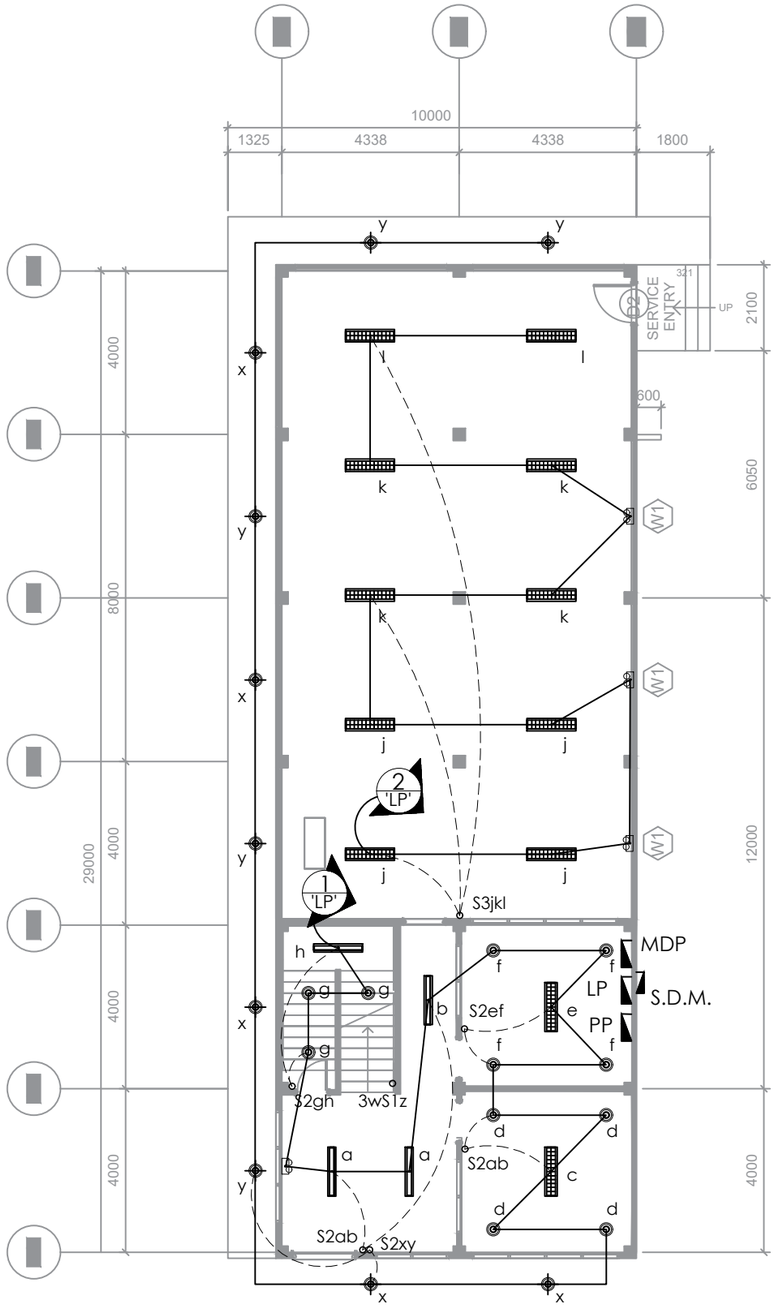
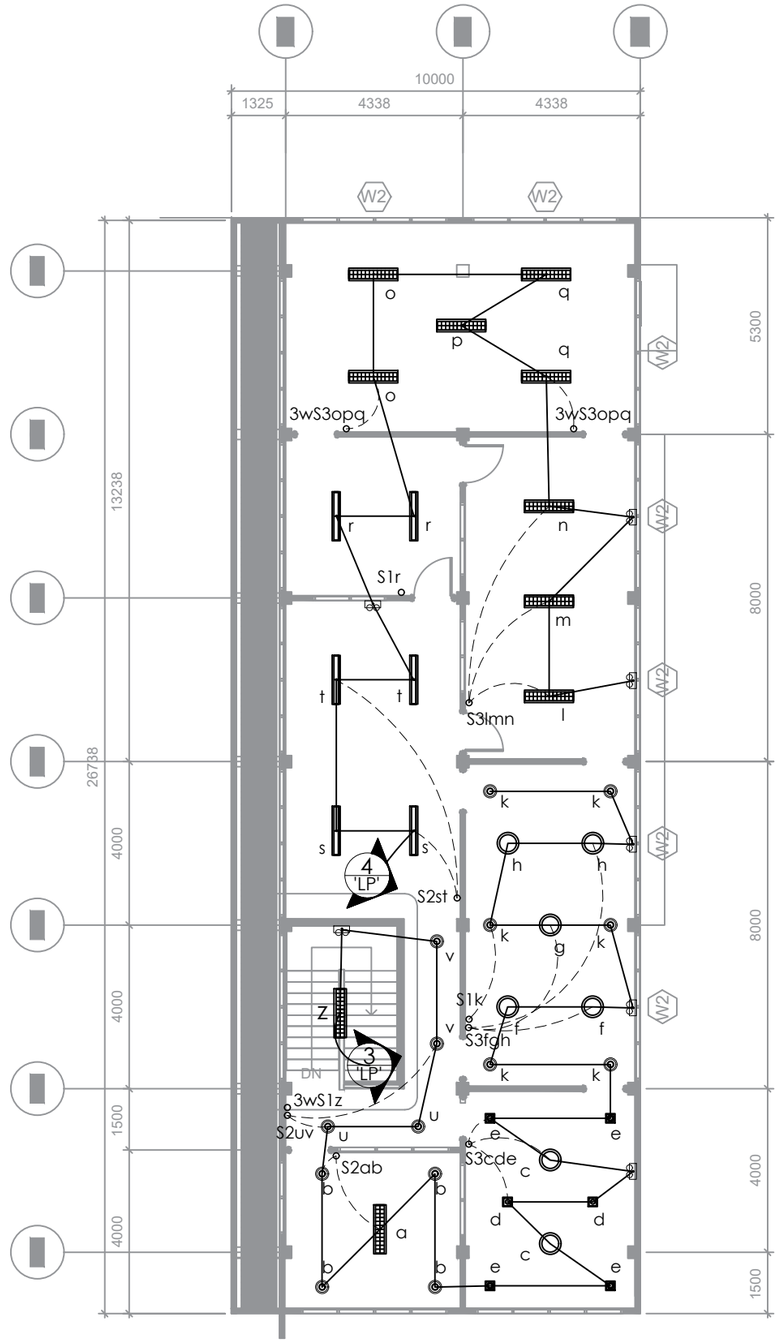
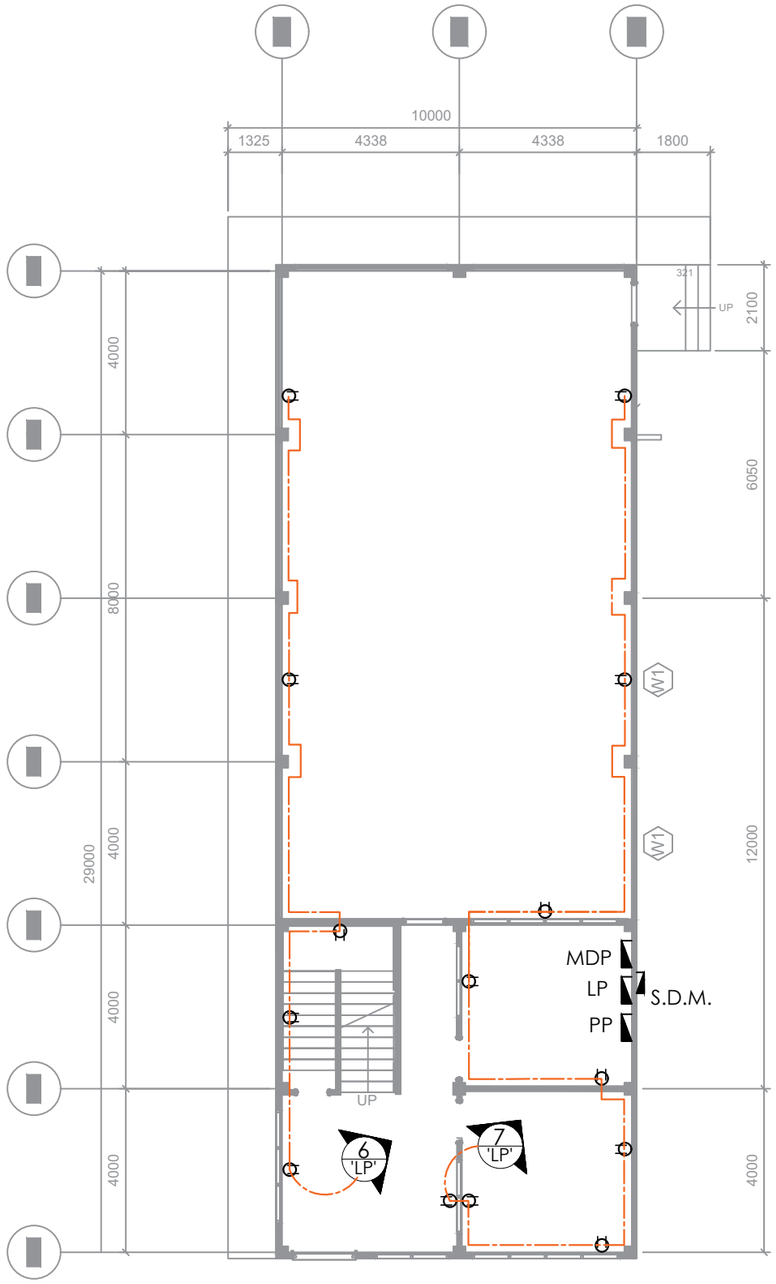



