



MARIANO MARCOS STATE UNIVERSITY

Bids and Awards Committee

INVITATION TO MAKE AN OFFER: Negotiated Procurement

20-06-1

THE PROJECT: Additional Electrical Works for Center of Flexible Learning

Number of Working Days: 30 calendar days

ABC: P302,393.44

1. The Mariano Marcos State University (MMSU), with offices at Quiling Sur, City of Batac, Ilocos Norte, invites the public to make an offer to furnish all labor, materials, tools and equipment necessary and proper for the implementation of the above Project as per approved designs, plans and drawings.
2. This process is in accordance with Section 53 of R.A. 9184, the Government Procurement reform Act and Section 53.9 of the Implementing Rules and Regulations where interested and qualified contractors are to submit proposals.
4. The offer must be in writing submitted at the address below on or before **September 28, 2021; 9:00 AM** together with the following documents:
 - a) The amount of the offer in writing duly signed by the person making the offer, indicated in numbers and figures.
 - b) The particulars of the offer as to labor, materials, tools, equipment and other work details.
 - c) Documents in support of the legal, technical and financial capability of the person making the offer, which documents shall be confirmed and verified (3 copies).
5. It is understood that any offer may be accepted or rejected, or the process invalidated, at any time prior to contract award, without liability to anyone.
6. Documents for this procurement may be secured from the MMSU BAC Secretariat at the address below or downloaded from the MMSU website or from the Philippine Government Electronic Procurement System (PhilGEPS) website.
7. For questions and inquiries, please write or email the University President, thru the BAC Chair, at the address indicated below.

Mariano Marcos State University
 Quiling Sur, City of Batac
 www.mmsu.edu.ph _____

September 24, 2021

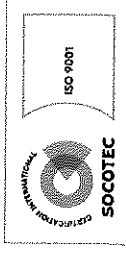
NATHANIEL R. ALIBUYOG
 BAC CHAIR

Received: _____
 Received: _____
 Received: _____

Rm.105 FEM Hall, MMSU, #16S Quiling Sur, City of Batac, Ilocos Norte
 ✉ bac@mmsu.edu.ph ☎ (077) 600-0459 www.mmsu.edu.ph



STARS
RATING SYSTEM



PROJECT INFORMATION DOCUMENT

Project Title : Additional Electrical Works for Center of Flexible Learning

Project Location: MMSU Library, City of Batac, Ilocos Norte

The project calls for the furnishing of all required materials, labor, tools and equipment needed for the partial implementation of the new flexible learning hub of the university located at the MMSU Library, City of Batac, Ilocos Norte. The said improvement works shall be done in accordance with the plans, designs, drawings and other details, as well as the specifications and this Project Information Document prepared and approved for this project.

It also calls for the employment of men power with the appropriate skills and expertise to undertake the specific items of work and to enable the contractor to produce and deliver to the satisfaction of the Owner the needed services and output required of this undertaking. In addition, the contractor shall have adequate and readily available construction tools and equipment to be utilized during the period. It is also a must as it is necessary that the contractor shall have a regular qualified site project engineer to administer strictly the implementation of the project, including a regular log book of construction activities, as well as receiving and briefing, if requested by the authorized University Officials and Project Inspectors.

GENERAL INSTRUCTIONS

A. The prospective bidders shall submit, among others, a bid proposal corresponding to the above-mentioned project with the following scope of works:

Electrical Works

- a. Electrical works shall be done by a contractor with **PCAB License with Principal Classification in Electrical Works, Category B** specializing in electrical works and with experience in the installation of ECB, PANELBOARDS, FEEDER LINES and CABLE TRAYS. Works shall be done by a duly accredited electrician (NC II) under the direct supervision of a licensed Electrical Practitioner PEE/REE/RME.
- b. The contractor shall provide one (1) licensed electrical practitioner PEE/REE/RME on the job site as resident project supervisor for the electrical works. No installation shall be done without the presence of the project supervisor.
- c. Before starting any works, the contractor must provide its metering equipment (KWHr Meter) for the power consumption throughout the project construction. The power consumption shall be paid by the contractor to the university after all works is furnished. The provision shall be limited to equipment for drilling and cutting only but not including welding machines. Welding works shall be done outside the project site premises or other power supply shall be used by the contractor except from the Library power supplying the IT sensitive equipment, whichever is more convenient.

- d. Sample of each wire, wiring devices, pull box, and conduits shall be submitted for approval by the technical committee or inspection committee of the University prior to their installation. **No installation shall be made without the approval of materials by the technical committee of the University.**
- e. Pipes for the Duplex Floor Convenience Outlet should be embedded and should be installed in a workman like manner.
- f. Panel boards, and other enclosures shall be gauge #16 galvanized materials, rust proof powder coated finished. Panel boards shall be bolted type, complete tin-plated copper busbar.
- g. All circuit breakers shall be bolt-on type and must have correct labels. It is a must that the arrangement of circuit breakers and busbars shall conform the panel board diagram provided in the approved plans by the end user and the technical committee to avoid the occurrence of unbalanced loading.
- h. All wires for general wirings, except for feeder and sub-feeder shall be copper 99%, plastic insulated for 600V type THHN / THWN-2 or as specified in the approved plans and specifications, lead free, stranded, or approved equal brand by the end-user and the technical committee, and USE ONLY ONE (1) BRAND FOR THE WIRE.
- i. Wires for main feeder / sub-feeder shall be THW Copper Wire.
- j. Conduit / Cable tray shall be supported for permanent connection following the latest Philippine Electrical Code (PEC) and/or being referred from the approved plans.
- k. No termination of wires inside the manhole and conduits shall be done.
- l. Color coding of wires shall be observed following the latest PEC: Line A (red), Line B (yellow), Line C (blue), and Ground (green).
- m. The mounting heights shall be as follows:
- A/C outlet, Motor outlet – not less than 0.4m above finished floor or as required
 - Convenience outlet – 0.3m above finished floor or as required
 - Panel board – 1.8m above finished floor to the center of the main MCCB or as required
- n. Grounding system. Provide grounding wires for all the circuit and grounding terminal lugs of all gutters and panel boards. All exposed non-current-carrying metallic parts of electrical equipment, metallic raceway system, grounding conductor and neutral conductor or wiring system shall be grounded. The ground connection shall be made at the main service equipment and shall be made to the driven rods on the exterior of the building.
- o. Maximum number of wires inside the cable tray shall be observed (20% of the total cross-sectional area). Also, maximum number of wires inside the pipes and conduits must be observed.
- p. Existing electrical system shall remain functional and normal operation until the new electrical system is ready to be energized.
- q. All wiring shall be tested for circuit continuity and shall be tested to assure that the wiring system is free from short-circuit, accidental grounding or other defects prior to normal system operation.

