTE: ALL PANEL BOARDS, WIRES, CIRCUIT BREAKERS SHOULD BE STANDARD/BRANDED MATERIALS							
1	150mm ² THHN WIRE						
	Line 1 (Red)	10	lm				
	Line 2 (Yellow)	10	lm				
	Line 3 (Blue)	10	lm				
	Ground (Green)	10	lm				
2	Panel Board, Nema-1, 16 Branches, 2P MCCB, Main Breaker - 250AT, 3P MCCB (OFFER: PANEL BOARD ONLY)	1	unit				
3	Panel Board, Nema-1, 3 Branches, 3P MCCB, Main Breaker - 700AT, 3P MCCB (NOTE: PANEL BOARD ONLY)	1	unit				
4	3 Phase, ECB Nema-3R, 700 AT, 700 AF, Isolation Breaker	1	unit				
5	30 AT, 50 AF, 2P, MCCB	1	pcs				
6	40 AT, 50 AF, 2P, MCCB	11	pcs				
7	50 AT, 100 AF, 2P, MCCB	3	pcs				
8	70 AT, 100 AF, 2P, MCCB	1	pc				
9	250 AT, 250 AF, 3P, MCCB	2	pcs				
10	700 AT, 700 AF, 3P, MCCB	2	pcs				
11	65mm Dia. PVC Pipe	10	length				
12	65mm Dia. IMC Pipe with Coupling	30	length				
13	Lock Nut & Bushing(65mm Dia.)	60	pcs				
14	Terminal Lugs (150mm ² THHN Wire) (OFFER: LONG BARREL)	18	pcs				
15	Mechanical Lugs (150mm ² THHN Wire)	18	pcs				
16	Shrinkable Tube (150mm ² THHN Wire)	9	lm				
17	Electrical Tape	10	roll				
18	Cable Gutter (500mmx300mmx300mm)	2	length				
19	Service Entrance Cap 3 sets of (3-150mm ² THHN + 1-30mm ² THHN (G))	3	pc				
20	C - Clamp for 65mm Dia. IMC Pipe	30	pcs				
21	Tax with Screw	50	set				
GROUND FLOOR TOTAL COST							

MATERIALS COST	
FREIGHT	
LABOR COST	
OCM	
CONTRACTORS PROFIT	
VAT 5%	
GRAND TOTAL	



Project: SLSU - MCC
Subject: Electrical BOQ
2ND FLOOR

ITEM	DESCRIPTION	TOTAL QTY.	UNIT	UNIT RATE			
				UNIT PRICE	TOTAL PRICE	LABOR PRICE	TOTAL
NOTE: ALL PANEL BOARDS, WIRES, CIRCUIT BREAKERS SHOULD BE STANDARD/BRANDED MATERIALS							
1	30.0mm ² THHN WIRE						
	Line 1 (Red)	90	lm				
	Line 2 (Yellow)	90	lm				
	Ground (Green)	90	lm				
2	100mm ² THHN WIRE						
	Line 1 (Red)	62	lm				
	Line 2 (Yellow)	62	lm				
	Line 3 (Blue)	62	lm				
	Ground (Green)	62	lm				
3	Square Box	10	pcs				
4	Panel Board, Nema-1, 14 Branches, 2P MCB, Main Breaker - 100AT, 2P MCCB (NOTE: PANEL BOARD ONLY)	1	pc				
5	Panel Board, Nema-1, 9 Branches, 2P MCCB, Main Breaker -400AT, 3P MCCB (NOTE: PANEL BOARD)	1	pc				
6	20 AT, 50 AF, 2P, MCB	9	pcs				
7	40 AT, 50 AF, 2P, MCB	5	pcs				
8	40 AT, 50 AF, 2P, MCCB	2	pcs				
9	50 AT, 100 AF, 2P, MCCB	2	pcs				
10	70 AT, 100 AF, 2P, MCCB	2	pc				
11	100 AT, 100 AF, 2P, MCCB	5	pc				
12	400 AT, 400 AF, 3P, MCCB	2	pcs				
13	32mm Dia. PVC Pipe	32	length				
14	32mm Dia. IMC Pipe with Coupling	5	length				
15	50mm Dia. IMC Pipe with Coupling	7	length				
16	Straight Connector	50	pcs				
17	Lock Nut & Bushing(32mm Dia.)	10	pcs				
18	Lock Nut & Bushing(50mm Dia.)	10	pcs				
19	Terminal Lugs (100mm ² THHN Wire) (OFFER: 100-12)	12	pcs				
20	Terminal Lugs (30.0mm ² THHN Wire) (OFFER: 38-8)	26	pcs				
21	Mechanical Lugs (100mm ² THHN Wire)	12	pcs				
22	Mechanical Lugs (30.0mm ² THHN Wire)	26	pcs				
23	Shrinkable Tube (100mm ² THHN Wire)	6	lm				
24	Shrinkable Tube (30.0mm ² THHN Wire)	13	lm				
25	Electrical Tape	15	roll				
26	Cable Gutter (500mmx300mmx300mm)	4	length				
27	C - Clamp for 32mm Dia. IMC Pipe	10	pcs				
28	C - Clamp for 50mm Dia. IMC Pipe	10	pcs				
29	Tax with Screw	100	set				
SECOND FLOOR TOTAL COST							