1 E-1 GROUND FLOOR LIGHTING LAYOUT
SCALE 1 : 150 M

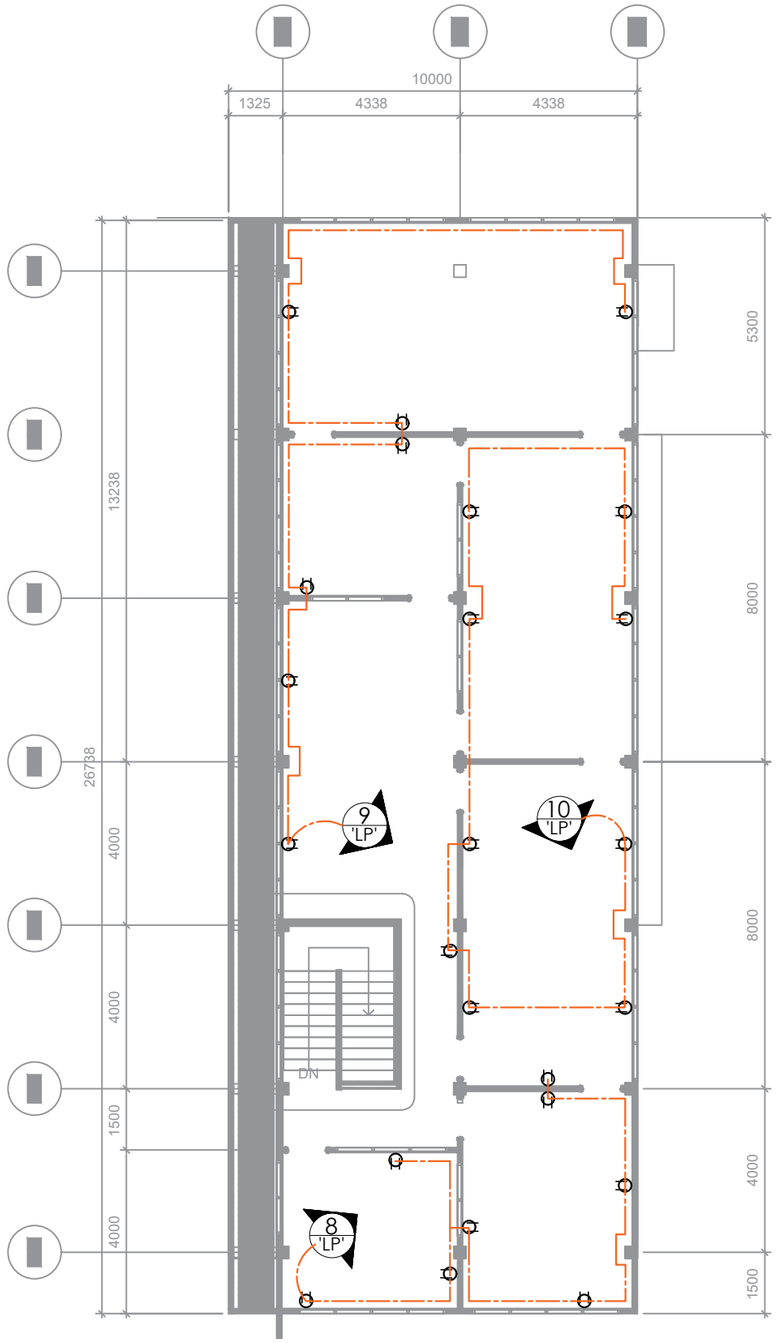



2 E-1 SECOND FLOOR LIGHTING LAYOUT
SCALE 1 : 150 M

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TIN: | Prepared by: | PROJECT TITLE: | CHECKED / APPROVED BY: | CONFORMED / APPROVED BY: | APPROVED BY: | SHEET CONTENT: | DESIGNED BY: | E1 02 |
| PRC: 0059366 | | **CONSTRUCTION OF VSU POWER PLANT BUILDING** | **ENGR. MARIO LILIO P. VALENZONA** | **DR. DANIEL LESLIE S. TAN** | **DR. EDGARDO E. TULIN** | LIGHTING LAYOUT | CADD BY: | |
| PTR: | | | | | | | STARTED: | SHEET NO. |
| DATE: 09/30/2015 | **Engr. CLINT C. SARVIDA** | | | | | | FINISHED: | 1 07 |
| PLACE: Ormoc City | Electrical Engineer II | LOCATION: VSU MAIN CAMPUS, BAYBAY CITY, LEYTE PHILIPPINES, 6521 - A | DIRECTOR, PPO | VP OF ADMINISTRATIVE AND FINANCE | VSU PRESIDENT | | PLACE: | |