- r. Tests shall be performed after all the wiring is completed and connected, specifically for main feeder and sub-feeder. The instrument to be used for testing must be capable of measuring accurately the resistances involved and having a voltage rating of 500 volts. Reading shall be taken after the voltage has been applied continuously for one (1) minute. The insulation resistance between the conductors and between each conductor and ground shall be measured, also.
- s. Tests shall be done for each item of control equipment not less than five times and must be functional after the testing. **All tests shall be performed in the presence of the university inspection or technical committee. All tests results shall be submitted in three copies.**
- t. Energize the Electrical System. After the contractor has assured that the wiring system is free of faults, the Contractor shall energize the system from their normal power sources and confirm that the system is operational as required by the contract documents, prior to final inspection.
- u. The contractor shall connect the service wire from ECB to the Distribution Transformer including the installation of the kWhr meter and Current Transformer. The contractor shall coordinate with INEC for the proper installation process.

B. SUPPLEMENTARY PROVISIONS

1. In case of conflict in specifications and quality of materials, installation procedure and in the plans and drawings as well as in the other contract documents before and during the implementation stage, the same should be referred to the end-user and the technical committee for proper resolution of the said conflicts.
2. All other items or scope of works not mentioned or not shown and/or indicated in the plans, drawings and specifications and needed for the proper functioning of the system, the Contractor shall likewise furnish all materials, labor and equipment necessary to complete the same.
3. Where the above-mentioned items or scope of works require the approval of the quality and design of the materials to be used or their testing before they are installed, embedded in concrete or enclosed with specified covering materials, the Contractor shall secure from the University clearance or permission related hereto.
4. After all the works have been completed, the surrounding immediate areas affected in the prosecution of the project shall be cleaned and cleared of all excess materials and debris, temporary structures, facilities and utilities used during the construction period.

- A. Time is a very important factor in the implementation of this project and as such, all works indicated in the plans, specifications and in this document shall be completed within **Thirty (30) Calendar Days** from receipt of the Notice to Proceed;
- B. Each bid shall be submitted in two (2) separate sealed envelopes with the name of the bidder in capital letters addressed to the BAC Chairman:
- C. The Approved Budget for the Project to be bid is **Three Hundred Two Thousand Three Hundred Ninety Three and 44/100 Pesos (Php 302,393.44)**.
- D. All bids must be submitted to the BAC Chairman, MMSU-Batac, Ilocos Norte not later than _____.

Prepared by :


LEMUEL JOSHUA P. BAGAYAS
Electrical Engineer

Checked by :


FREDDIE MICHAEL S. BALANAY
Chief, Electrical Section

Recommended by :


ROMEO R. DULDULAO
Director



BILL OF QUANTITIES

ITEM NO.	DESCRIPTION		
I.	ELECTRICAL WORKS		
I.	Panelboards, Enclosures, Pullboxes, and Wire Gutters (Rustproof)	1.00	lot
II.	Pipes, Conduits, and Fittings	1.00	lot
III.	Conductors, Lead Free	1.00	lot
IV.	Wiring Devices	1.00	lot

Prepared By :

LEMUEL JOSHUA P. BAGAYAS
Electrical Engineer

Checked by :

FREDDIE MICHAEL S. BAKANAY
Chief, Electrical Section

AIDA V. CABANG
Chief, Physical Planning Section

Recommending Approval :

ROMEO R. BALDILAO
Director



SPECIFICATION

ITEM NO.	DESCRIPTION
I.	PANELBOARDS, ENCLOSURES, PULL BOXES, & WIRE GUTTERS (RUSTPROOF) General Requirements : Specifications : Ga. 16 Galvanized Materials, Powder Coated Finish, Complete ground lugs Circuit Breaker : All bolt-on type Circuit Breakers Panel board assembly must be subject to inspection of the end user before installation.
II.	PIPES, CONDUITS, & FITTINGS It must be painted the same color as the surface where it is installed.
III.	CONDUCTORS, LEAD FREE UL listed brands, lead free, and 100% Copper Wire.
IV.	WIRING DEVICES Install junction boxes, if necessary. Install fabricated supports, if necessary.

Prepared By :

LEMUEL JOSTUA P. BAGAYAS
Electrical Engineer

Checked by :

FREDDIE MICHAEL S. BALANAY
Chief, Electrical Section

AIDA V. CABANG
Chief, Physical Planning Section

Recommending Approval :

ROMEO R. DULDULAO
Director, PPDO



DETAILED ESTIMATES

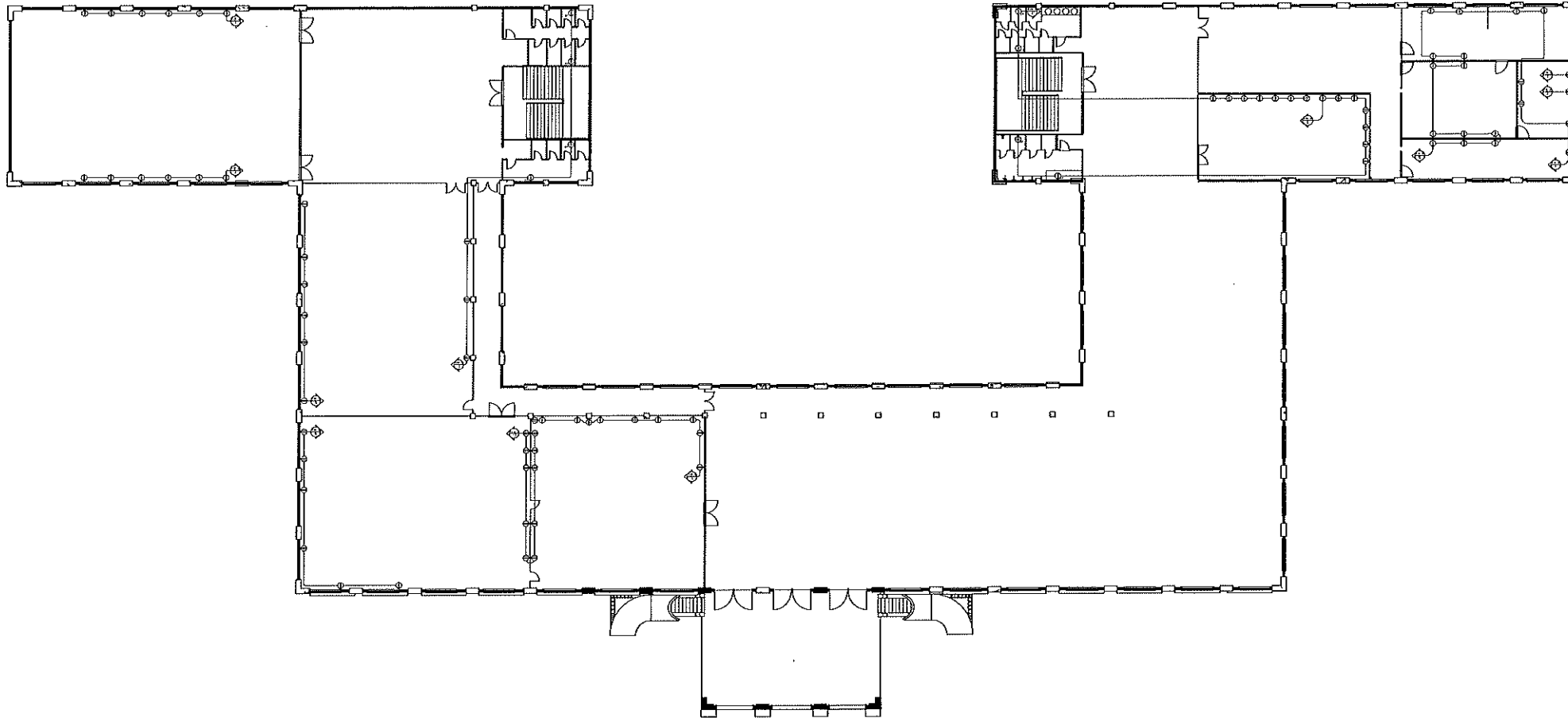
Item No.: I	Quantity: 1.00
Description: Electrical Works	Unit: lot