MATERIALS COST	
FREIGHT	
LABOR COST	
OCM	
CONTRACTORS PROFIT	
VAT 5%	
GRAND TOTAL	



Project: SLSU - MCC
 Subject: Electrical BOQ
 3RD FLOOR

ITEM	DESCRIPTION	TOTAL QTY.	UNIT	UNIT RATE			
				UNIT PRICE	TOTAL	LABOR PRICE	TOTAL
NOTE: ALL PANEL BOARDS, WIRES, AND CIRCUIT BREAKERS SHOULD BE STANDARD/BRANDED MATERIALS							
1	Panel Board, Nema-1, 15 Branches, 2P MCCB, Main Breaker - 40AT, 3P MCCB (NOTE: PANEL BOARD ONLY)	1	unit				
2	Panel Board, Nema-1, 8 Branches, 2P MCCB, Main Breaker 70AT, 3P MCCB (NOTE: PANEL BOARD ONLY)	1	unit				
3	Panel Board, Nema-1, 13 Branches, 2P MCCB, Main Breaker - 70AT, 3P MCCB (NOTE: PANEL BOARD ONLY)	1	unit				
4	Panel Board, Nema-1, 3 Branches, 3P MCCB, Main Breaker - 150AT, 3P MCCB (NOTE: PANEL BOARD ONLY)	1	unit				
5	22.0mm ² THHN WIRE						
	Line 1 (Red)	74	lm				
	Line 2 (Yellow)	74	lm				
	Line 3 (Blue)	74	lm				
	Ground (Green)	74	lm				
6	14.0mm ² THHN WIRE						
	Line 1 (Red)	67	lm				
	Line 2 (Yellow)	67	lm				
	Line 3 (Blue)	67	lm				
	Ground (Green)	67	lm				
7	25mm Dia. PVC Pipe	23	length				
8	32mm Dia. PVC Pipe	24	length				
9	20 AT, 50 AF, 2P, MCCB	25	pcs				
10	30 AT, 50 AF, 2P, MCCB	6	pcs				
11	40 AT, 50 AF, 2P, MCCB	4	pcs				
12	40 AT, 50 AF, 3P, MCCB	2	pcs				
13	70 AT, 100 AF, 3P, MCCB	4	pcs				
14	150 AT, 150 AF, 3P, MCCB	2	pcs				
THIRD FLOOR TOTAL COST							

MATERIALS COST	
FREIGHT	
LABOR COST	
OCM	
CONTRACTORS PROFIT	
VAT5%	
GRANDTOTAL	

For guidance and information of all concerned.


MADONNA GRACE D. JACOBE
 BAC Chairperson