GROUND FLOOR
1 / E-2 POWER LAYOUT
SCALE 1 : 150 M




SECOND FLOOR
2 / E-2 POWER LAYOUT
SCALE 1 : 150 M

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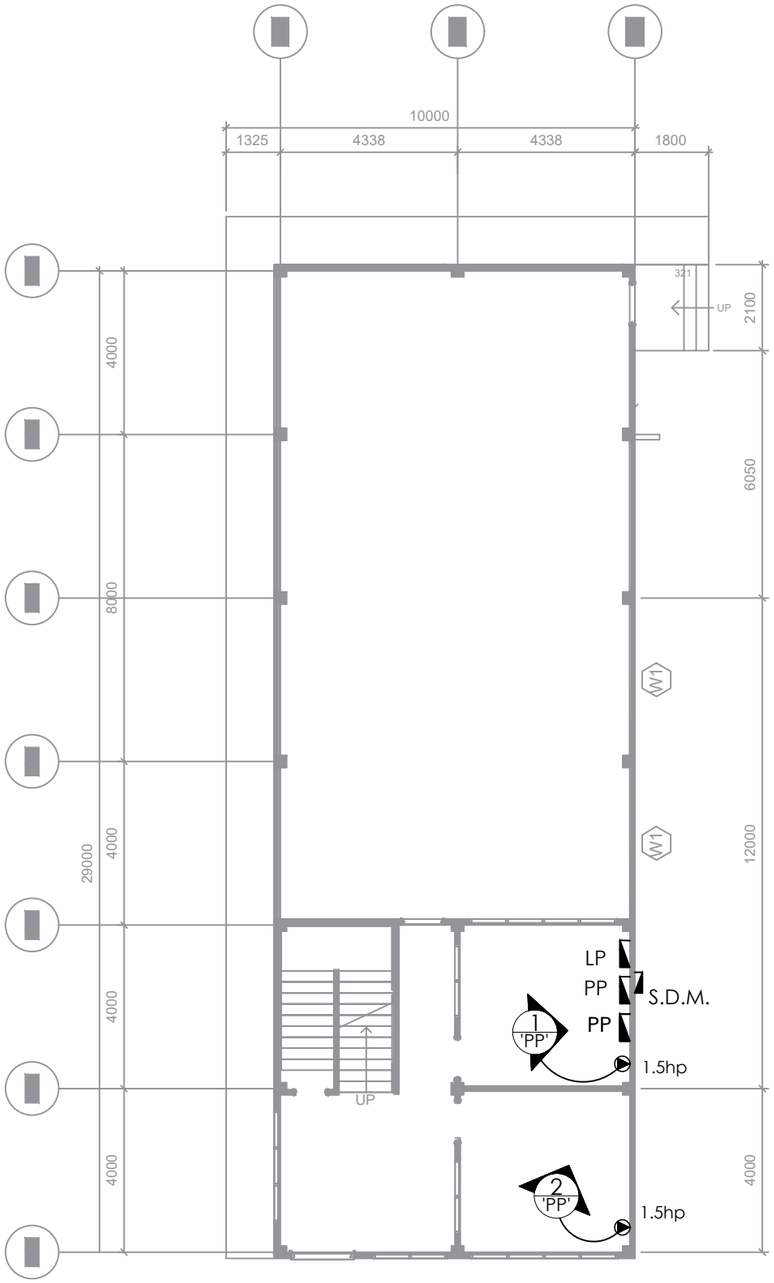
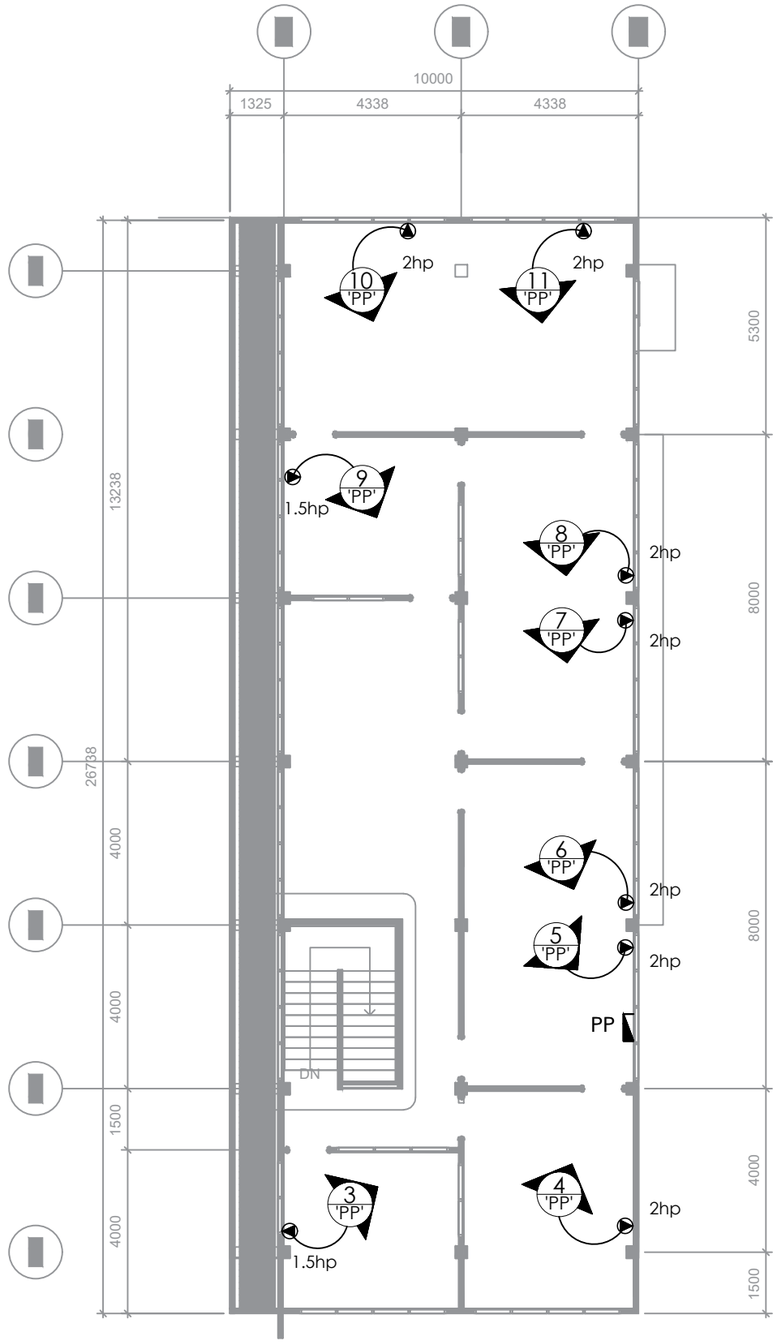
|---|---|---|---|---|---|---|---|---|
| TIN: | Prepared by: | | PROJECT TITLE: | CHECKED / APPROVED BY: | CONFORMED / APPROVED BY: | APPROVED BY: | SHEET CONTENT: | DESIGNED BY: |
| PRC: 0059366 | | | **CONSTRUCTION OF VSU POWER PLANT BUILDING** | | | | POWER LAYOUT | CADD BY: |
| PTR: | **Engr. CLINT C. SARVIDA** | | | **ENGR. MARIO LILIO P. VALENZONA** | **DR. DANIEL LESLIE S. TAN** | **DR. EDGARDO E. TULIN** | | STARTED: |
| DATE: 09/30/2015 | | | LOCATION: VSU MAIN CAMPUS, BAYBAY CITY, LEYTE PHILIPPINES, 6521 - A | DIRECTOR, PPO | VP OF ADMINISTRATIVE AND FINANCE | VSU PRESIDENT | | FINISHED: |
| PLACE: Ormoc City | Electrical Engineer II | | | | | | | PLACE: |