Description	Quantity	Unit	Unit Price	Sub-Total
I. Panelboards, Enclosures, Pullboxes and Wire Gutters (Rustproof)				
Specifications: Ga. 16 Galvanized Materials, Powder Coated Finish Complete Ground Lugs with Tin Plated Busbar, Bolted Type Circuit Breaker: All Bolt-on Type Circuit Breakers				
20AT, MCCB, 2P, 240V, 25KAIC, Bolt-On Type	-	-	-	-
30AT, MCB, 2P, 240V, 25 KAIC, Bolt-on Type with NEMA 3R Enclosure	-	-	-	-
20AT, MCB, 2P, 240V, 25 KAIC, Bolt-on Type with NEMA 3R Enclosure	-	-	-	-
SUB-TOTAL I. Panelboards, Enclosures, Pullboxes and Wire Gutters (Rustproof)				
II. Pipes, Conduits, and Fittings				
Adapter with Locknut / Straight Connector				
15 mm Ø, EMT	-	-	-	-
20 mm Ø, EMT	-	-	-	-
25 mm Ø, EMT	-	-	-	-
uPVC Pipe, Thick Wall				
20 mm Ø, 2.2 mm thick	-	-	-	-
20 mm Ø, EMT	-	-	-	-
25 mm Ø, EMT	-	-	-	-
Elbow				
15 mm Ø, EMT	-	-	-	-
20 mm Ø, EMT	-	-	-	-
25 mm Ø, EMT	-	-	-	-
Coupling				
15 mm Ø, EMT	-	-	-	-
20 mm Ø, EMT	-	-	-	-
25 mm Ø, EMT	-	-	-	-
Clamp, with Tox and Screw #8				
15 mm Ø, EMT	-	-	-	-
20 mm Ø, EMT	-	-	-	-
25 mm Ø, EMT	-	-	-	-
SUB-TOTAL II. Pipes, Conduits, and Fittings				
III. Conductors, Lead Free				
200.0 mm ² THW	-	-	-	-
125.0 mm ² THW	-	-	-	-
38.0 mm ² THW	-	-	-	-
5.5 mm ² THHN	-	-	-	-
3.5 mm ² THHN	-	-	-	-
SUB-TOTAL III. Conductors, Lead Free				
IV. Wiring Devices and Others				
Electrical Tape, Big	-	-	-	-
Rubber Tape	-	-	-	-
Dyna Bolt 1/4"	-	-	-	-
Tox and Screw #8	-	-	-	-
SUB-TOTAL IV. Wiring Devices and Others				
TOTAL MATERIALS COST				
			Sub-Total	-
			Unit Cost	-
EQUIPMENT COST				
Description				
Electric Drill 1 @ 200/day	Quantity	Unit	Unit Price	Sub-Total
Cut-off Machine 1 @ 200/day				-
Total Equipment Cost				
			Sub-Total	-
			Unit Cost	-
LABOR COST				
Description				
1 - PEE/REE/RME @ 600/day	Quantity	Unit	Unit Price	Sub-Total
2 - Accredited Electrician @ 400/day				-
2 - Electrical Helper @ 350/day				-
Total Labor Cost				
			Sub-Total	-
			Unit Cost	-


DIRECT COST: -
 DIRECT UNIT COST: -

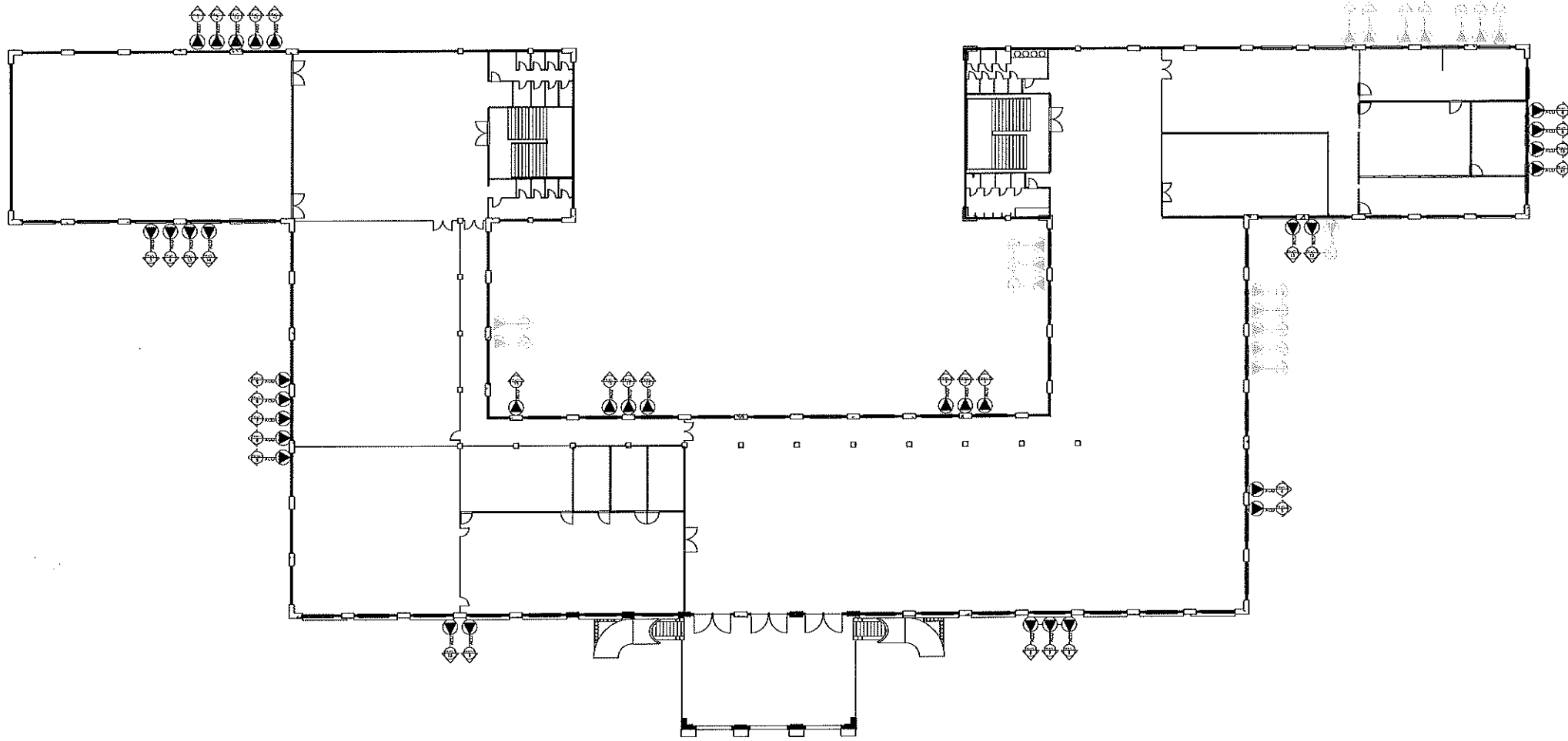
Plus Indirect Cost:
 % OCM -
 % CP -
 % VAT -
 Indirect Unit Cost: -

