SCHEDULE OF LOADS

PANEL LOAD SCHEDULE

PANEL DESIGNATION : **PB** | MOUNTING LOCATION : **ELECTRICAL ROOM** | VOLTAGE SYSTEM : **230 V, 1Ø, 60Hz**

AREA/EQPT SERVED : **MATERIAL RECOVERY FACILITY** | MOUNTING METHOD : **WALL MOUNTED** | WIRE : **2W + G**

FEED FROM : **MCB** | FEED TYPE : **CONDUIT** | ENCLOSURE : **NEMA ENCL.**

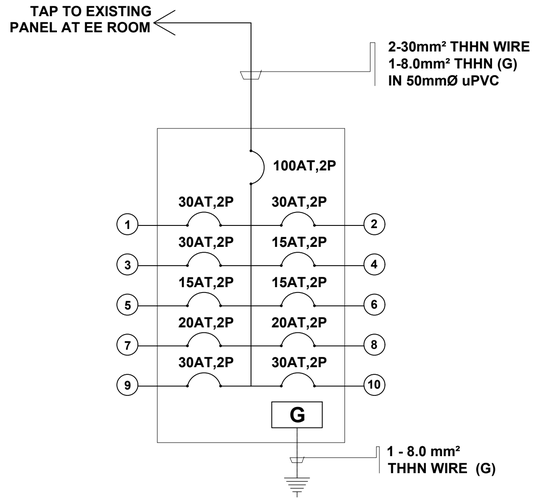
CKT. NO.		LOAD DESCRIPTION	RATING		LOAD DISTRIBUTION, KVA				CIRCUIT BREAKER					DECIDED WIRE SIZE				GRD-WIRE SIZE		DECIDED PIPE		LENGTH	PERMIT	I.L.	P.F.	D.F.	VOLTAGE DROP	
			KW	KVA	AN	BN	CN	3ø	TYPE	KAIC	POLE	AT	AF	xC	(mm²)	A(mm²)	TYPE	(mm²)	TYPE	mmØ	TYPE	Meter	V-Drop	Amp.			e(V)	%V
1	1	INDUCTION MOTOR 3 HP (BIOMAS CRUSHER)	3.13	3.91	3.91				MCCB	10	2	30	50	2	5.5	5.5	THHN	5.5	THHN	25	uPVC	30	4.6	17.00	1	1	3.25	1.41
2	1	INDUCTION MOTOR 3 HP (PLASTIC CRUSHER)	3.13	3.91	3.91				MCCB	10	2	30	50	2	5.5	5.5	THHN	5.5	THHN	25	uPVC	30	4.6	17.00	1	1	3.25	1.41
3	1	INDUCTION MOTOR 3 HP (GLASS CRUSHER)	3.13	3.91	3.91				MCCB	10	2	30	50	2	5.5	5.5	THHN	5.5	THHN	25	uPVC	30	4.6	17.00	1	1	3.25	1.41
4	4	LIGHTING OUTLET	0.32	0.40	0.40				MCCB	10	2	15	50	2	2	2	THHN	2	THHN	20	uPVC	30	4.6	1.74	1	1	0.92	0.40
5	4	LIGHTING OUTLET	0.32	0.40	0.40				MCCB	10	2	15	50	2	2	2	THHN	2	THHN	20	uPVC	30	4.6	1.74	1	1	0.92	0.40
6	4	LIGHTING OUTLET	0.32	0.40	0.40				MCCB	10	2	15	50	2	2	2	THHN	2	THHN	20	uPVC	30	4.6	1.74	1	1	0.92	0.40
7	4	CONVENIENCE OUTLET	0.58	0.72	0.72				MCCB	10	2	20	50	2	3.5	3.5	THHN	3.5	THHN	20	uPVC	30	4.6	3.13	1	1	0.94	0.41
8	4	CONVENIENCE OUTLET	0.58	0.72	0.72				MCCB	10	2	20	50	2	3.5	3.5	THHN	3.5	THHN	20	uPVC	30	4.6	3.13	1	1	0.94	0.41
9	1	SPARE	0.40	0.50	0.50				MCCB	10	2	30	50	2	5.5	5.5	THHN	5.5	THHN	25	uPVC	30	4.6	2.17	1	1	0.42	0.18
10	1	SPARE	0.40	0.50	0.50				MCCB	10	2	30	50	2	5.5	5.5	THHN	5.5	THHN	25	uPVC	30	4.6	2.17	1	1	0.42	0.18
TOTAL			**12.30**	**15.37**	**15.37**	**0.00**	**0.00**	0.00																					

TOTAL PANEL LOAD	=	15.37	KVA
DEMAND FACTOR	=	100.00	%
TOTAL DEMAND LOAD	=	15.37	KVA
TOTAL CURRENT LOAD	=	71.08	AMPS

MAIN PROTECTION: **2P - 100AT/100AF MCCB**

MAIN FEEDER SIZE: **2 - 30mm² THHN + 1 - 8.0mm² THHN (G) in 50mmø uPVC**

2	30	30	THHN	8	THHN	50	uPVC	30	6.9	71.08	1	1	2.49	1.08



SINGLE LINE DIAGRAM

SCALE: NTS

DESIGN COMPUTATION

$I_T = \frac{PB + (0.25 \times LM)}{0.23}$ KVA / KV

$I_T = \frac{15.37 + (0.25 \times 3.91)}{0.23}$ KVA / KV

I_T = **71.08** AMPS

FOR MAIN SERVICE ENTRANCE EQUIPMENT:

USE: 2P - 100AT/100AF MCCB IN NEMA ENCLOSURE

FOR MAIN SERVICE ENTRANCE CONDUCTOR:

USE: 2 - 30mm² THHN + 1 - 8.0mm² THHN (G) in 50mmø uPVC

VOLTAGE DROP CALCULATION: PB

VD = $\frac{1.732 \times L \times I}{X \times A}$ (For 3Ø); $\frac{2 \times L \times I}{X \times A}$ (For 1Ø)

%VD= (VD/V) x 100

Where:

VD - Voltage Drop

\- Constant for 3Ø = 1.732 (constant value)

\- Constant for 1Ø = 2 (constant value)

L - Single Length of Conductor = 30 meters

I - Current in Ampere = 71.08 amps

X - Conductivity, 57m/omh mm² = 57 ohm/mm² (constant value for copper wire)

A - Single Conductor Cross Section = 30 mm²

\- System Voltage = 230 volts

For 1Ø,

VD = 2.49 volts

%VD = 1.08 % (3% and 2% allowable allowance for feeder and branch respectively)

Project: CONSTRUCTION OF MATERIAL RECOVERY FACILITY
Location: TAGONGTONG, GOA, CAMARINES SUR
Owner: PHILIPPINE SCIENCE HIGHSCHOOL

Short Circuit Calculation

DATA: Fault Empirical Data, Available Fault MVA at EE Room : 0.05; Transformer Impedance : 2; L-L Voltage : 230; Phase : 1

Length (feet) of conduit to the fault No. 1 : 15 m = 49.2 ft
Length (feet) of conduit to the fault No. 2 : 45 m = 147.6 ft
Size of conductors use : 30 mm² = 2 AWG
Number of conductor per phase : 1

Fault No.1

Step - 1 $I_{FLA} = \frac{KVA \times 1000}{E_{L-L}}$ — $I_{FLA} = \frac{50 \times 1000}{230}$ = **217.39 A**

Step - 2 Multiplier = $\frac{1000}{\text{Transformer \%Z}}$ — Multiplier = $\frac{100}{2}$ = **50.00**

Step - 3 $I_{SCA(L-L-L)} = I_{FLA} \times$ Multiplier — $I_{SCA(L-L-L)} = 217.39 \times 50$ = **10,869.57 A**
1 phase Short Circuit Current at Transformer Secondary

Step - 4 $f = \frac{L \times I_{L-L-L}}{C \times n \times E_{L-L}}$ — $f = \frac{49.2 \times 10,869.57}{5,907 \times 1 \times 230}$ = **0.394**

Where: f = fault factor
L = length (ft) of conduit to the fault
C = Conductors constant, see **Table - 1**
n = number of conductors per phase
I = available short circuit current in amperes at beginning of circuit

Step - 5 $M = \frac{1}{1+f}$ — $M = \frac{1}{1 + 0.394}$ = **0.718**

Where: M = multiplier
f = fault factor

Step - 6 $I_{SCA} = I_{SCA(L-L-L)} \times M$ — $I_{SCA} = 10,869.57 \times 0.718$ = **7,799.49 A**
1 phase Short Circuit Current at Fault - 1 — **Fault No.1**

Fault No.2

(Use $I_{SCA(L-L-L)}$ x at Fault No. 1 to calculate)

Step - 4 $f = \frac{L \times I_{L-L-L}}{C \times n \times E_{L-L}}$ — $f = \frac{147.6 \times 7,799.49}{617 \times 1 \times 230}$ = **8.112**

Step - 5 $M = \frac{1}{1+f}$ — $M = \frac{1}{1 + 8.112}$ = **0.110**

Step - 6 $I_{SCA} = I_{SCA(L-L-L)} \times M$ — $I_{SCA} = 7,799.49 \times 0.110$ = **855.94 A**
1 phase Short Circuit Current at Fault - 2 — **Fault No.2**

Copper	
AWG	Three Single Conductors conduit 600V
14	389
12	617
10	981
8	1,557
6	2,425
4	3,806
3	4,774
2	5,907
1	7,293
1/0	8,925
2/0	10,755
3/0	12,844
4/0	15,082
250	16,483
300	18,177
350	19,704
400	20,566
500	22,185
600	22,965
750	24,137
1000	25,278

USE 10 kAIC FOR MAIN CB

USE 6 kAIC MIN FOR BRANCH CB

P.E.E. : ARNOLD C. REONAL
PRC Reg. No : 3776
PTR No. : 9368103
Issued on : January 8, 2021
Issued at : PTO-Cam Sur

PHILIPPINE SCIENCE HIGH SCHOOL BICOL REGION CAMPUS

LOCATION: PSHS-BRC, BRGY. TAGONGTONG, GOA, CAMARINES SUR, PHILIPPINES

CERTIFIED BY:

ENGR. ARNOLD C. REONAL
PROFESSIONAL ELECTRICAL ENGINEER

PRC NO. 3776 | PTR NO.: 9368103
T I N: 928-553-648 | DATE/PLACE ISSUED: 1/08/21 PTO-C.S

REGISTERED PROFESSIONAL ENGINEER PHILIPPINES — ARNOLD C. REONAL — LIC. NO. 3776 — ELECTRICAL ENGINEER

PROJECT TITLE & LOCATION:
CONSTRUCTION OF MATERIAL RECOVERY FACILITY
LOCATION : TAGONGTONG, GOA, CAMARINES SUR

RECOMMENDING APPROVAL:
JAY P. BASSIG
FAD CHIEF

APPROVED BY:
LORVI B. PAGOROGON, RPAE, MHWQ
CAMPUS DIRECTOR

SHEET CONTENTS: **AS SHOWN**

DESIGNED BY: ARNOLD C. REONAL
CADD BY:
CHECKED BY:
FILENAME:

SHEET NO. **E 2 2**

DATE: SEPT. 22, 2021