E2 | 02
SHEET NO.
02 | 07



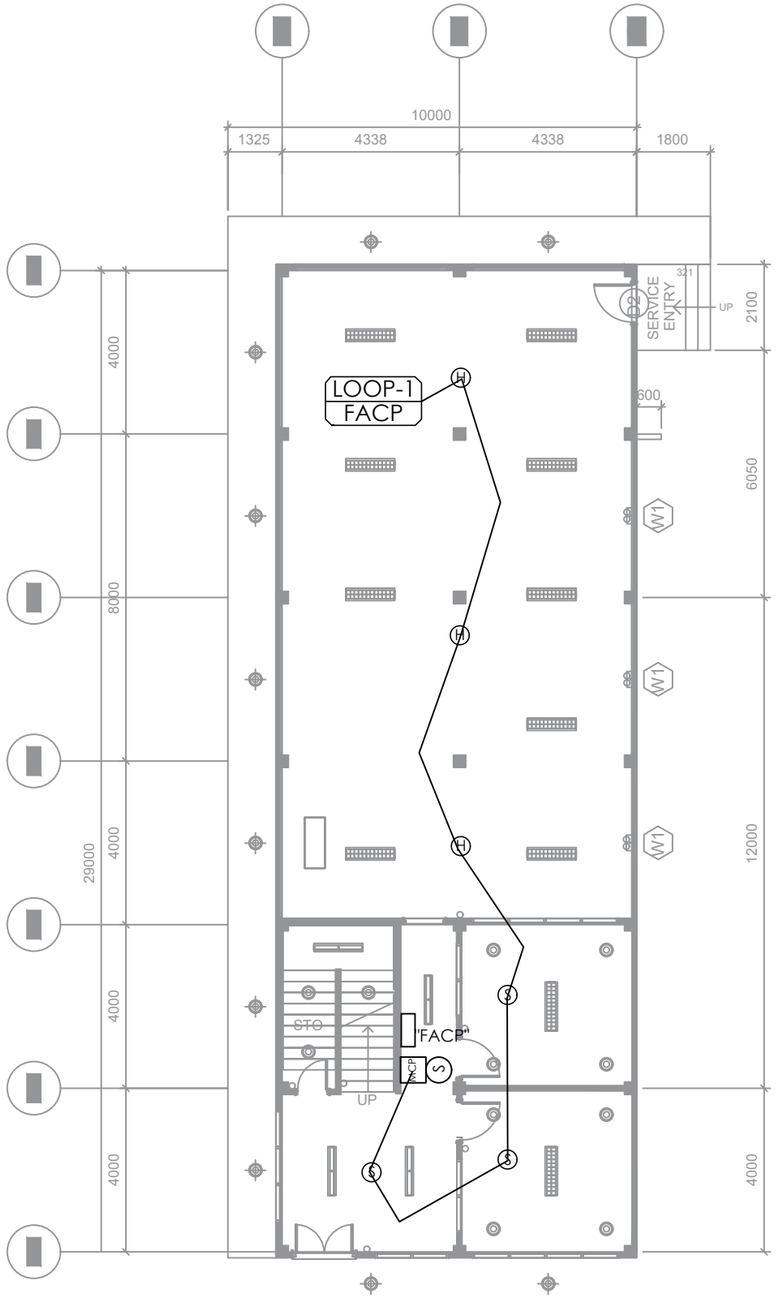

GROUND FLOOR
1 / E-3 ACU POWER LAYOUT
SCALE 1 : 150 M




SECOND FLOOR
2 / E-3 ACU POWER LAYOUT
SCALE 1 : 150 M

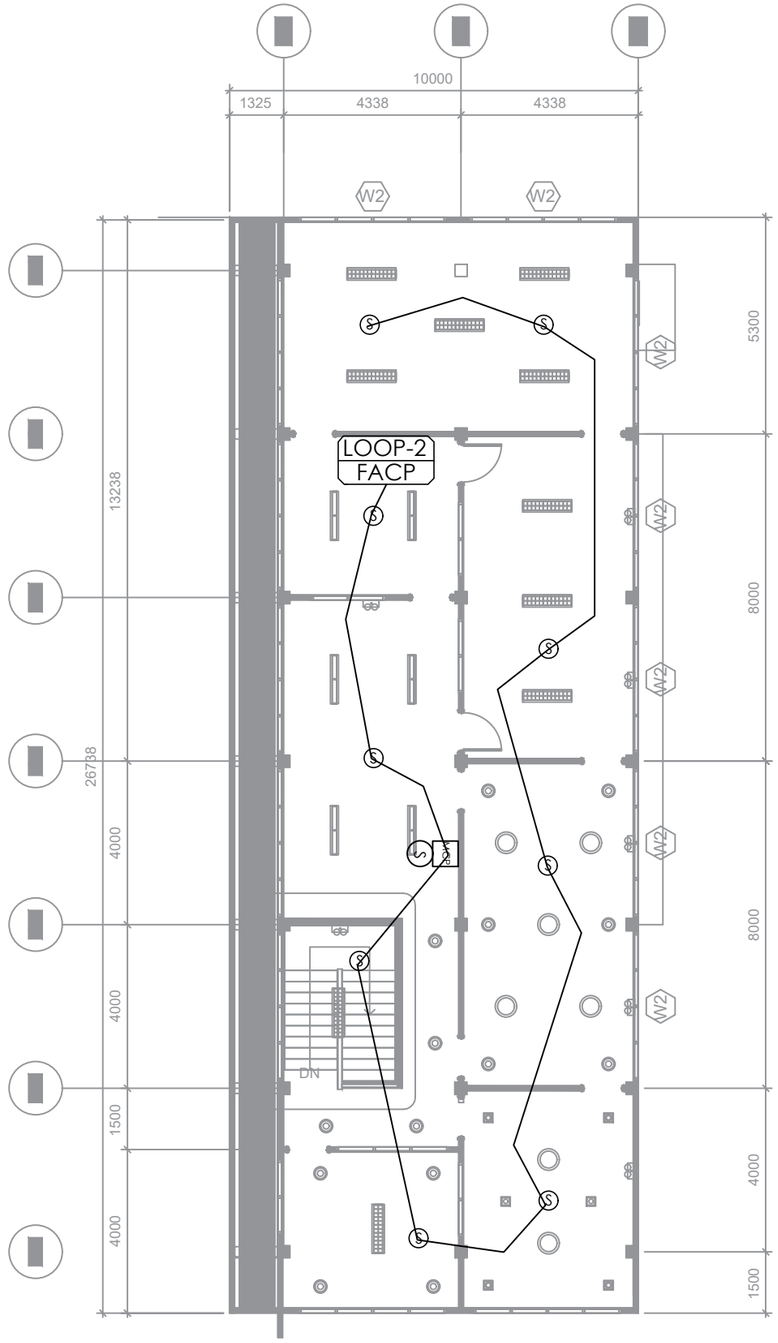
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| TIN: | Prepared by: | PROJECT TITLE: | CHECKED / APPROVED BY: | CONFORMED / APPROVED BY: | APPROVED BY: | SHEET CONTENT: | DESIGNED BY: |
| PRC: 0059366 | | **CONSTRUCTION OF VSU POWER PLANT BUILDING** | **ENGR. MARIO LILIO P. VALENZONA** | **DR. DANIEL LESLIE S. TAN** | **DR. EDGARDO E. TULIN** | ACU LAYOUT | CADD BY: |
| PTR: | **Engr. CLINT C. SARVIDA** | | | | | | STARTED: |
| DATE: 09/30/2015 | | | | | | | FINISHED: |
| PLACE: Ormoc City | Electrical Engineer II | LOCATION: VSU MAIN CAMPUS, BAYBAY CITY, LEYTE PHILIPPINES, 6521 - A | DIRECTOR, PPO | VP OF ADMINISTRATIVE AND FINANCE | VSU PRESIDENT | | PLACE: |

E3 02 / SHEET NO. 03 07




1 E-4 GROUND FLOOR FIRE ALARM LAYOUT

SCALE 1 : 150 M




2 E-4 GROUND FLOOR FIRE ALARM LAYOUT

SCALE 1 : 150 M

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TIN: | Prepared by: | | PROJECT TITLE: | CHECKED / APPROVED BY: | CONFORMED / APPROVED BY: | APPROVED BY: | SHEET CONTENT: | DESIGNED BY: |
| PRC: 0059366 | | | | | | | | CADD BY: |
| PTR: | Engr. CLINT C. SARVIDA | | CONSTRUCTION OF VSU POWER PLANT BUILDING | ENGR. MARIO LILIO P. VALENZONA | DR. DANIEL LESLIE S. TAN | DR. EDGARDO E. TULIN | | STARTED: |
| DATE: 09/30/2015 | | | | | | | | FINISHED: |
| PLACE: Ormoc City | Electrical Engineer II | | LOCATION: VSU MAIN CAMPUS, BAYBAY CITY, LEYTE PHILIPPINES, 6521 - A | DIRECTOR, PPO | VP OF ADMINISTRATIVE AND FINANCE | VSU PRESIDENT | | PLACE: |

E4 02 SHEET NO. 04 07

PROJECT NAME: POWER PLANT OFFICE
ADDRESS: VSU, BAYBAY CITY, LEYTE
PANEL NAME: LP

SYSTEM: SINGLE PHASE
CONNECTION: L-N ( GROUNDED L2 )
L-L VOLTAGE: 240 VAC
FREQUENCY: 60 HZ

WIRE COLOR CODING:
L1- RED
L2- WHITE
G- GREEN
N- WHITE

TYPE: BOLT-ON TYPE
MOUNTING TYPE: FLUSHED TYPE
ENCLOSURE TYPE: NEMA 3R

| CKT. NO | DESCRIPTION | LIGHTS,EM. &FAN | SWITCH | C.O. | SPECIAL LOADS | LOAD DETAILS | | | | | I(A) | CIRCUIT BREAKER | | | | | WIRES | | | | | | | CONDUIT | | % VD | TER-MINAL # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | LOAD VA | PHASE NO. | LOAD P.F. | TYPE ( C , N-C) | VOLTS | L-N | AT | AF | P | KAIC | TYPE | SETS | PHASE | EGC | TYPE | | RUN (mtrs) | SIZE | TYPE | | |
| | | | | | | | | | | | | | | | | | | | | INSULATION | Cu/Al | | | | | |
| 1 | LIGHTING OUTLET | 28 | 5 | | | 553 | 1 | 1 | C | 240 | 2.88 | 15 | 50 | 2 | 6 | MCCB | 1 | 3.5 mm2 | 2.0 mm2 | THHN/THW | Cu | 92 | 20 mm. dia. | PVC | 0.72 | 1,3 |
| 2 | LIGHTING OUTLET | 5 | 1 | | | 400 | 1 | 1 | C | 240 | 2.08 | 15 | 50 | 2 | 6 | MCCB | 1 | 3.5 mm2 | 2.0 mm2 | THHN/THW | Cu | 52 | 20 mm. dia. | PVC | 0.30 | 2,4 |
| 3 | LIGHTING OUTLET | 26 | 7 | | | 300 | 1 | 1 | C | 240 | 1.56 | 15 | 50 | 2 | 6 | MCCB | 1 | 3.5 mm2 | 2.0 mm2 | THHN/THW | Cu | 76 | 20 mm. dia. | PVC | 0.32 | 5,7 |
| 4 | LIGHTING OUTLET | 17 | 5 | | | 898 | 1 | 1 | C | 240 | 4.68 | 15 | 50 | 2 | 6 | MCCB | 1 | 3.5 mm2 | 2.0 mm2 | THHN/THW | Cu | 54 | 20 mm. dia. | PVC | 0.69 | 6,8 |
| 5 | FIRE ALARM CKT. | | | | | 500 | 1 | 1 | C | 240 | 2.60 | 20 | 50 | 2 | 6 | MCCB | 1 | 3.5 mm2 | 2.0 mm2 | THHN/THW | Cu | 9 | 20 mm. dia. | PVC | 0.06 | 9,11 |
| 6 | RECEPTACLE OUTLET | | | 5 | | 900 | 1 | 1 | N-C | 240 | 3.75 | 20 | 50 | 2 | 6 | MCCB | 1 | 3.5 mm2 | 2.0 mm2 | THHN/THW | Cu | 27 | 20 mm. dia. | PVC | 0.28 | 10,12 |
| 7 | RECEPTACLE OUTLET | | | 9 | | 1620 | 1 | 1 | N-C | 240 | 6.75 | 20 | 50 | 2 | 6 | MCCB | 1 | 3.5 mm2 | 2.0 mm2 | THHN/THW | Cu | 38 | 20 mm. dia. | PVC | 0.70 | 13,15 |
| 8 | RECEPTACLE OUTLET | | | 8 | | 1440 | 1 | 1 | N-C | 240 | 6.00 | 20 | 50 | 2 | 6 | MCCB | 1 | 3.5 mm2 | 2.0 mm2 | THHN/THW | Cu | 25 | 20 mm. dia. | PVC | 0.41 | 14,16 |
| 9 | RECEPTACLE OUTLET | | | 7 | | 1260 | 1 | 1 | N-C | 240 | 5.25 | 20 | 50 | 2 | 6 | MCCB | 1 | 3.5 mm2 | 2.0 mm2 | THHN/THW | Cu | 45 | 20 mm. dia. | PVC | 0.65 | 17,19 |
| 10 | RECEPTACLE OUTLET | | | 9 | | 1620 | 1 | 1 | N-C | 240 | 6.75 | 20 | 50 | 2 | 6 | MCCB | 1 | 3.5 mm2 | 2.0 mm2 | THHN/THW | Cu | 37 | 20 mm. dia. | PVC | 0.68 | 18,20 |
| 11 | SPARE | | | | | 1000 | 1 | 1 | N-C | 240 | 4.17 | 20 | 50 | 2 | 6 | MCCB | 1 | | | | | | 20 mm. dia. | PVC | | 21,23 |
| 12 | SPARE | | | | | 1000 | 1 | 1 | N-C | 240 | 4.17 | 20 | 50 | 2 | 6 | MCCB | 1 | | 2.0 mm2 | | | | 20 mm. dia. | PVC | | 22,24 |
| TOTAL | | | | | | 11491 | | | | | 50.64 | | | | | | | | | | | | | | | |