Total Direct and Indirect Cost: -



○ SECOND FLOOR CONVENIENCE OUTLET LAYOUT

	FROM THE OFFICE: PHYSICAL PLANNING AND DEVELOPMENT OFFICE ROOM 202 FEM HALL, MARIANO MARCOS STATE UNIVERSITY City of Batac, 2506 Ilocos Norte Telefax: +63 (77) 792-3191	DESIGNED BY: LEMUEL P. BAGAYAS <small>CHIEF ELECTRICAL ENGINEER</small>	SIGNED AND SEALED BY: 	PROJECT TITLE: ADDITIONAL ELECTRICAL WORKS FOR CENTER OF FLEXIBLE LEARNING	CONFORME: 	APPROVED BY: 	SHEET CONTENT: AS SHOWN	REVISION AND DATE: 	SHEET NO: <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin: 0 auto;"> E-1 </div>
	CHECKED/REVIEWED BY: FREDDIE MICHAEL S. BALANAY <small>CHIEF ELECTRICAL ENGINEER</small>	P/RG NO.: P/RG NO.: PLACED ISSUED: DATE ISSUED: T/C:	LOCATION: WVSU-CITY OF BATAC, ILOCOS NORTE	RECOMMENDING APPROVAL: ROMEO B. MATA <small>REGISTERED ELECTRICAL ENGINEER</small>	SHIRLEY C. ASUPIS <small>REGISTERED ELECTRICAL ENGINEER</small>	Details and specifications of electrical equipment shall comply with the requirements of approved standards. All electrical work shall be done in accordance with the approved standards. The contractor shall be responsible for the proper installation and maintenance of all electrical equipment. The contractor shall also be responsible for the safety of all personnel and the public during the execution of the work.			



SECOND FLOOR ACU OUTLET LAYOUT



FROM THE OFFICE:
PHYSICAL PLANNING AND DEVELOPMENT OFFICE
 ROOM 202 FEK HALL, MARIANO MARCOS STATE UNIVERSITY
 City of Batac, Ilocos Norte
 Telefax: +63 (77) 792-3191

DESIGNED BY:
LEMUEL P. BAGAYAS
 ARCHITECT

CHECKED/REVIEWED BY:
FREDDIE MICHAEL S. BALANAY
 CIVIL ENGINEER

SIGNED AND SEALED BY:
 PRC NO.:
 PIR NO.:
 PLACED ISSUED:
 DATE ISSUED:
 BY:

PROJECT TITLE:
**ADDITIONAL ELECTRICAL WORKS FOR
 CENTER OF FLEXIBLE LEARNING**

LOCATION: MMSU - CITY OF BATAC, ILOCOS NORTE

CONFORME:
SATURNINA M. ESPEROS
 DIRECTOR, ARCHITECTURE CENTER

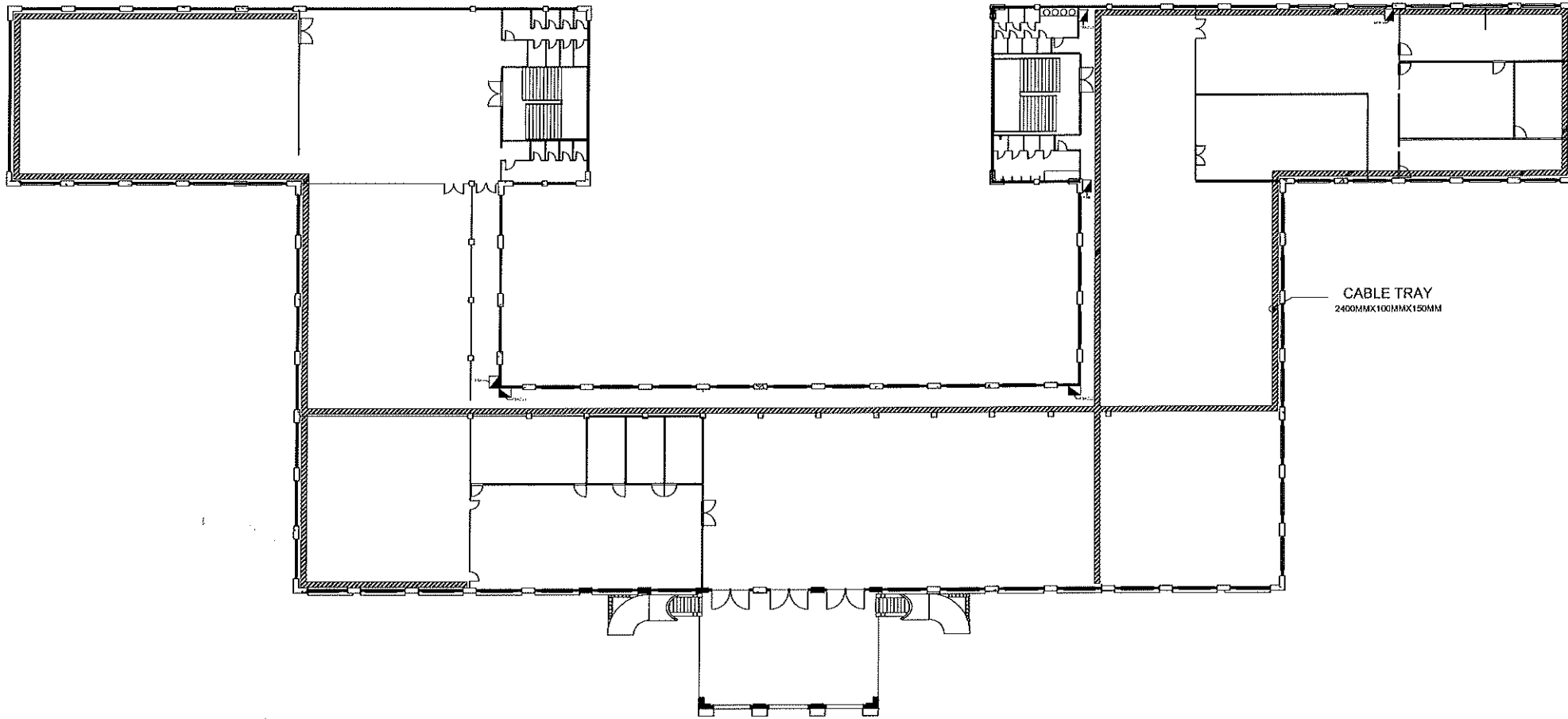
RECOMMENDING:
JOSE M. BULAG
 DIRECTOR, PDP

APPROVED BY:
SHIRLEY C. AGRUPIS
 ASSISTANT DIRECTOR, PDP


SHEET CONTENT:
 AS SHOWN

REVISION AND DATE:

SHEET NO:
 E-2
 ELECTRICAL



○ PANELBOARD AND CABLE TRAY LOCATION
N O T I O S C A L E

 <p>FROM THE OFFICE: PHYSICAL PLANNING AND DEVELOPMENT OFFICE ROOM 202 FEM HALL, MARIANO MARCOS STATE UNIVERSITY City of Batang, 2806 Ilocos Norte Telephone: +63 (77) 792-3191</p>	DESIGNED BY: LEMUEL JESUUS BAGAYAS	SIGNED AND SEALED BY:	PROJECT TITLE: ADDITIONAL ELECTRICAL WORKS FOR CENTER OF FLEXIBLE LEARNING	CONFORME: SATURNINA CASPEROS DIRECTOR, PHYSICAL PLANNING CENTER	APPROVED BY: SHINE MARCELO TRUPIS	SHEET CONTENT: AS SHOWN	REVISION AND DATE:	SHEET NO: E-3
	CHECKED/REVIEWED BY: FREDDIE MICHAEL BALANAY	PRG NO.:	LOCATION: VHSU-CITY OF BATANG, ILOCOS NORTE	RECOMMENDED BY: ROBERTO DEL ROSARIO				
	PLACED ISSUED:	DATE ISSUED:						
	TYPE:							

ELECTRICAL

DEMAND LOAD TABULATION												
PB-A FEEDER BREAKER 3-POLE 70AT FEEDER CONDUCTOR 3-30.0mm ² & 1-14.0mm ² THHN Cu. WIRE IN CABLE TRAY												
CIRCUIT NUMBER	LOAD DESCRIPTION	VA LOAD	AB	CA	BC	CIRCUIT BREAKER			CONDUCTOR		CONDUIT	
						POLE	AF	AT	SIZE	TYPE	DIAMETER	TYPE
1	6 SETS OF 460VA CONVENIENCE OUTLET, DESKTOP	2,760	12			2	100	20	2-3.5mm ² & 1-3.5mm ²	THHN	15MM	EMT
2	6 SETS OF 460VA CONVENIENCE OUTLET, DESKTOP	2,760		12		2	100	20	2-3.5mm ² & 1-3.5mm ²	THHN	15MM	EMT
3	3 SETS OF 460VA CONVENIENCE OUTLET, DESKTOP	1,500			6.52	2	100	20	2-3.5mm ² & 1-3.5mm ²	THHN	15MM	EMT
	4 SETS OF CONVENIENCE OUTLET, 30 WATTS EXHAUST FAN											
4	10 SETS OF 180VA CONVENIENCE OUTLET	1,800	7.82			2	100	20	2-3.5mm ² & 1-3.5mm ²	THHN	15MM	EMT
5	6 SETS OF 460VA CONVENIENCE OUTLET, DESKTOP	2,760		12		2	100	20	2-3.5mm ² & 1-3.5mm ²	THHN	15MM	EMT
6	6 SETS OF 460VA CONVENIENCE OUTLET, DESKTOP	2,760			12	2	100	20	2-3.5mm ² & 1-3.5mm ²	THHN	15MM	EMT
TOTAL		14,340	19.82	24	18.52							

FEEDER CONDUCTOR
 IFL = $\sqrt{3} (24) = 41.5692 \text{ A}$
 USE: 3 - 30.0 mm² THW Cu. WIRE & 1 - 14.0 mm² THHN Cu. wire in 50 mm Ø PVC

FEEDER PROTECTION
 USE: 3 POLE 70AT, 240V, 100AF, 60HZ, MCCB

DEMAND LOAD TABULATION												
PB-B FEEDER BREAKER 3-POLE 125AT FEEDER CONDUCTOR 3-38.0mm ² THW Cu. WIRE & 1-14.0mm ² THHN Cu. WIRE IN CABLE TRAY												
CIRCUIT NUMBER	LOAD DESCRIPTION	VA LOAD	AB	CA	BC	CIRCUIT BREAKER			CONDUCTOR		CONDUIT	
						POLE	AF	AT	SIZE	TYPE	DIAMETER	TYPE
1	8 SETS OF 180VA CONVENIENCE OUTLET	2,360	10.26			2	100	20	2-3.5mm ² & 1-3.5mm ²	THHN	15MM	EMT
	2 SETS OF 460VA CONVENIENCE OUTLET, DESKTOP											
2	1 SET OF CONVENIENCE OUTLET, SERVER	9,200		40		2	100	40	2-8.0mm ² & 1-5.5mm ²	THHN	20MM	EMT
3	1 SET OF CONVENIENCE OUTLET, SERVER	9,200			40	2	100	40	2-8.0mm ² & 1-5.5mm ²	THHN	20MM	EMT
4	7 SETS OF 180VA CONVENIENCE OUTLET	1,320	5.74			2	100	20	2-3.5mm ² & 1-3.5mm ²	THHN	15MM	EMT
	2 SETS OF CONVENIENCE OUTLET, 30 WATTS EXHAUST FAN											
5	8 SETS OF 180VA CONVENIENCE OUTLET	1,440		6.26		2	100	20	2-3.5mm ² & 1-3.5mm ²	THHN	15MM	EMT
6	7 SETS OF 180VA CONVENIENCE OUTLET	1,320			5.74	2	100	20	2-3.5mm ² & 1-3.5mm ²	THHN	15MM	EMT
	2 SETS OF CONVENIENCE OUTLET, 30 WATTS EXHAUST FAN											
7	1 SET OF 3.0HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	1865		8.11		2	100	20	2-3.5mm ² & 1-3.5mm ²	THHN	15MM	EMT
8	1 SET OF 3.0HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	1865			8.11	2	100	20	2-3.5mm ² & 1-3.5mm ²	THHN	15MM	EMT
	SPARE	1500			6.52	2	100	20	2-3.5mm ² & 1-3.5mm ²	THHN	15MM	EMT
TOTAL		28,570	24.37	54.37	52.26							

FEEDER CONDUCTOR
 IFL = $\sqrt{3} (54.37) = 94.1716 \text{ A}$
 USE: 3 - 38.0 mm² THW Cu. WIRE & 1 - 14.0 mm² THHN Cu. wire in 50 mm Ø PVC