1. SERVICE WIRE SIZING
DEMAND LOAD = [ TOTAL LOAD x D.F. + 25% OF HIGHEST MOTOR LOAD ]/SYSTEM VOLTAGE
*TOTAL LOAD = SUM OF -- EACH KVA LOAD MULTIPLIED BY ITS CORRESPONDING CONTINUOUS/NON- CONTINUOUS FACTOR --*
=[(12153.75)(0.74)+(0.25)(0.00) ] /240 A
= 37.69 A

FOR FEEDER/SERVICE WIRE & CONDUIT, USE:
1 set of 2-14 mm2 THHN/THW + 1-8.0 mm2 THHN/THW(G)
IN 25mm dia. PVC PIPE
FOR FEEDER/SERVICE PROTECTION, USE:
60AT/60AF,2P,8KAIC ,MCCB

1 / E-5 PANEL " LP " SCHEDULE OF LOADS NOT TO SCALE

PROJECT NAME: POWER PLANT OFFICE
ADDRESS: VSU, BAYBAY CITY, LEYTE
PANEL NAME: PP

SYSTEM: SINGLE PHASE
CONNECTION: L-N ( GROUNDED L2 )
L-L VOLTAGE: 240 VAC
FREQUENCY: 60 HZ

WIRE COLOR CODING:
L1- RED
L2- WHITE
G- GREEN
N- WHITE

TYPE: PLUG-IN TYPE
MOUNTING TYPE: FLUSHED TYPE
ENCLOSURE TYPE: NEMA 3R

| CKT. NO | DESCRIPTION | LIGHTS,EM. &FAN | SWITCH | C.O. | SPECIAL LOADS | LOAD DETAILS | | | | | I(A) | CIRCUIT BREAKER | | | | | WIRES | | | | | | | CONDUIT | | % VD | TER-MINAL # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | LOAD VA | PHASE NO. | LOAD P.F. | TYPE ( C , N-C) | VOLTS | L-N | AT | AF | P | KAIC | TYPE | SETS | PHASE | EGC | TYPE | | RUN (mtrs) | SIZE | TYPE | | |
| | | | | | | | | | | | | | | | | | | | | INSULATION | Cu/Al | | | | | |
| 1 | ACU OUTLET(1.5HP) | | | | 1 | 1231 | 1 | 0.92 | C | 240 | 5.90 | 30 | 50 | 2 | 6 | MCCB | 1 | 5.5 mm2 | 3.5 mm2 | THHN/THW | Cu | 4 | 20 mm. dia. | PVC | 0.04 | 1,3 |
| 2 | ACU OUTLET(1.5HP) | | | | 1 | 1231 | 1 | 0.92 | C | 240 | 5.90 | 30 | 50 | 2 | 6 | MCCB | 1 | 5.5 mm2 | 3.5 mm2 | THHN/THW | Cu | 7 | 20 mm. dia. | PVC | 0.06 | 2,4 |
| 3 | ACU OUTLET(1.5HP) | | | | 1 | 1231 | 1 | 0.92 | C | 240 | 5.90 | 30 | 50 | 2 | 6 | MCCB | 1 | 5.5 mm2 | 3.5 mm2 | THHN/THW | Cu | 12 | 20 mm. dia. | PVC | 0.11 | 5,7 |
| 4 | ACU OUTLET(2.0HP) | | | | 1 | 1810 | 1 | 0.92 | C | 240 | 8.67 | 30 | 50 | 2 | 6 | MCCB | 1 | 5.5 mm2 | 3.5 mm2 | THHN/THW | Cu | 7 | 20 mm. dia. | PVC | 0.09 | 6,8 |
| 5 | ACU OUTLET(2.0HP) | | | | 1 | 1810 | 1 | 0.92 | C | 240 | 8.67 | 30 | 50 | 2 | 6 | MCCB | 1 | 5.5 mm2 | 3.5 mm2 | THHN/THW | Cu | 4 | 20 mm. dia. | PVC | 0.05 | 9,11 |
| 6 | ACU OUTLET(2.0HP) | | | | 1 | 1810 | 1 | 0.92 | C | 240 | 8.67 | 30 | 50 | 2 | 6 | MCCB | 1 | 5.5 mm2 | 3.5 mm2 | THHN/THW | Cu | 5 | 20 mm. dia. | PVC | 0.07 | 10,12 |
| 7 | ACU OUTLET(2.0HP) | | | | 1 | 1810 | 1 | 0.92 | C | 240 | 8.67 | 30 | 50 | 2 | 6 | MCCB | 1 | 5.5 mm2 | 3.5 mm2 | THHN/THW | Cu | 12 | 20 mm. dia. | PVC | 0.16 | 13,15 |
| 8 | ACU OUTLET(2.0HP) | | | | 1 | 1810 | 1 | 0.92 | C | 240 | 8.67 | 30 | 50 | 2 | 6 | MCCB | 1 | 5.5 mm2 | 3.5 mm2 | THHN/THW | Cu | 12 | 20 mm. dia. | PVC | 0.16 | 14,16 |
| 9 | ACU OUTLET(1.5HP) | | | | 1 | 1231 | 1 | 0.92 | C | 240 | 5.90 | 30 | 50 | 2 | 6 | MCCB | 1 | 5.5 mm2 | 3.5 mm2 | THHN/THW | Cu | 18 | 20 mm. dia. | PVC | 0.16 | 17,19 |
| 10 | ACU OUTLET(2.0HP) | | | | 1 | 1810 | 1 | 0.92 | C | 240 | 8.67 | 30 | 50 | 2 | 6 | MCCB | 1 | 5.5 mm2 | 3.5 mm2 | THHN/THW | Cu | 23 | 20 mm. dia. | PVC | 0.31 | 18,20 |
| 11 | ACU OUTLET(2.0HP) | | | | 1 | 1810 | 1 | 0.92 | C | 240 | 8.67 | 30 | 50 | 2 | 6 | MCCB | 1 | 5.5 mm2 | 3.5 mm2 | THHN/THW | Cu | 21 | 20 mm. dia. | PVC | 0.28 | 21,23 |
| 12 | SPARE | | | | | 1231 | 1 | 0.92 | C | 240 | 5.90 | 30 | 50 | 2 | 6 | MCCB | | | | | | | 20 mm. dia. | PVC | | 22,24 |
| TOTAL | | | | | | 18825 | | | | | 90.20 | | | | | | | | | | | | | | | |

1. SERVICE WIRE SIZING
DEMAND LOAD = [ TOTAL LOAD x D.F. + 25% OF HIGHEST MOTOR LOAD ]/SYSTEM VOLTAGE
*TOTAL LOAD = SUM OF -- EACH KVA LOAD MULTIPLIED BY ITS CORRESPONDING CONTINUOUS/NON- CONTINUOUS FACTOR --*
=[(21648.75)(0.98)+(0.25)(1810.00) ] /240 A
= 90.32 A

FOR FEEDER/SERVICE WIRE & CONDUIT, USE:
1 set of 2-38 mm2 THHN/THW + 1-14 mm2 THHN/THW(G)
IN 40mm DIA. PVC PIPE
FOR FEEDER/SERVICE PROTECTION, USE:
100AT/100AF,2P,8KAIC ,MCCB

1 / E-5 PANEL " PP " SCHEDULE OF LOADS NOT TO SCALE

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| TIN: | Prepared by: | PROJECT TITLE: | CHECKED / APPROVED BY: | CONFORMED / APPROVED BY: | APPROVED BY: | SHEET CONTENT: | DESIGNED BY: E5 02 |
| PRC: 0059366 | Engr. CLINT C. SARVIDA | CONSTRUCTION OF VSU POWER PLANT BUILDING | ENGR. MARIO LILIO P. VALENZONA | DR. DANIEL LESLIE S. TAN | DR. EDGARDO E. TULIN | SCHEDULE OF LOADS | CADD BY: |
| PTR: | | | | | | | STARTED: SHEET NO. |
| DATE: 09/30/2015 | | LOCATION: VSU MAIN CAMPUS, BAYBAY CITY, LEYTE PHILIPPINES, 6521 - A | DIRECTOR, PPO | VP OF ADMINISTRATIVE AND FINANCE | VSU PRESIDENT | | FINISHED: 23 27 |
| PLACE: Ormoc City | Electrical Engineer II | | | | | | PLACE: |

## 1 E-4 PANEL " MDP " SCHEDULE OF LOADS

NOT TO SCALE

PANEL NAME: MDP

SYSTEM: SINGLE PHASE
CONNECTION: L-N ( GROUNDED L2 )
L-L VOLTAGE: 240
FREQUENCY: 60

WIRE COLOR CODING:
L1- RED
L2- WHITE
G- GREEN
N- WHITE

TYPE: BOLT-ON TYPE
MOUNTING TYPE: FLUSHED TYPE
ENCLOSURE TYPE: NEMA 3R

| CKT. NO | DESCRIPTION | LOAD DETAILS | | | I(A) | CIRCUIT BREAKER | | | | | WIRES | | | | | CONDUIT | | TER-MINAL # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LOAD VA | PHASE NO. | VOLTS | L-N | AT | AF | P | KAIC | TYPE | SETS | PHASE | EGC | TYPE | | SIZE | TYPE | |
| | | | | | | | | | | | | | | INSULATION | Cu/Al | | | |
| 1 | PANEL LP | 11491 | 1 | 240 | 51 | | | | | | 1 | 14 mm2 | 8.0 mm2 | THHN/THW | Cu | 25 mm. dia. | PVC | 1,3 |
| 2 | PANEL PP | 18825 | 1 | 240 | 90 | | | | | | 1 | 38 mm2 | 14 mm2 | THHN/THW | Cu | 40 mm. dia. | PVC | 2,4 |
| | TOTAL | 30316 | | | 172.42 | | | | | | | | | | | | | |

1. SERVICE WIRE SIZING

DEMAND LOAD = [ TOTAL LOAD x D.F. + 25% OF HIGHEST MOTOR LOAD ]/SYSTEM VOLTAGE

*TOTAL LOAD = SUM OF -- EACH KVA LOAD MULTIPLIED BY ITS CORRESPONDING CONTINUOUS/NON- CONTINUOUS FACTOR --*

=[(30316.00)(0.89)+(0.25)(8.67) ] /240 A

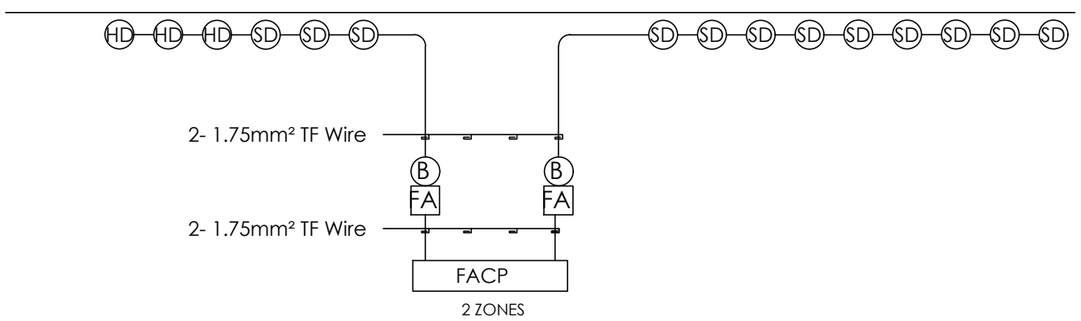
= 112.54 A

FOR FEEDER/SERVICE WIRE & CONDUIT, USE:
1 set of 2-60 mm2 THHN/THW Cu wire
IN 40mm DIA. PVC PIPE

FOR FEEDER/SERVICE PROTECTION, USE:
150AT/150AF,2P,10KAIC ,MCCB

## 2 E-4 FIRE ALARM RISER DIAGRAM

NOT TO SCALE




G/F

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| LEYTE STATE UNIVERSITY | TIN: | Prepared by: | PROJECT TITLE: | CHECKED / APPROVED BY: | CONFORMED / APPROVED BY: | APPROVED BY: | SHEET CONTENT: | DESIGNED BY: | E6 02 |
| | PRC: 0059366 | | CONSTRUCTION OF VSU POWER PLANT BUILDING | ENGR. MARIO LILIO P. VALENZONA | DR. DANIEL LESLIE S. TAN | DR. EDGARDO E. TULIN | SCHEDULE OF LOADS<br>FIRE ALARM RISER DIAGRAM | CADD BY: | |
| | PTR: | | | | | | | STARTED: | SHEET NO. |
| | DATE: 09/30/2015 | Engr. CLINT C. SARVIDA | | | | | | FINISHED: | 24 27 |
| | PLACE: Ormoc City | Electrical Engineer II | LOCATION: VSU MAIN CAMPUS, BAYBAY CITY, LEYTE PHILIPPINES, 6521 - A | DIRECTOR, PPO | VP OF ADMINISTRATIVE AND FINANCE | VSU PRESIDENT | | PLACE: | |

## 1 E-5 GENERAL NOTES AND SPECIFICATIONS
NOT TO SCALE

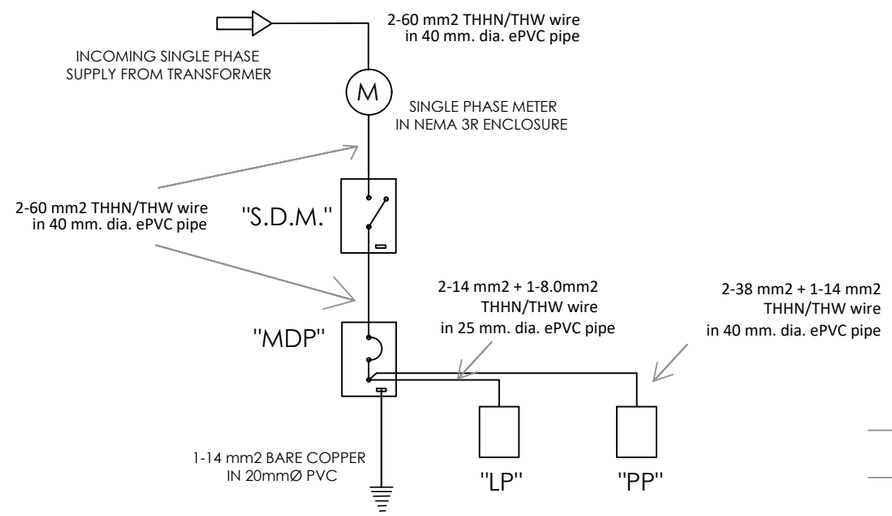
1. ALL ELECTRICAL WORKS SHALL COMPLY IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS. THE APPLICABLE PROVISIONS OF THE LATEST EDITION OF THE PHILIPPINE ELECTRICAL CODE (PEC).THE RULES AND REGULATIONS OF THE LOCAL ENFORCING AUTHORITY AND THE REQUIREMENTS OF THE LOCAL POWER COMPANY.
   THE ELECTRICAL WORKS SHALL BE UNDER IMMEDIATE SUPERVISION OF A DULLY REGISTERED ELECTRICAL ENGINEER.
2. THE ELECTRICAL SERVICE POWER IS 1 - PHASE, 2 WIRE + GROUND 230 V AC, 60Hz.
3. WIRING METHOD SHALL BE AS FOLLOWS :
   a. FEEDERS AND RISERS - POLYVINYL CHLORIDE CONDUIT
   b. LIGHTING, POWER RECEPTACLE
   BRANCH CKT., & AUXILLARY - POLYVINYL CHLORIDE CONDUIT
4. ALL WIRES SHALL BE COPPER AND THERMOPLASTIC INSULATED TYPE "THHN" UNLESS OTHERWISE INDICATED IN THE PLAN. THE MINIMUM SIZE OF WIRE FOR POWER AND LIGHTING CIRCUIT HOME RUN SHALL BE 3.5 mm AND INSULATED FOR 600 VOLTS. SMALLEST RACEWAY SHALL BE 15 mm2 TRADE/NOMINAL SIZE. LIKEWISE ALL ELECTRICAL WIRES SHALL BE COLOR CODED.
5. ALL OUTLET BOXES SHALL BE GALVANIZED GAGE NO. 16 DEEP TYPE WITH FACTORY KNOCKOUTS.
6. ALL MATERIALS TO BE USED SHALL BE BRAND NEW AND APPROVED TYPE FOR THE PARTICULAR LOCATION AND PURPOSE OF USAGE.
7. EQUIPMENT GROUNDING SYSTEM SHALL BE PROVIDED TO ELECTRICAL SYSTEM AS PER ELECTRICAL CODE REQUIREMENT.
8. MOUNTING HEIGHT OF WIRING DEVICES SHALL BE AS FOLLOWS :

| | | | |
|---|---|---|---|
| a. | LIGHT SWITCH | - | 1.20 M ABOVE FINESHED FLOOR |
| b. | CONVENIENCE OUTLET | - | 0.30 M ABOVE FINISHED FLOOR |
| c. | PANELBOARD | - | 1.50 M ABOVE FINISHED FLOOR |
| d. | FIRE ALARM STATION OUTLET | - | 1.50 ABOVE FINISHED FLOOR |
| e. | PUSH BOTTON OUTLET | - | 1.20 M ABOVE FINISHED FLOOR |
| f. | FIRE ALARM AND VIBRATING BELL | - | 0.30 M BELOW CEILING LINE |