FEEDER PROTECTION
 USE: 3 POLE 125AT, 240V, 100AF, 60HZ, MCCB

DEMAND LOAD TABULATION													
PBACU1 FEEDER BREAKER 3-POLE 300AT FEEDER CONDUCTOR 3-200.0mm ² & 1-22.0mm ² THW Cu. WIRE IN CABLE TRAY													
CIRCUIT NUMBER	LOAD DESCRIPTION	VA LOAD	3Ø CURRENT	AB	CA	BC	CIRCUIT BREAKER			CONDUCTOR		CONDUIT	
							POLE	AF	AT	SIZE	TYPE	DIAMETER	TYPE
1	1 SET OF 7.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	5370	23.35				3	400	40	3-8.0mm ² & 1-5.5mm ²	THHN	25MM	EMT
2	1 SET OF 7.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	5370	23.35				3	400	40	3-8.0mm ² & 1-5.5mm ²	THHN	25MM	EMT
3	1 SET OF 7.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	5370	23.35				3	400	40	3-8.0mm ² & 1-5.5mm ²	THHN	25MM	EMT
4	1 SET OF 7.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	5370	23.35				3	400	40	3-8.0mm ² & 1-5.5mm ²	THHN	25MM	EMT
5	1 SET OF 7.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	5370	23.35				3	400	40	3-8.0mm ² & 1-5.5mm ²	THHN	25MM	EMT
6	1 SET OF 7.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	5370	23.35				3	400	40	3-8.0mm ² & 1-5.5mm ²	THHN	25MM	EMT
7	1 SET OF 7.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	5370	23.35				3	400	40	3-8.0mm ² & 1-5.5mm ²	THHN	25MM	EMT
8	1 SET OF 7.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	5370	23.35				3	400	40	3-8.0mm ² & 1-5.5mm ²	THHN	25MM	EMT
9	1 SET OF 7.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	5370	23.35				3	400	40	3-8.0mm ² & 1-5.5mm ²	THHN	25MM	EMT
10	1 SET OF 4.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	3100		13.48			2	400	30	2-5.5mm ² & 1-3.5mm ²	THHN	25MM	EMT
11	1 SET OF 4.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	3100			13.48		2	400	30	2-5.5mm ² & 1-3.5mm ²	THHN	25MM	EMT
12	1 SET OF 4.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	3100				13.48	2	400	30	2-5.5mm ² & 1-3.5mm ²	THHN	25MM	EMT
13	1 SET OF 3.0HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	1865		6.11			2	400	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
14	1 SET OF 3.0HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	1865			8.11		2	400	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
15	1 SET OF 3.0HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	1865				8.11	2	400	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
16	1 SET OF 1.5HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	910		3.96			2	400	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
17	1 SET OF 1.5HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	910			3.96		2	400	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
18	1 SET OF 1.5HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	910				3.96	2	400	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
19	10 SETS OF 180VA CONVENIENCE OUTLET	1,800		7.82			2	400	20	2-3.5mm ² & 1-3.5mm ²	THHN	15MM	EMT
20	SPACE WITH BUSBAR												
21	SPACE WITH BUSBAR												
TOTAL		67,755	210.1304	33.36	25.54	25.54							

FEEDER CONDUCTOR
 IFL = $210.13 + \sqrt{3} (33.36 + 13.48 @ 25\%) = 273.75 \text{ A}$
 USE: 3 - 200.0 mm² & 1 - 22.0 mm² THW Cu. WIRE IN CABLE TRAY

OVERCURRENT PROTECTION
 IFL = $210.13 + \sqrt{3} (12.06522 + 13.48 @ 25\%) = 289.39015 \text{ A}$
 USE: 3 POLE 300AT, 240V, 400AF, 60HZ, MCCB

SCHEDULE OF LOADS



PHYSICAL PLANNING AND DEVELOPMENT OFFICE
 ROOM 202 FEM HALL, MARIANO MARCOS STATE UNIVERSITY
 City of Batac, Ilocos Norte
 Telephone: +63 (77) 792-3191

DESIGNED BY:
 LEMUEL ROSALBA S. BAGAYAS
 CHECKED/REVIEWED BY:
 FREDDIE MICHAEL S. BALANAY

SPONSORED AND SEALED BY:
 PROJECT TITLE:
 ADDITIONAL ELECTRICAL WORKS FOR
 CENTER OF FLEXIBLE LEARNING

CONFORME:
 SATURNINO M. NISPEROS
 RECOMMENDED APPROVAL:
 SHIRLEY C. TRUPIS

APPROVED BY:
 SHEET CONTENT:
 AS SHOWN

REVISOR AND DATE:
 SHEET NO.:
 E-4

DATE ISSUED:
 LOCATION: NMSU-CITY OF BATAC, ILOCOS NORTE

DATE ISSUED:
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DEMAND LOAD TABULATION													
PBACU2 FEEDER BREAKER 3-POLE 250AT FEEDER CONDUCTOR 3-125.0mm ² & 1-22.0mm ² THW Cu. WIRE IN CABLE TRAY													
CIRCUIT NUMBER	LOAD DESCRIPTION	VA LOAD	3Ø CURRENT	AB	CA	BC	CIRCUIT BREAKER			CONDUCTOR		CONDUIT	
							POLE	AF	AT	SIZE	TYPE	DIAMETER	TYPE
1	1 SET OF 7.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	5370	23.35				3	225	40	3-8.0mm ² & 1-5.5mm ²	THHN	25MM	EMT
2	1 SET OF 7.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	5370	23.35				3	225	40	3-8.0mm ² & 1-5.5mm ²	THHN	25MM	EMT
3	1 SET OF 7.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	5370	23.35				3	225	40	3-8.0mm ² & 1-5.5mm ²	THHN	25MM	EMT
4	1 SET OF 7.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	5370	23.35				3	225	40	3-8.0mm ² & 1-5.5mm ²	THHN	25MM	EMT
5	1 SET OF 7.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	5370	23.35				3	225	40	3-8.0mm ² & 1-5.5mm ²	THHN	25MM	EMT
6	1 SET OF 7.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	5370	23.35				3	225	40	3-8.0mm ² & 1-5.5mm ²	THHN	25MM	EMT
7	1 SET OF 7.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	5370	23.35				3	225	40	3-8.0mm ² & 1-5.5mm ²	THHN	25MM	EMT
8	1 SET OF 7.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	5370	23.35				3	225	40	3-8.0mm ² & 1-5.5mm ²	THHN	25MM	EMT
9	1 SET OF 4.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	3100		13.48			2	225	30	2-5.5mm ² & 1-3.5mm ²	THHN	25MM	EMT
10	1 SET OF 4.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	3100			13.48		2	225	30	2-5.5mm ² & 1-3.5mm ²	THHN	25MM	EMT
11	1 SET OF 2.0HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	1510				6.57	2	225	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
12	1 SET OF 1.5HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	910		3.96			2	225	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
TOTAL		51,580	186.7826	17.44	13.48	6.57							