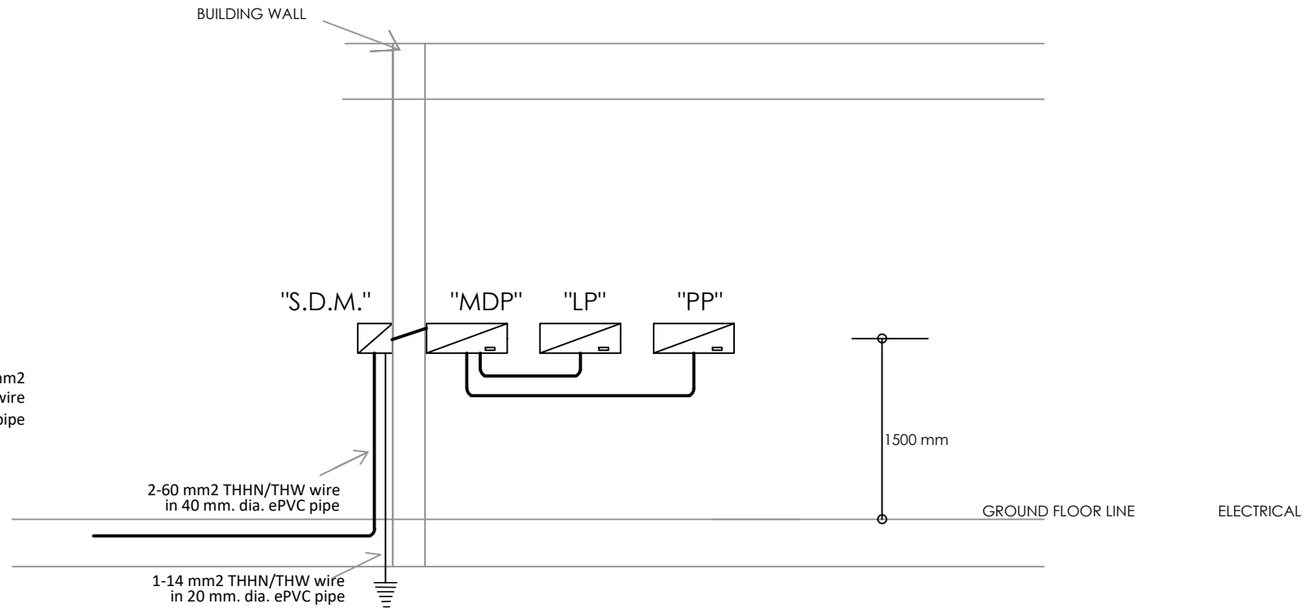
## 2 E-5 LEGEND AND SYMBOLS
NOT TO SCALE

- LED STRIP LIGHTS TRICOLOR
- 3 WATTS SQUARE PIN LIGHT
- 7 WATTS CIRCULAR PINLIGHT
- 9 WATTS CYLINDRICAL SURFACE MOUNTED LIGHTS ( FOR OUTDOOR CEILING LIGHTS )
- 1x40 WATTS T8 LED IN LOUVER TYPE SURFACE MOUNT LIGHTING FIXTURE 1"X48"
- 2x40 WATTS T8 LED IN LOUVER TYPE SURFACE MOUNT LIGHTING FIXTURE 12"X48"
- EXHAUST FAN
- EMERGENCY LIGHT WITH BATTERY BACK–UP POWER SOURCE
- $S_1$ ONE GANG SWITCH WITH LED INDICATOR
- $S_2$ TWO GANG SWITCH WITH LED INDICATOR
- $S_3$ THREE GANG SWITCH WITH LED INDICATOR
- $3wS1$ THREE WAY ONE GANG SWITCH
- $3wS2$ THREE WAY TWO GANG SWITCH
- DUPLEX RECEPTACLE OUTLET WITH GROUND PRONG
- TABLE POP UP DUPLEX RECEPTACLE OUTLET WITH GROUND
- CH DUPLEX RECEPTACLE OUTLET WITH GROUND PRONG (COUNTER HEIGHT)
- SPO SPECIAL PURPOSE OUTLET WITH GROUND PRONG
- AIRCON OUTLET
- S SMOKE DETECTOR
- H HEAT DETECTOR
- S / MCP FIRE ALARM BELL & MANUAL CALL POINT
- "FACP" FIRE ALARM CONTROL PANEL
- PANEL BOARD WITH NEMA ENCLOSURE

## 3 E-5 SINGLE LINE DIAGRAM
NOT TO SCALE




## 4 E-5 RISER DIAGRAM
NOT TO SCALE



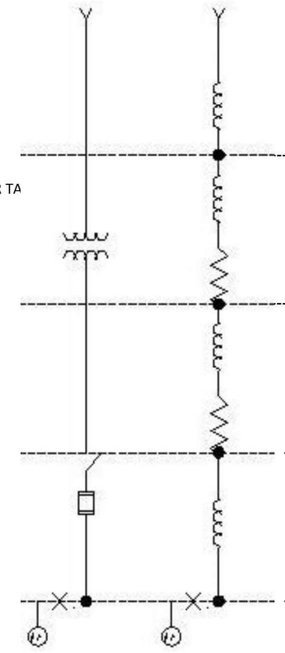

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| LEYTE STATE UNIVERSITY | TIN: | Prepared by: | PROJECT TITLE: | CHECKED / APPROVED BY: | CONFORMED / APPROVED BY: | APPROVED BY: | SHEET CONTENT: | DESIGNED BY: | E7 02 |
| | PRC: 0059366 | | **CONSTRUCTION OF VSU POWER PLANT BUILDING** | **ENGR. MARIO LILIO P. VALENZONA** | **DR. DANIEL LESLIE S. TAN** | **DR. EDGARDO E. TULIN** | GENERAL NOTES AND SPECIFICATIONS<br>LEGEND AND SYMBOLS<br>SINGLE LINE DIAGRAM<br>RISER DIAGRAM | CADD BY: | SHEET NO. |
| | PTR: | **Engr. CLINT C. SARVIDA** | | | | | | STARTED: | 07 07 |
| | DATE: 09/30/2015 | | LOCATION: VSU MAIN CAMPUS, BAYBAY CITY, LEYTE PHILIPPINES, 6521 - A | DIRECTOR, PPO | VP OF ADMINISTRATIVE AND FINANCE | VSU PRESIDENT | | FINISHED: | |
| | PLACE: Ormoc City | Electrical Engineer II | | | | | | PLACE: | |

ELECTRICAL

## TRANSFORMER TO MDP

ONE LINE DIAGRAM / IMPEDANCE DIAGRAM

SYSTEM VOLTAGE = 240 V
BASE KVA = 10000 KVA



| | | PUR | PUX |
|---|---|---|---|
| AVAILABLE UTILITY S.C. MVA= 1000 | $PUX = \frac{10000}{1000000} = 0.01$ | --- | |
| | $PUX = 2 \times 0.01 = 0.02$ (FOR SINGLE PHASE SYSTEM) | --- | 0.02 |
| 25 KVA TRANSFORMER 240 V, SINGLE PHASE (CENTER TA | $PUX = \frac{1}{100}\left[\frac{1.6000}{25}\right]\left[10000\right] = 6.400$ | --- | 6.4000 |
| 1.6 %X 1.2 %R | $PUR = \frac{1}{100}\left[\frac{1.2000}{25}\right]\left[10000\right] = 4.800$ | 4.8000 | --- |
| 98.43 FEET - 60mm2(2/0 AWG) THHN/THW WIRES IN 40 MM.DIA. PVC PIPE | $PUX = \frac{2 \times \frac{98.43}{1000} \times \frac{0.0327}{1} \times 10000}{\frac{1000}{0.24^2}} = 1.1175$ | --- | 1.1175 |
| | $PUR = \frac{2 \times \frac{98.43}{1000} \times \frac{0.0812}{1} \times 10000}{\frac{1000}{0.24^2}} = 2.7750$ | 2.7750 | --- |
| 150 AT, 2 P, MCCB | $PUX = \frac{2 \times \frac{0.0005}{1000}\left[10000\right]}{0.24^2} = 0.1736$ | --- | 0.1736 |
| | TOTAL PUR and PUX = | 7.5750 | 7.7311 |

$PUZ = \sqrt{7.575^2 + 7.731^2} = 10.824$

$I_{S.C.\ sym.\ RMS} = \frac{10000}{1 \times 0.240 \times 10.824} = 3849.5861$ A

$I_{sym.\ Motor\ contr.} = 4.000 \times 90.20 = 360.80$ **A**

$I_{Total\ S.C.\ sym.\ RMS.} = 3849.59 + 360.8 = \mathbf{4,210.39}$ **A**

$X/R_{RATIO} = \frac{7.7311}{7.575} = 1.0206076$

ASYM FACTOR = 1.0020082 ( TABLE 8 )

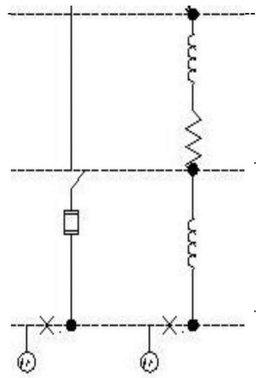
$I_{S.C.\ Asym.\ RMS.} = 3849.59 \times 1.002008 = 3,857.32$ **A**

$I_{Asym.\ Motor\ contr.(100\%\ motor\ load)} = 5 \times 90.200 = 451.00$ **A**

$I_{Total\ S.C.\ Asym.\ RMS.} = 3857.32 + 451.0000 = \mathbf{4,308.32}$ **A**

**Use:** **10 KAIC rating, Circuit Breaker SSC protection**

## MDP TO SUB-PANEL PP



| | | PUR | PUX |
|---|---|---|---|
| 9.84 FEET - 38mm2(1 AWG) THHN/THW WIRES IN 40 MM.DIA. PVC PIPE | $PUX = \frac{2 \times \frac{9.84}{1000} \times \frac{0.0342}{1} \times 10000}{\frac{1000}{0.24^2}} = 0.1169$ | --- | 0.1169 |
| | $PUR = \frac{2 \times \frac{9.84}{1000} \times \frac{0.129}{1} \times 10000}{\frac{1000}{0.24^2}} = 0.4409$ | 0.4409 | --- |
| 100 AT, 2 P, MCCB | $PUX = \frac{2 \times \frac{0.0007}{1000}\left[10000\right]}{0.24^2} = 0.243$ | --- | 0.2431 |
| | TOTAL PUR and PUX = | 8.0159 | 8.0911 |