FEEDER CONDUCTOR
 $I_{FL} = 186.7826 + \sqrt{3} (17.44 + 13.47826 @ 25\%) = 222.8266 \text{ A}$
 USE: 3 - 125.0 mm² & 1 - 22.0 mm² THW Cu. WIRE IN CABLE TRAY

OVERCURRENT PROTECTION
 $I_{FL} = 186.7826 + \sqrt{3} (13.47826 @ 250\%) = 245.14518 \text{ A}$
 USE: 3 POLE 250AT, 240V, 225AF, 60HZ, MCCB

DEMAND LOAD TABULATION													
MDP FEEDER CONDUCTOR 3 SETS (3-100.0 mm ² & 1-30.0 mm ² THW Cu. WIRE IN 65 mm Ø IMC)													
CIRCUIT NUMBER	LOAD DESCRIPTION	VA LOAD	3Ø CURRENT	AB	CA	BC	CIRCUIT BREAKER			CONDUCTOR		CONDUIT	
							POLE	AF	AT	SIZE	TYPE	DIAMETER	TYPE
1	PB-A	14,340		19.82	24	18.52	3	800	70				
2	PB-B	28,570		24.11	54.37	52.26	3	800	125				
3	PB-ACU1	67,755	210.1304	33.36	25.54	25.54	3	800	300				
4	PB-ACU2	51,580	186.7826	17.44	13.48	6.57	3	800	250				
4	PB-ACU3	33,595		54.44	51.11	40.59	3	800	150				
6	SPACE WITH BUSBAR												
7	SPACE WITH BUSBAR												
8	SPACE WITH BUSBAR												
TOTAL		195,840	396.913	149.17	168.5	143.48							

SIZING OF CONDUCTOR:
 $I_{TOTAL} = 396.913 + \sqrt{3} (168.5) = 688.7636 \text{ A}$
 USE: 3 SETS (3- 100.0 mm² & 1- 30.0 mm² THW Cu. WIRE IN 65 mm Ø EMT)

$P_{TOTAL} = \sqrt{3} * 230 \text{ VOLTS} * 698.7055 \text{ AMP} = 274,383.9164 \text{ VA}$

KVA RATING OF TRANSFORMER : 274,383.9164 VA / 3 @ 80% DF = 73,169.04438 VA
 USE : 3 SETS OF 1Ø 75 KVA TRANSFORMER, PRIMARY VOLTAGE 13.2 KV / 7620V,
 SECONDARY VOLTAGE 240V / 120V


FEEDER CONDUCTOR:
 $I_{FL} = 225,000 \text{ VA} / (\sqrt{3} * 230 \text{ VOLTS}) = 564.3992$
 USE : 3 SETS (3- 100.0 mm² & 1-30.0 mm² THW Cu. WIRE IN 65 mm Ø IMC)

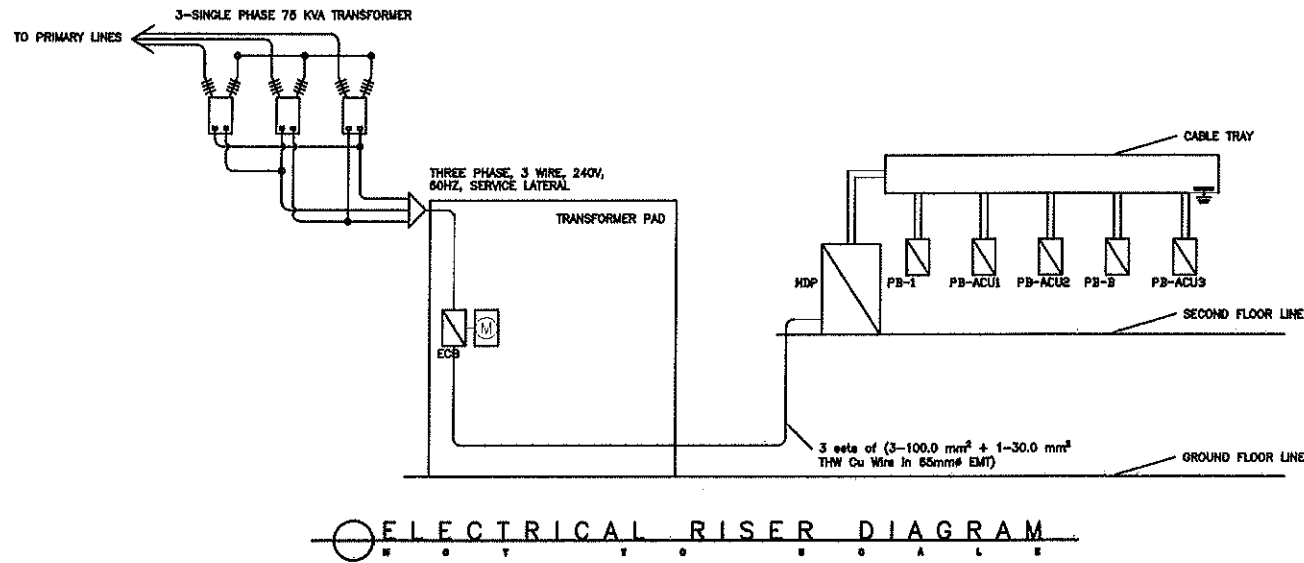
DEMAND LOAD TABULATION													
PBACU3 FEEDER BREAKER 3-POLE 125AT FEEDER CONDUCTOR 3-80.0mm ² THW Cu. WIRE & 1-14.0mm ² THHN Cu. WIRE IN CABLE TRAY													
CIRCUIT NUMBER	LOAD DESCRIPTION	VA LOAD	3Ø CURRENT	AB	CA	BC	CIRCUIT BREAKER			CONDUCTOR		CONDUIT	
							POLE	AF	AT	SIZE	TYPE	DIAMETER	TYPE
1	1 SET OF 4.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	3100		13.48			2	150	30	2-5.5mm ² & 1-3.5mm ²	THHN	25MM	EMT
2	1 SET OF 2.0HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	1510			6.57		2	150	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
3	1 SET OF 2.0HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	1510				6.57	2	150	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
4	1 SET OF 2.0HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	1510		6.57			2	150	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
5	1 SET OF 2.0HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	1945			6.46		2	150	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
6	1 SET OF 2.0HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	1945				6.46	2	150	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
7	1 SET OF 2.0HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	1510		6.57			2	150	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
8	1 SET OF 2.0HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	1510			6.57		2	150	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
9	1 SET OF 2.0HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	1510				6.57	2	150	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
10	1 SET OF 3.0HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	1885		8.11			2	150	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
11	1 SET OF 3.0HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	1885			8.11		2	150	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
12	1 SET OF 2.0HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	1510				6.57	2	150	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
13	1 SET OF 2.0HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	1510		6.57			2	150	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
14	1 SET OF 1.5HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	910			3.96		2	150	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
15	1 SET OF 1.5HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	910				3.96	2	150	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
16	1 SET OF 2.0HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	1510		6.57			2	150	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
17	1 SET OF 1.5HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	910			3.96		2	150	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
18	1 SET OF 2.0HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	1945				6.46	2	150	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
19	1 SET OF 2.0HP WALL MOUNTED SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	1510		6.57			2	150	20	2-3.5mm ² & 1-3.5mm ²	THHN	20MM	EMT
20	1 SET OF 4.0HP STANDING SPLIT, INVERTER TYPE AIRCONDITIONING UNIT OUTLET	3100			13.48		2	150	30	2-5.5mm ² & 1-3.5mm ²	THHN	25MM	EMT
TOTAL		33,595		54.44	51.11	40.59							

FEEDER CONDUCTOR
 $I_{FL} = \sqrt{3} (54.44 + 13.48 @ 25\%) = 100.13 \text{ A}$
 USE: 3 - 80.0 mm² THW Cu. WIRE & 1 - 14.0 mm² THHN Cu. WIRE IN CABLE TRAY

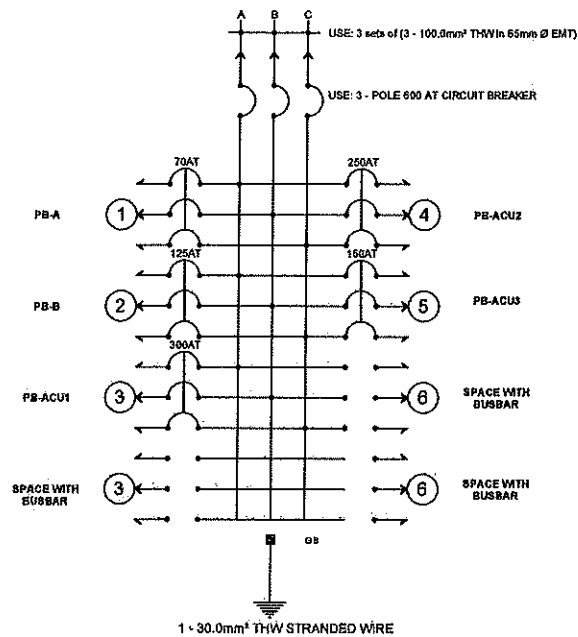
OVERCURRENT PROTECTION
 $I_{FL} = \sqrt{3} (40.96 + 13.48 @ 250\%) = 129.3149 \text{ A}$
 USE: 3 POLE 150AT, 240V, 150AF, 60HZ, MCCB

SCHEDULE OF LOADS

 <p>PHYSICAL PLANNING AND DEVELOPMENT OFFICE ROOM 202 FEM HALL, MARIANO MARCOS STATE UNIVERSITY City of Batangas, Batangas Province Telephone: +63 (77) 792-3191</p>	FROM THE OFFICE:	DESIGNED BY:	SIGNED AND SEALED BY:	PROJECT TITLE:	CONFORME:	APPROVED BY:	SHEET CONTENT:	REVISION AND DATE:	SHEET NO.:
		LEMUEL J. BACAYAS		ADDITIONAL ELECTRICAL WORKS FOR CENTER OF FLEXIBLE LEARNING	SATURIN M. NIEVEROS		AS SHOWN		E-5
		CHECKED/REVIEWED BY:	DATE ISSUED:	LOCATION: WWSU - CITY OF BATAK, ILOCOS NORTE	RECOMMENDED BY:				



MDP



- | | | | |
|--|-----------------------------------|--|-------------------------------|
| | Panelboard | | Duplex Weather proof CO |
| | Circuit Breaker | | Duplex Convenience Outlet |
| | 2 x 18V LED Fluorescent Lamp Tube | | SPONEMA 3R (ACU) |
| | LED COB High Ceiling Downlight | | Distribution Line/Feeder Line |
| | LED Wall Lamp | | Circuit Homeman |
| | LED Floodlight | | 1-Gang Switch |
| | LED Downlight/Dimmable | | 2-Gang Switch |
| | LED Inground Light | | 3-Gang Switch |
| | Emergency Light Outlet | | 3-Way Switch |
| | Ceiling Mounted Exhaust Fan | | Fan Switch |

GENERAL NOTES AND SPECIFICATIONS

- All works herein shall be done in accordance with the plans and specifications. The applicable provisions of the latest edition of the Philippine Electrical Code, the rules and regulation of the local enforcing authority, and the requirements of the local power and telephones companies, the electrical works shall be under the immediate supervision of a duly Registered Electrical Engineer/Registered Master Electrician.
- The control wires shall be as indicated or as specified elsewhere on plans.
- The contractor shall be verify and attest the actual location of service entrance for connection to the power supply.
- All pipe sleeves shall be provided with proper support or anchorage necessary for permanent connection with concrete on beam electrical code.
- All service entrance equipment, switches, panel boards, lighting fixtures and all man-current carrying metals parts shall be properly grounded in accordance with the latest edition of the Philippine Electrical Code.
- All homeruns to panelboards more than 30 meters in length shall be one step larger unless otherwise specified.
- All feeders shall be installed as indicated on plans branch circuit homerun wires shall be installed in individual homerun conduits.
- Conduit shall be properly supported for permanent installation. Conduit run in second floor ceiling shall be installed above ceiling line.
- Any discrepancy in location and rating of equipment and apparatus shall be verified with the proper authority and changes shall be made accordingly.
- All materials to be used and the equipment to be installed shall be brand new and must be of the approved type for the particular location and purpose intended.
- The mounting heights of wiring devices shall be as follows:
 - Light switches - 1.4 m above finished floor
 - Convenience outlets - 0.3 m above finished floor or as required
 - Convenience outlets/SPG - 0.3 m above finished counter top or as required
 - ACU, Motor Outlet and SPG's - not less than 0.4 m above finished floor or as required
 - Telephone outlets - 0.3 m above finished floor by its required
 - Panelboards & cabinets - 1.8 m above finished floor to center
 All switches should be located in a very strategic location.
- Refer to the accompanying notes and specifications for more complete description/requirements of this project.

SINGLE LINE DIAGRAM

ELECTRICAL SYMBOLS



FROM THE OFFICE:
 PHYSICAL PLANNING AND DEVELOPMENT OFFICE
 ROOM 202 FENI HALL, MARIKINA BARCOS STATE UNIVERSITY
 City of Marikina, Bataan
 Telephone: +63 (77) 792-3191

DESIGNED BY:
 LEMUEL JOSEPH P. BAGAYAS
 CHECKED/REVIEWED BY:
 FREDDIE MICHAEL DALCANYAN

SIGNED AND SEALED BY:
 PROJECT TITLE:
 ELECTRICAL WORKS FOR
 CENTER OF FLEXIBLE LEARNING

CONFORME:
 SATURIN M. NISPEROS
 RECORDED AND INDEXED:
 INOVA O. DELA CRUZ

APPROVED BY:
 SHIRLEY M. GRUPIS

SHEET CONTENT:
 AS SHOWN

REVISION AND DATE:

SHEET NO:
 E-6