$PUZ = \sqrt{8.016^2 + 8.091^2} = 11.389$

$I_{S.C.\ sym.\ RMS} = \frac{10000}{1 \times 0.240 \times 11.389} = 3,658.345$ A

$I_{sym.\ Motor\ contr.} = 4.000 \times 90.20 = 360.80$ **A**

$I_{Total\ S.C.\ sym.\ RMS.} = 3658.345 + 360.8 = \mathbf{4,019.14}$ **A**

$X/R_{RATIO} = \frac{8.091}{8.016} = 1.0094$

ASYM FACTOR = 1.0019061 ( TABLE 8 )

$I_{S.C.\ Asym.\ RMS.} = 3658.345 \times 1.0019061 = 3,659.35$ **A**

$I_{Asym.\ Motor\ contr.(100\%\ motor\ load)} = 5.000 \times 90.200 = 451.00$ **A**

$I_{Total\ S.C.\ Asym.\ RMS.} = 3659.35 + 451 = \mathbf{4,110.35}$ **A**

**Use:** **8 KAIC rating, Circuit Breaker SSC protection**

1 / E-8 SHORT CIRCUIT ANALYSIS NOT TO SCALE

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| TIN: | Prepared by: | | PROJECT TITLE: | CHECKED / APPROVED BY: | CONFORMED / APPROVED BY: | APPROVED BY: | SHEET CONTENT: | DESIGNED BY: | E8 01 |
| PRC: 0059366 | | | CONSTRUCTION OF VSU POWER PLANT BUILDING | ENGR. MARIO LILIO P. VALENZONA | DR. DANIEL LESLIE S. TAN | DR. EDGARDO E. TULIN | SHORT CIRCUIT ANALYSIS | CADD BY: | |
| PTR: | | | | | | | | STARTED: | SHEET NO. |
| DATE: 09/30/2015 | Engr. CLINT C. SARVIDA | | | | | | | FINISHED: | 26 27 |
| PLACE: Ormoc City | Electrical Engineer II | | LOCATION: VSU MAIN CAMPUS, BAYBAY CITY, LEYTE PHILIPPINES, 6521 - A | DIRECTOR, PPO | VP OF ADMINISTRATIVE AND FINANCE | VSU PRESIDENT | | PLACE: | |

1ST **LOCATION POINTS** **FROM:** TRANSFORMER TO MDP

| | |
|---|---|
| **SYSTEM TYPE:** | SINGLE PHASE |
| **SYSTEM VOLTAGE TYPE (SECONDARY):** | DUAL VOLTAGE |
| **VOLTAGE (VOLTS):** | 240 |
| **MATERIAL TYPE OF THE WIRE:** | COPPER |
| **WIRE SIZE:** | 60 mm2 (2/0 AWG) |
| **NUMBER OF PARALLEL CONDUCTORS:** | 1 |
| **DISTANCE IN METERS (ONE WAY):** | 30 |
| **INSTALLATION TYPE:** | PVC CONDUIT |
| **LOAD DETAILS** | |
| **LOAD CURRENT (AMPERE):** | 112.54 |
| **DESIRED VOLTAGE DROP PERCENTAGE:** | |
| **DESIRED VD PERCENTAGE (%VD):** | 2 |
| **TEMPERATURE AT CONDUCTOR(°c):** | 75 |

**FORMULA FOR VOLTAGE DROP (VD):**

$$\text{VOLTAGE DROP (VD)} = \frac{A \times I \times L \times \sqrt{R^2 + X^2}}{n}$$

where:

VD - is the L-N Voltage drop
I - Load current
L - Length of conductor
R- Resistance of the conductor
(using table having resistance(R) value every 305 meters @ 75 deg.celsius)
X- Reactance of the conductor
(using table having reactance(X) value every 305 meters @ 75 deg. celsius)
n- Number of parallel conductors
A - is 2 for single phase and 1.732 for three phase

**TEMPERATURE-RESISTANCE FORMULA:**

$R_2 = R_{REF}(1+\dot{\alpha}_{REF}(T_2-T_{REF}))$

$\dot{\alpha}_{REF}$ = Temperature Coefficient of Resistance at some reference temperature ( usually 0 $^{O}$C or 20$^{o}$C)

$\dot{\alpha}_{20^{O}C}$ = 0.00386 for copper (@ 20 deg.celsius)
0.00429 for aluminum (@ 20 deg.celsius)

A. FROM: TRANSFORMER TO: MDP

$$\text{VOLTAGE DROP (VD)} = \frac{2 \times 112.54 \times 30 \times \sqrt{0.100^2 + 0.043^2}}{1 \times 305}$$

$$\text{VOLTAGE DROP (VD)} = \frac{735.0198}{305}$$

VOLTAGE DROP(VP) = 2.410 V

CONSIDERING TEMPERATURE EFFECTS:

$R_{75} = R_{20^{O}C}(1+\dot{\alpha}_{20^{O}C}(T_{75^{O}C}-T_{20^{O}C}))$

2.410 = $R_{20^{O}C}$ ( 1 + .00386 x ( 75 - 20 ))

$R_{20^{O}C}$ = 1.988

(FINAL VD) $R_{T2}$ = 1.988 ( 1 + .00386 x ( 75 - 20 ))

(FINAL VD) $R_{T2}$ = 2.410 V

RECEIVING VOLTAGE = SENDING VOLTAGE - VOLTAGE DROP
= 240.00 - 2.410 V
= 237.590 V

$$\%VD = \frac{2.4099}{240}$$ %

%VD = 1.004 %

ASSESSMENT = PASSED

**2nd LOCATION POINT--** **FROM:** MDP TO PP

| | |
|---|---|
| **SYSTEM TYPE:** | SINGLE PHASE |
| **SYSTEM VOLTAGE TYPE (SECONDARY):** | L-L ( DUAL VOLTAGE ) |
| **VOLTAGE (VOLTS):** | 118.795 |
| **MATERIAL TYPE OF THE WIRE:** | COPPER |
| **SIZE:** | 38 mm2 (1 AWG) |
| **NUMBER OF PARALLEL CONDUCTORS:** | 1 |
| **DISTANCE IN METERS (ONE WAY):** | 3 |
| **INSTALLATION TYPE:** | PVC CONDUIT |
| **LOAD DETAILS** | |
| **LOAD CURRENT (AMPERE):** | 90.32 |
| **DESIRED VOLTAGE DROP PERCENTAGE:** | |
| **PERCENTAGE (%VD):** | 1 |
| **TEMPERATURE AT CONDUCTOR(°c):** | 75 |

B. FROM: MDP TO: PP

$$\text{VOLTAGE DROP (VD)} = \frac{2 \times 90.32 \times 3 \times \sqrt{0.15^2 + 0.046^2}}{1 \times 305}$$

$$\text{VOLTAGE DROP (VD)} = \frac{85.0245}{305}$$

VOLTAGE DROP(VP) = 0.279 V

CONSIDERING TEMPERATURE EFFECTS:

$R_{75} = R_{20^{O}C}(1+\dot{\alpha}_{20^{O}C}(T_{75^{O}C}-T_{20^{O}C}))$

0.279 = $R_{20^{O}C}$ ( 1 + .00386 x ( 75 - 20 ))

$R_{20^{O}C}$ = 0.230

(FINAL VD) $R_{T2}$ = 0.230 ( 1 + .00386 x ( 75 - 20 ))

(FINAL VD) $R_{T2}$ = 0.279 V

RECEIVING VOLTAGE = SENDING VOLTAGE - VOLTAGE DROP
= 118.80 - 0.279 V
= 118.516 V

$$\%VD = \frac{0.2788}{118.7950}$$ %

%VD = 0.2347 %

ASSESSMENT = PASSED

1 / E-9 VOLTAGE DROP ANALYSIS NOT TO SCALE

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TIN: | Prepared by: | | PROJECT TITLE: | CHECKED / APPROVED BY: | CONFORMED / APPROVED BY: | APPROVED BY: | SHEET CONTENT: | DESIGNED BY: |
| PRC: 0059366 | | | **CONSTRUCTION OF VSU POWER PLANT BUILDING** | | | | SCHEDULE OF LOADS | CADD BY: |
| PTR: | | | | **ENGR. MARIO LILIO P. VALENZONA** | **DR. DANIEL LESLIE S. TAN** | **DR. EDGARDO E. TULIN** | | STARTED: |
| DATE: 09/30/2015 | **Engr. CLINT C. SARVIDA** | | | | | | | FINISHED: |
| PLACE: Ormoc City | Electrical Engineer II | | LOCATION: VSU MAIN CAMPUS, BAYBAY CITY, LEYTE PHILIPPINES, 6521 - A | DIRECTOR, PPO | VP OF ADMINISTRATIVE AND FINANCE | VSU PRESIDENT | | PLACE: |

E9 01 SHEET NO. 27 27